

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-11183-MR
ADDRESS: 524 28 1/2 ROAD

SEPTEMBER 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
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September 25, 1985

REA11183:REA-KL025

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-11183-MR, is a single-family residence located at 524 28 1/2 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 select removal of contaminated material and restoration of the property to its original condition. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 80 cu. yd.; interior, 18 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$12,751. Remedial action on this property will take approximately 14 days to complete.

Area A will not be included in this remedial action, as discussed in Section 4.0 of this REA.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 524 28 1/2 Road, Grand Junction, Colorado

Zoning: Residential (RMF-16)

Lot Size: Approximately 8,093 sf (0.19 acres)

Legal Description: Lot 1, Ireland Subdivision, Section 7, T1S, R1E, U.M., City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 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: | Overhead |

Bordering Properties:

| | |
|--------|-------------------------|
| North: | Elm Avenue |
| South: | Single-family residence |
| East: | Single-family residence |
| West: | 28 1/2 Road |

2.2 Existing Facilities and Structures

Primary Structure:

| | |
|--------------------|---|
| Type: | Single-family residence |
| Size: | Approximately 1,093 sf |
| Construction Date: | 1918 |
| Construction: | Wood-frame with T&G siding |
| Foundation: | Cobblestone wall on a concrete footing, except the southeast corner of the structure is a slab-on-grade |
| Footing Depth: | Approximately 8" to bottom of footing from grade |
| Basement: | None |
| Crawl Space: | Yes, except area with slab-on-grade |
| Condition: | Good |

Other Structures:

| | |
|---------------|--|
| Type: | Garage and storage shed |
| Size: | Approximately 611 sf |
| Construction: | Wood-frame with T&G siding and wood-lap siding |
| Foundation: | Slab-on-grade |
| Condition: | Fair |

General Remarks:

The storage shed noted as Area D is in poor condition. A lot of paraphernalia is stored in the shed and garage. Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

This structure is over 50 years old. Therefore, it does meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

Alterations to Structure: A concrete slab-on-grade was poured at the southeast corner of the structure. This was enclosed to make a dining room.

Architectural Significance: None known.

Historical Significance: None known.

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-11183-MR on July 15, 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.

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: 15 to 17 uR/h
Highest Outside Gamma Reading (HOG): 369 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results are shown in Appendix Figure 3.1.

3.2.2 Interior Findings

Background Readings: 14 to 17 uR/h
Highest Inside Gamma Reading (HIG): 20 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 3.2 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; these areas 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: 0.008 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: Interior
 Other Directions: Southeast room of primary structure
 Total Depth of Contamination: Estimated at 12 inches
 Other (height or thickness): 4-inch-thick concrete
 Comments: The depth of contamination is based on data collected in adjacent exterior areas.
 Approximate Square Footage: 208; this Area is excluded from remedial action.
- (Area B) Surface Material: Concrete
 Direction From Primary Structure: Southeast
 Other Directions: Floor of shed
 Total Depth of Contamination: Estimated at 12 inches
 Other (height or thickness): 4-inch-thick concrete
 Comments: The depth of contamination is based on data collected in Area D.
 Approximate Square Footage: 170
- (Area C) Surface Material: Concrete
 Direction From Primary Structure: Southeast
 Other Directions: Garage floor
 Total Depth of Contamination: Estimated at 12 inches
 Other (height or thickness): 4-inch-thick concrete
 Comments: The depth of contamination is based on data collected in Area K. The contamination may extend further south than surface gamma readings indicate.
 Approximate Square Footage: 176
- (Area D) Surface Material: Soil
 Direction From Primary Structure: Southeast
 Other Directions: In shed
 Total Depth of Contamination: 12 inches
 Approximate Square Footage: 80
- (Area E) Surface Material: Lawn
 Direction From Primary Structure: East and northeast
 Total Depth of Contamination: 6 inches
 Approximate Square Footage: 640

- (Area F) Surface Material: Lawn
Direction From Primary Structure: East
Other Directions: North of garage
Total Depth of Contamination: 12 inches
Approximate Square Footage: 390
- (Area G) Surface Material: Lawn and gravel
Direction From Primary Structure: East
Other Directions: Adjacent to Area F
Total Depth of Contamination: 9 inches
Approximate Square Footage: 383
- (Area H) Surface Material: Lawn
Direction From Primary Structure: Northeast
Other Directions: Surrounded by Area E
Total Depth of Contamination: 12 inches
Approximate Square Footage: 104
- (Area I) Surface Material: Soil
Direction From Primary Structure: Southeast
Other Directions: North of garage
Total Depth of Contamination: Estimated at 12 inches
Comments: The depth of contamination is based on data collected in Area F.
Approximate Square Footage: 36
- (Area J) Surface Material: Gravel
Direction From Primary Structure: South and southeast
Other Directions: South, east, and west of garage
Total Depth of Contamination: 6 inches
Approximate Square Footage: 567
- (Area K) Surface Material: Concrete
Direction From Primary Structure: South
Other Directions: West and north of garage
Total Depth of Contamination: 12 inches
Other (height or thickness): 4-inch-thick concrete
Comments: The contamination may extend beneath the concrete south of this area.
Approximate Square Footage: 297
- (Area L) Surface Material: Soil
Direction From Primary Structure: South
Other Directions: Along south foundation
Total Depth of Contamination: 9 inches
Approximate Square Footage: 40
- (Area M) Surface Material: Soil
Direction From Primary Structure: South
Other Directions: Along south foundation
Total Depth of Contamination: 6 inches
Approximate Square Footage: 130

- (Area N) Surface Material: Flagstone
Direction From Primary Structure: East
Other Directions: West of Area F, along east foundation
Total Depth of Contamination: Estimated at 12 inches
Comments: The depth of contamination is based on data collected in Area F.
Approximate Square Footage: 40
- (Area O) Surface Material: Soil
Direction From Primary Structure: East
Other Directions: West of Area F, along east foundation
Total Depth of Contamination: Estimated at 12 inches
Comments: The depth of contamination is based on data collected in Area F.
Approximate Square Footage: 48
- (Area P) Surface Material: Soil
Direction From Primary Structure: West
Other Directions: East of Area S, along west foundation
Total Depth of Contamination: 9 inches
Approximate Square Footage: 16
- (Area Q) Surface Material: Concrete
Direction From Primary Structure: West
Other Directions: North of Area S, along foundation
Other (height or thickness): Estimated at 15 inches
Comments: The depth of contamination is based on data collected in Area P.
Approximate Square Footage: 12
- (Area R) Surface Material: Lawn and gravel
Direction From Primary Structure: West, along foundation
Total Depth of Contamination: Estimated at 9 inches
Comments: The depth of contamination for these two deposits is based on data collected in Area S.
Approximate Square Footage: 153
- (Area S) Surface Material: Concrete
Direction From Primary Structure: West
Other Directions: West of Area M
Total Depth of Contamination: 9 inches
Other (height or thickness): 4-inch-thick concrete
Comments: The soil beneath the concrete east of this area should be monitored during remedial action.
Approximate Square Footage: 83
- (Area T) Surface Material: Lawn
Direction From Primary Structure: Northwest
Other Directions: Northwest property corner
Total Depth of Contamination: 9 inches
Approximate Square Footage: 40

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-11183-MR, includes removal of select 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.

Remedial action will not be performed on Area A of this property because the levels of radioactivity in these areas do not exceed the EPA Standards (40 CFR 192), as described below:

- (1) Indoor radon-decay products shall not exceed a working level of 0.03, nor, to the extent possible, a working level of 0.02. (At this property the gross working level, as determined by CTH, is 0.008.)
- (2) Indoor gamma radiation shall not exceed 20 microroentgens per hour (uR/h) above background levels. (At this location the interior background readings were found to be between 14 and 17 uR/h, with the highest mean surface gamma reading at 18 uR/h.)

An indoor RDC measurement shall be completed on this property. If the RDC measurement exceeds EPA Standards, then the REA will be revised and remedial action accomplished in accordance with the Vicinity Property Management and Implementation Manual. If EPA Standards are not exceeded, then the recommendation to exclude Area A will be considered valid, and a Property Completion Report will be prepared for DOE certification.

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 \$12,751.

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

No legal or other complications are foreseen at this time.

Owner preference is as follows:

- 1) That remedial action be completed as soon as possible; and
- 2) That a locker be rented to store frozen food. There is no place in town to provide this service.

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 Grid-Point 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. | | |
| 11 | 148269 | 00 | DS | 3.0 | | * | Water line |
| | | 03 | TC | 4.8 | | * | Northwest of |
| | | 06 | TC | 5.1 | | * | primary structure |
| | | 09 | TC | 4.7 | | * | DC = 9 inches |
| | | 12 | TC | 4.2 | | * | Based on the |
| | | 15 | TC | 3.9 | | * | deconvolution graph |
| | | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.4 | | * | |
| | | 24 | TC | 3.3 | | * | |
| | | 27 | TC | 3.2 | | * | |
| | | 30 | TC | 3.2 | | * | |
| | | 33 | TC | 3.1 | | * | |
| | | 36 | TC | 3.0 | | * | |
| | | 39 | TC | 3.0 | | * | |
| 12 | 160210 | 00 | DS | <1.0 | | * | Background |
| | | 03 | TC | 3.1 | | * | DC = 0 inches |
| | | 06 | TC | 3.4 | | * | |
| | | 09 | TC | 3.5 | | * | |
| | | 12 | TC | 3.6 | | * | |
| | | 15 | TC | 3.6 | | * | |
| | | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.5 | | * | |
| | | 24 | TC | 3.5 | | * | |
| | | 27 | TC | 3.5 | | * | |
| | | 30 | TC | 3.5 | | * | |
| 13 | 175249 | 00 | DS | 1.7 | | * | West of primary |
| | | 06 | DS | 1.3 | | * | structure |
| 14 | 181254 | 00 | DS | 1.7 | | * | West of primary |
| | | 03 | TC | 3.6 | | * | structure |
| | | 06 | TC | 3.6 | | * | DC = 0 inches |
| | | 09 | TC | 3.6 | | * | |
| | | 12 | TC | 3.6 | | * | |
| | | 15 | TC | 3.5 | | * | |
| | | 18 | TC | 3.5 | | * | |
| | | 21 | TC | 3.4 | | * | |
| | | 24 | TC | 3.4 | | * | |
| | | 27 | TC | 3.4 | | * | |
| | | 30 | TC | 3.4 | | * | |
| | | 33 | TC | 3.4 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-11183-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. | | |
| 15 | 183246 | 00 | DS | 68.7 | | * | On west step of primary structure |
| 16 | 184233 | 00 | DS | 2.4 | | * | On sidewalk |
| | | 03 | TC | 5.6 | | * | South of |
| | | 06 | TC | 6.2 | | * | primary structure |
| | | 09 | TC | 5.0 | | * | DC = 9 inches |
| | | 12 | TC | 4.3 | | * | Based on the |
| | | 15 | TC | 3.9 | | * | deconvolution graph |
| | | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.5 | | * | |
| | | 24 | TC | 3.4 | | * | |
| | | 27 | TC | 3.2 | | * | |
| | | 30 | TC | 3.3 | | * | |
| | | 33 | TC | 3.3 | | * | |
| | | 36 | TC | 3.3 | | * | |
| | | 39 | TC | 3.3 | | * | |
| | | 42 | TC | 3.3 | | * | |
| | | 45 | TC | 3.3 | | * | |
| 17 | 185262 | 00 | DS | 1.4 | | * | Gas line |
| | | 24 | DS | 1.4 | | * | |
| 18 | 186245 | [06] | DS | 62.5 | | * | Horizontal on |
| | | 00 | DS | 7.9 | | * | concrete porch |
| | | 03 | TC | 7.6 | | * | West of primary |
| | | 06 | TC | 6.2 | | * | structure |
| | | 09 | TC | 5.1 | | * | DC = 9 inches |
| | | 12 | TC | 4.3 | | * | Based on the |
| | | 15 | TC | 4.0 | | * | deconvolution graph |
| | | 18 | TC | 3.7 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.6 | | * | |
| 19 | 192217 | 00 | DS | 3.2 | | * | In driveway |
| | | | | | | | |
| 20 | 192237 | 00 | DS | 35.3 | | * | South of |
| | | 03 | TC | 6.4 | | * | primary structure |
| | | 06 | TC | 5.4 | | * | DC = 9 inches |
| | | 09 | TC | 4.6 | | * | Based on the |
| | | 12 | TC | 4.0 | | * | deconvolution graph |
| | | 15 | TC | 3.6 | | * | |

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. | | |
| 20 | 192237 | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.4 | | * | |
| | | 24 | TC | 3.5 | | * | |
| 21 | 201263 | 03 | TC | 3.1 | | * | Water line DC = 0 inches |
| | | 06 | TC | 3.3 | | * | |
| | | 09 | TC | 3.4 | | * | |
| | | 12 | TC | 3.4 | | * | |
| | | 15 | TC | 3.4 | | * | |
| | | 18 | TC | 3.4 | | * | |
| | | 21 | TC | 3.4 | | * | |
| | | 24 | TC | 3.4 | | * | |
| | | 27 | TC | 3.2 | | * | |
| | | 30 | TC | 3.3 | | * | |
| | | 33 | TC | 3.3 | | * | |
| | | 36 | TC | 3.4 | | * | |
| | | 39 | TC | 3.3 | | * | |
| | | 42 | TC | 3.3 | | * | |
| | | 45 | TC | 3.3 | | * | |
| | | 48 | TC | 3.3 | | * | |
| | | 51 | TC | 3.3 | | * | |
| | | 54 | TC | 3.3 | | * | |
| 22 | 202236 | 00 | DS | 2.8 | | * | South of primary structure |
| | | 06 | DS | 2.4 | | * | |
| 23 | 207217 | 00 | DS | 3.2 | | * | In driveway |
| | | 06 | DS | 1.8 | | * | |
| 24 | 208234 | 00 | DS | 5.6 | | * | South of primary structure Horizontal under sidewalk |
| | | 06 | DS | 1.4 | | * | |
| | | 06 | DS | 1.4 | | * | |
| 25 | 213217 | 06 | DS | 1.7 | | * | Horizontal |
| 26 | 213235 | 03 | TC | 4.4 | | * | Sewer line DC = 9 inches Based on all available data |
| | | 06 | TC | 4.4 | | * | |
| | | 09 | TC | 4.4 | | * | |
| | | 12 | TC | 4.1 | | * | |

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. | | |
| 26 | 213235 | 12 | TC | 4.1 | | * | |
| | | 15 | TC | 3.9 | | * | |
| | | 18 | TC | 3.8 | | * | |
| | | 21 | TC | 3.5 | | * | |
| | | 24 | TC | 3.5 | | * | |
| | | 27 | TC | 3.5 | | * | |
| | | 30 | TC | 3.6 | | * | |
| | | 33 | TC | 3.6 | | * | |
| | | 36 | TC | 3.6 | | * | |
| | | 39 | TC | 3.6 | | * | |
| | | 42 | TC | 3.7 | | * | |
| | | 45 | TC | 3.7 | | * | |
| | | 48 | TC | 3.6 | | * | |
| | | 51 | TC | 3.5 | | * | |
| | | 54 | TC | 3.7 | | * | |
| 27 | 222235 | 00 | DS | 4.1 | | * | South of primary structure DC = 9 inches Based on the deconvolution graph |
| | | 03 | TC | 4.7 | | * | |
| | | 06 | TC | 4.9 | | * | |
| | | 09 | TC | 4.5 | | * | |
| | | 12 | TC | 4.1 | | * | |
| | | 15 | TC | 3.9 | | * | |
| | | 18 | TC | 3.8 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.6 | | * | |
| | | 27 | TC | 3.6 | | * | |
| | | 30 | TC | 3.6 | | * | |
| | | 33 | TC | 3.6 | | * | |
| | | 36 | TC | 3.6 | | * | |
| 28 | 232222 | 00 | DS | 2.9 | | * | West of garage DC = 12 inches Based on the deconvolution graph |
| | | 03 | TC | 5.8 | | * | |
| | | 06 | TC | 6.7 | | * | |
| | | 09 | TC | 5.9 | | * | |
| | | 12 | TC | 4.7 | | * | |
| | | 15 | TC | 4.2 | | * | |
| | | 18 | TC | 3.9 | | * | |
| | | 21 | TC | 3.9 | | * | |
| | | 24 | TC | 3.8 | | * | |
| | | 27 | TC | 3.8 | | * | |
| | | 30 | TC | 3.7 | | * | |
| | | 33 | TC | 3.5 | | * | |

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. | | |
| 29 | 233210 | 00 | DS | 4.3 | | * | Southwest corner of garage Horizontal under concrete slab |
| | | 06 | DS | 2.1 | | * | |
| | | 06 | DS | 2.1 | | * | |
| 30 | 235252 | 00 | DS | 10.3 | | * | East yard |
| | | 06 | DS | 3.7 | | * | |
| | | 12 | DS | 2.0 | | * | |
| 31 | 245240 | 00 | DS | 11.6 | | * | East of primary structure DC = 12 inches Based on the deconvolution graph |
| | | 03 | TC | 8.8 | | * | |
| | | 06 | TC | 10.6 | | * | |
| | | 09 | TC | 10.1 | | * | |
| | | 12 | TC | 7.9 | | * | |
| | | 15 | TC | 5.9 | | * | |
| | | 18 | TC | 4.9 | | * | |
| | | 21 | TC | 4.4 | | * | |
| | | 24 | TC | 4.0 | | * | |
| | | 27 | TC | 3.8 | | * | |
| 32 | 249266 | 00 | DS | 2.3 | | * | East yard |
| | | 06 | DS | 1.5 | | * | |
| 33 | 251275 | 00 | DS | 2.7 | | * | Northeast of primary structure |
| | | 06 | DS | 1.4 | | * | |
| 34 | 255244 | 00 | DS | 93.7 | | * | East yard DC = 9 inches Based on the deconvolution graph |
| | | 03 | TC | 63.4 | | * | |
| | | 06 | TC | 42.0 | | * | |
| | | 09 | TC | 23.5 | | * | |
| | | 12 | TC | 10.3 | | * | |
| | | 15 | TC | 8.8 | | * | |
| | | 18 | TC | 6.2 | | * | |
| | | 21 | TC | 5.1 | | * | |
| | | 24 | TC | 4.5 | | * | |
| | | 27 | TC | 4.2 | | * | |
| 35 | 257207 | 00 | DS | 4.2 | | * | South of garage |
| | | 06 | DS | 2.3 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-11183-MR

524 28 1/2 Road

Page 6 of 7

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|--|
| | | | | Tot. Ct | Spectr. | | |
| 36 | 257257 | 00 | DS | 3.6 | | * | North of garage |
| | | 00 | DS | 1.7 | | * | |
| 37 | 257268 | 03 | TC | 147.4 | | * | Northeast of primary structure DC = 12 inches Based on the deconvolution graph |
| | | 06 | TC | 135.6 | | * | |
| | | 09 | TC | 91.1 | | * | |
| | | 12 | TC | 53.4 | | * | |
| | | 15 | TC | 30.0 | | * | |
| | | 18 | TC | 19.4 | | * | |
| | | 21 | TC | 13.7 | | * | |
| | | 24 | TC | 10.4 | | * | |
| | | 27 | TC | 8.4 | | * | |
| | | 30 | TC | 7.5 | | * | |
| | | 33 | TC | 7.1 | | * | |
| | | 36 | TC | 6.7 | | * | |
| | | 39 | TC | 5.9 | | * | |
| | | 42 | TC | 5.6 | | * | |
| | | 45 | TC | 5.3 | | * | |
| | | 48 | TC | 4.8 | | * | |
| | | 51 | TC | 4.2 | | * | |
| | | 54 | TC | 4.1 | | * | |
| | | 57 | TC | 4.0 | | * | |
| | | 60 | TC | 4.0 | | * | |
| | | 63 | TC | 4.1 | | * | |
| | | 66 | TC | 4.4 | | * | |
| 38 | 263210 | 00 | DS | 3.2 | | * | Southeast corner of garage |
| | | 06 | DS | 2.3 | | * | |
| 39 | 263228 | 03 | TC | 12.6 | | * | East of garage DC = 9 inches Based on the deconvolution graph |
| | | 06 | TC | 10.2 | | * | |
| | | 09 | TC | 7.7 | | * | |
| | | 12 | TC | 5.9 | | * | |
| | | 15 | TC | 5.0 | | * | |
| | | 18 | TC | 4.2 | | * | |
| | | 21 | TC | 4.0 | | * | |
| | | 24 | TC | 3.8 | | * | |
| | | 27 | TC | 3.7 | | * | |
| | | 30 | TC | 3.7 | | * | |
| | | 33 | TC | 3.7 | | * | |
| | | 36 | TC | 3.8 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-11183-MR

524 28 1/2 Road

Page 7 of 7

| ===== | | | | | | | |
|----------------|----------|-------|-------|---------|---------|-------------|----------------|
| In Situ Ra-226 | | | | | | | |
| Loc | Grid | Depth | Meas. | (pCi/g) | | Chem Ra-226 | Comments |
| # | Location | (in.) | Type | Tot. Ct | Spectr. | (pCi/g) | |
| ----- | | | | | | | |
| 40 | 265221 | 00 | DS | 13.7 | | * | East of garage |
| | | 06 | DS | 2.9 | | * | |
| ===== | | | | | | | |

Measurement GB = GAD-6 Borehole
Types: GS = GAD-6 Surface
DS = Delta Scintillometer
TC = Total Count Borehole
SS = Soil Sample
BH = Combined GAD-6 and
Total Count Borehole

Notes: DC = Depth of Contamination
* = No Soil Sample Taken
[n] = Reading Taken n-Inches
Above Floor or Ground
Date of Survey = 07-15-85
Team Leader = DF

Radium Concentrations at Interior Locations

DOE ID #GJ-11183-MR

524 28 1/2 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. | | |
| 1 | | 00 | DS | 6.5 | | * | Center of dining room |
| 2 | | 00 | DS | 2.8 | | * | By south wall of dining room |
| 3 | | 00 | DS | 3.2 | | * | By north wall of dining room |
| 4 | | 00 | DS | 80.0 | | * | Inside shed |
| | | 03 | TC | 39.4 | | * | DC = 12 inches |
| | | 06 | TC | 44.2 | | * | Based on the |
| | | 09 | TC | 31.8 | | * | deconvolution graph |
| | | 12 | TC | 20.6 | | * | |
| | | 15 | TC | 13.1 | | * | |
| | | 18 | TC | 9.0 | | * | |
| | | 21 | TC | 7.4 | | * | |
| | | 24 | TC | 6.2 | | * | |
| | | 27 | TC | 5.5 | | * | |
| | | 30 | TC | 5.1 | | * | |
| | | 33 | TC | 4.7 | | * | |
| | | 36 | TC | 4.7 | | * | |
| | | 39 | TC | 5.2 | | * | |
| | | 42 | TC | 4.3 | | * | |
| | | 45 | TC | 4.1 | | * | |
| | | 48 | TC | 4.1 | | * | |
| | | 51 | TC | 4.2 | | * | |
| | | 54 | TC | 4.2 | | * | |
| | | 57 | TC | 4.4 | | * | |
| | | 60 | TC | 4.2 | | * | |
| 5 | | 00 | DS | 38.5 | | * | In shed |
| 6 | | 00 | DS | 26.5 | | * | In shed |
| 7 | | 00 | DS | 1.7 | | * | In shed |
| 8 | | 00 | DS | 3.3 | | * | Garage floor |

Radium Concentrations at Interior Locations

DOE ID #GJ-11183-MR

524 28 1/2 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. | | |
| 9 | | 00 | DS | 9.5 | | * | Garage floor |
| 10 | | 00 | DS | 10.9 | | * | Garage floor |

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 = 07-15-85
Team Leader = DF

| 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 | 14-20 | 18 | 09 | 14-20 | 18 |
| Room B | 08 | 14-17 | 16 | 09 | 14-17 | 16 |
| Room C | 05 | 13-14 | 14 | 05 | 13-14 | 13 |
| Room D | 04 | 13-14 | 14 | 05 | 14-14 | 14 |
| Room E | 09 | 14-18 | 16 | 09 | 14-18 | 16 |
| Room F | 01 | 14-14 | 14 | 01 | 14-14 | 14 |
| Room G | 05 | 14-15 | 14 | 05 | 14-15 | 14 |
| Room H | 05 | 15-23 | 18 | 05 | 15-31 | 20 |
| Room I | 05 | 47-65 | 56 | 05 | 94-167 | 117 |
| Room J | 02 | 37-40 | 39 | 03 | 51-58 | 55 |
| Room K | 05 | 17-38 | 27 | 07 | 16-55 | 37 |
| Garage | 11 | 15-29 | 20 | 12 | 15-35 | 22 |

=====

* Gamma exposure rates and room locations are shown in Appendix Figure 3.2.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11183-MR

Page 1 of 4

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-------------------|-----------------------------|-----------|------------------|-----------|--------------------|
| INTERIOR | | | | | |
| Concrete | | | | | |
| B | 18 x 9 | = 162 | | | |
| | 8 x 1 | = 8 | | | |
| * | 8 x 4 | = 32 | | | |
| | | | | | |
| | | 202 | x 0.3 | = 61 | |
| C** | 29 x 12 | = 348 | x 0.3 | = 104 | |
| | | | | | |
| | Volume of Concrete | | | = 165 | = 165/27 = 6 |
| Contaminated Fill | | | | | |
| B | 18 x 9 | = 162 | | | |
| | 8 x 1 | = 8 | | | |
| | | | | | |
| | | 170 | x 0.7 | = 119 | |
| C | 29 x 4 | = 116 | | | |
| | 5 x 12 | = 60 | | | |
| | | | | | |
| | | 176 | x 0.7 | = 123 | |
| D | 10 x 8 | = 80 | x 1.0 | = 80 | |
| | | | | | |
| | Volume of Contaminated Fill | | | = 322 | = 322/27 = 12 |
| | | | | | |
| | TOTAL VOLUME - INTERIOR | | | | = 18 |

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11183-MR

Page 2 of 4

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-------------|-------------------------|-----------|------------------|-----------|--------------------|
|-------------|-------------------------|-----------|------------------|-----------|--------------------|

EXTERIOR

Concrete

| | | | | | |
|---|---------|---|-----|---|----------|
| K | 15 x 16 | = | 240 | | |
| | 3 x 5 | = | 15 | | |
| | 14 x 3 | = | 42 | | |
| | | | | | |
| | | | 297 | x | 0.3 = 89 |
| Q | 3 x 4 | = | 12 | x | 0.3 = 4 |
| S | 4 x 14 | = | 56 | | |
| | 9 x 3 | = | 27 | | |
| | | | | | |
| | | | 83 | x | 0.3 = 25 |

Volume of Concrete = 118 = 118/27 = 4

Contaminated Fill

| | | | | | |
|---|---------|---|-----|---|-----------|
| E | 5 x 23 | = | 115 | | |
| | 10 x 7 | = | 70 | | |
| | 26 x 10 | = | 260 | | |
| | 15 x 8 | = | 120 | | |
| | 10 x 5 | = | 50 | | |
| | 5 x 5 | = | 25 | | |
| | | | | | |
| | | | 640 | x | 0.5 = 320 |
| F | 17 x 7 | = | 119 | | |
| | 17 x 13 | = | 221 | | |
| | 5 x 10 | = | 50 | | |
| | | | | | |
| | | | 390 | x | 1.0 = 390 |
| G | 24 x 12 | = | 288 | | |
| | 7 x 10 | = | 70 | | |
| | 5 x 5 | = | 25 | | |
| | | | | | |
| | | | 383 | x | 0.8 = 306 |

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11183-MR

Page 3 of 4

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-------------|-------------------------|-----------|------------------|-----------|--------------------|
| H | 13 x 8 = | 104 | x 1.0 = | 104 | |
| I | 18 x 2 = | 36 | x 1.0 = | 36 | |
| J | 17 x 5 = | 85 | | | |
| | 8 x 22 = | 176 | | | |
| | 15 x 2 = | 30 | | | |
| | 5 x 5 = | 25 | | | |
| | 20 x 3 = | 60 | | | |
| | 5 x 3 = | 15 | | | |
| | 8 x 22 = | 176 | | | |
| | | <hr/> | | | |
| | | 567 | x 0.5 = | 284 | |
| K | 15 x 16 = | 240 | | | |
| | 3 x 5 = | 15 | | | |
| | 14 x 3 = | 42 | | | |
| | | <hr/> | | | |
| | | 297 | x 0.7 = | 208 | |
| L | 20 x 2 = | 40 | x 0.8 = | 32 | |
| M | 5 x 26 = | 130 | x 0.5 = | 65 | |
| N | 10 x 4 = | 40 | x 1.0 = | 40 | |
| O | 16 x 3 = | 48 | x 1.0 = | 48 | |
| P | 8 x 2 = | 16 | x 0.8 = | 13 | |
| Q | 3 x 4 = | 12 | x 1.0 = | 12 | |
| R | 17 x 5 = | 85 | | | |
| | 8 x 7 = | 56 | | | |
| | 6 x 2 = | 12 | | | |
| | | <hr/> | | | |
| | | 153 | x 0.8 = | 122 | |

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-11183-MR

Page 4 of 4

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-------------|-----------------------------|-----------|------------------|-----------|--------------------|
| S | 4 x 14 | = | 56 | | |
| | 9 x 3 | = | 27 | | |
| | | | | | |
| | | | 83 x 0.5 | = | 42 |
| T | 8 x 5 | = | 40 x 0.8 | = | 32 |
| | | | | | |
| | Volume of Contaminated Fill | | | = 2,054 | = 2,054/27 = 76 |
| | | | | | |
| | TOTAL VOLUME - EXTERIOR | | | | = 80 |

* This is interior concrete that must be removed because it is part of the exterior slab in Area K.

** The entire concrete slab of this area will be removed, although contaminated fill is under only part of the slab.

See Appendix Figures 3.4a and 3.4b For Areas

=====

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-11183-MR

Page 1 of 3

INTERIOR

| | |
|--|----------|
| Remove concrete floor 550 sf @ \$2/sf | \$ 1,100 |
| Remove identified residual radioactive material 12 cy @ \$44/cy (manual-open) | 528 |
| Undermine and shore walls 54 lf @ \$3/lf | 162 |
| Replace concrete floor 550 sf @ \$2/sf | 1,100 |
| Sawcut concrete floor 62 lf @ \$2/lf | 124 |
| Brace walls 288 sf @ \$.40/sf | 115 |
| Remove, clean, store, and replace wood flooring | 50 |
| Relocate freezer | 50 |
| Remove, store, and replace personal property | 450 |
| Replace area with washed rock 9 cy @ \$15/cy | 135 |
| Replace area with roadbase 3 cy @ \$11.50/cy | 35 |
| Remove/replace millwork | 75 |
| General cleanup and repair | 50 |
| | <hr/> |
| TOTAL INTERIOR | \$ 3,974 |

EXTERIOR

| | |
|---|--------|
| Remove concrete driveway and sidewalks 380 sf @ \$1.48/sf | \$ 562 |
| Remove concrete stoop 1 cy @ \$100/cy | 100 |
| Remove identified residual radioactive material 76 cy @ \$14.50/cy | 1,102 |

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-11183-MR

Page 2 of 3

| | |
|---|----------|
| Remove, clean, and replace flagstone | \$ 50 |
| Sawcut concrete driveway and sidewalk 23 lf @ \$2/lf | 46 |
| Replace area with 3/4" crushed rock 3 cy @ \$13.50/cy | 41 |
| Replace area with roadbase 15 cy @ \$11.50/cy | 173 |
| Replace area with topsoil 58 cy @ \$9.50/cy | 551 |
| Replace sod 1,670 sf @ \$.35/sf | 585 |
| Remove, clean, and replace brick planter | 30 |
| Remove and place new trees 5 ea @ \$100/ea | 500 |
| Landscaping | 240 |
| Remove tree stumps | 100 |
| Replace concrete driveway and sidewalks 380 sf @ \$1.50/sf | 570 |
| Replace concrete stoop 1 cy @ \$175/cy | 175 |
| Remove, store, and replace personal property | 150 |
| Paint concrete | 25 |
| General cleanup and repair | 100 |
| <hr/> | |
| TOTAL EXTERIOR | \$ 5,100 |

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-11183-MR

Page 3 of 3

| | | |
|------------------------------------|----|--------|
| TOTAL EXTERIOR | \$ | 5,100 |
| TOTAL INTERIOR | | 3,974 |
| ACCESS CONTROL | | 200 |
| | | <hr/> |
| SUBTOTAL | \$ | 9,274 |
| CONTINGENCY @ 10% | | 927 |
| | | <hr/> |
| SUBTOTAL | \$ | 10,201 |
| CONTRACTOR OVERHEAD & PROFIT @ 25% | | 2,550 |
| | | <hr/> |
| GRAND TOTAL | \$ | 12,751 |

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VG092385

REA11183/KL025/AP

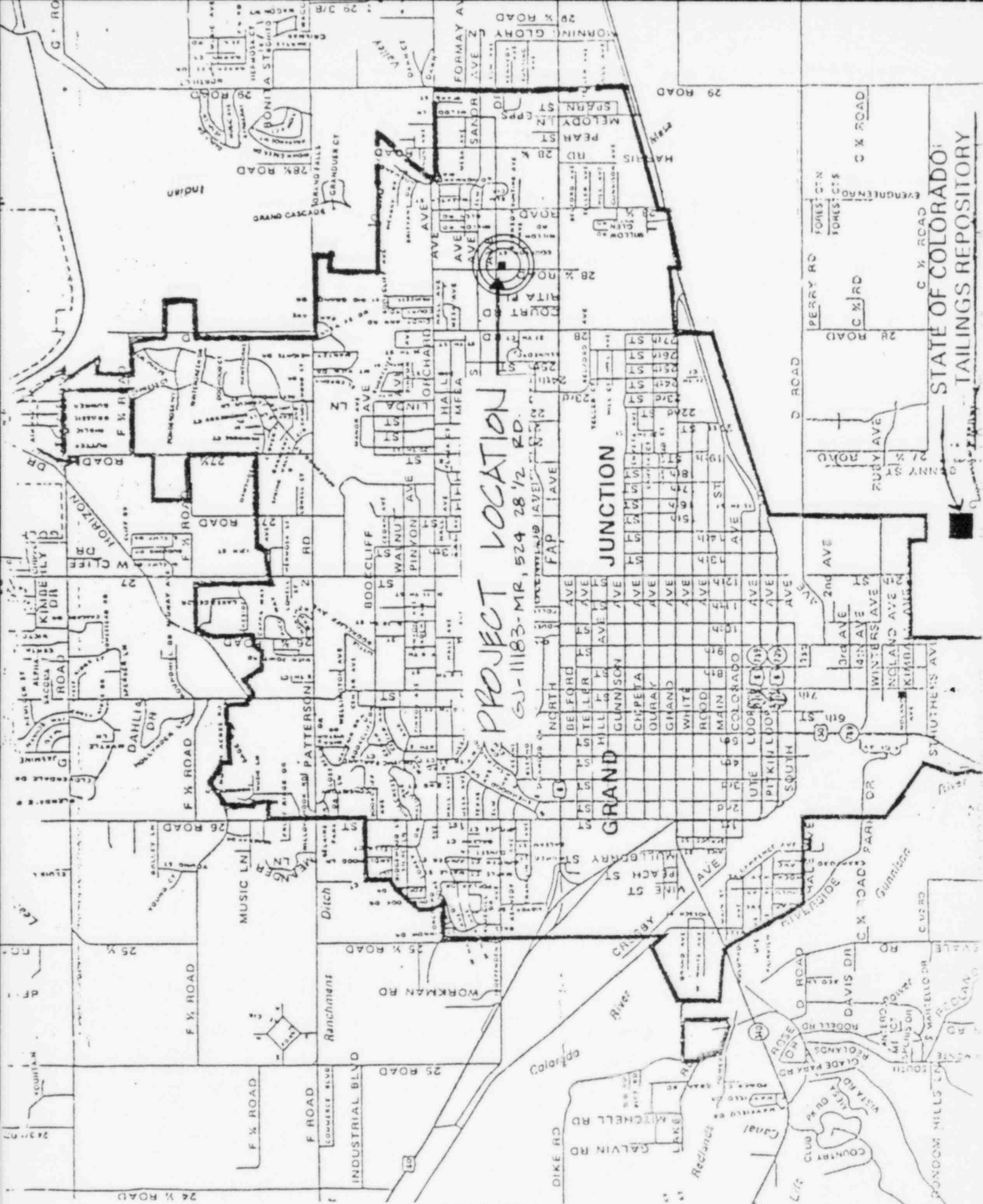
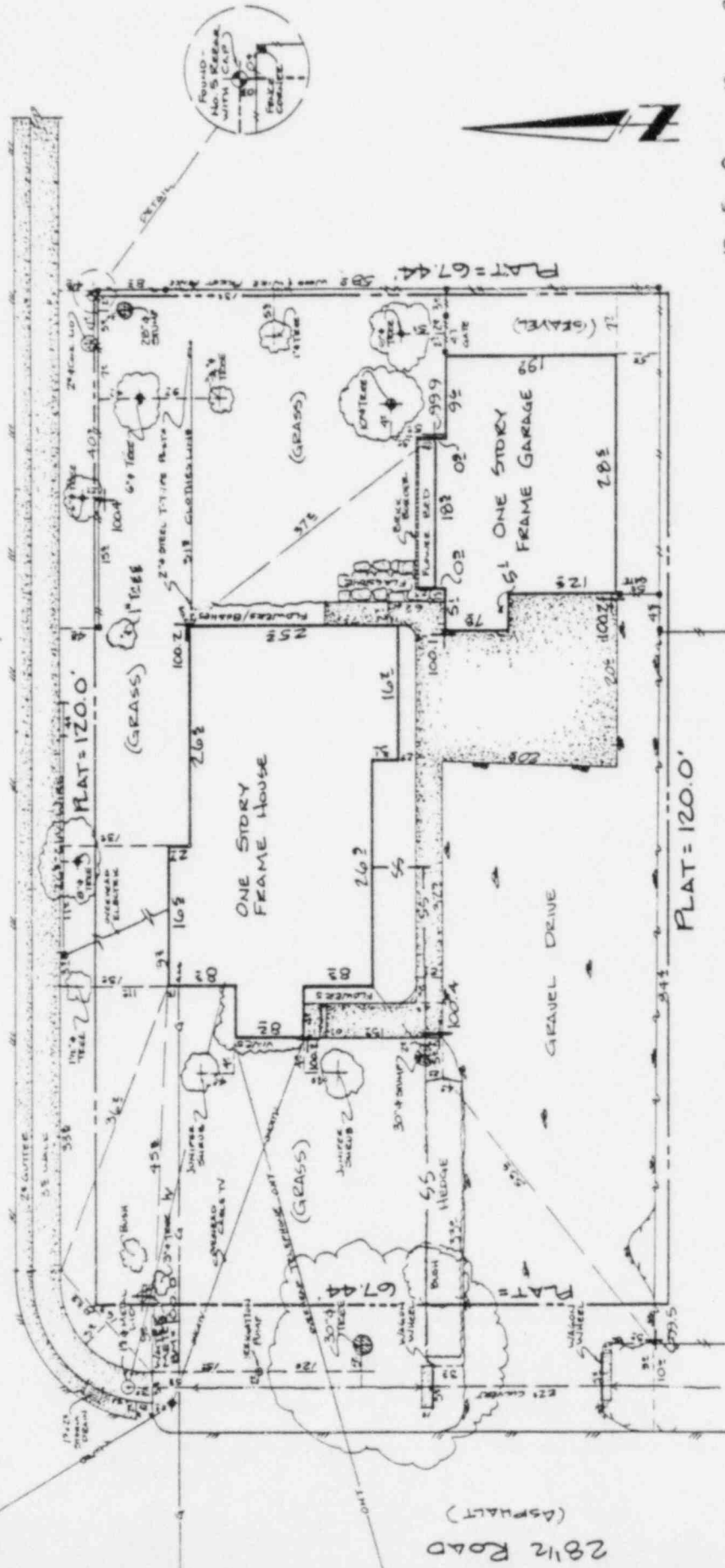


FIGURE 2.1
VICINITY MAP

ELM AVENUE
(ASPHALT)



LOT 1 IRELAND SUBDIVISION
SECTION 7, T.15, R.1E, U.M.,
CITY OF GRAND JUNCTION,
MESA COUNTY, COLORADO.

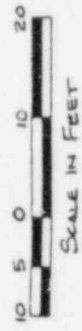
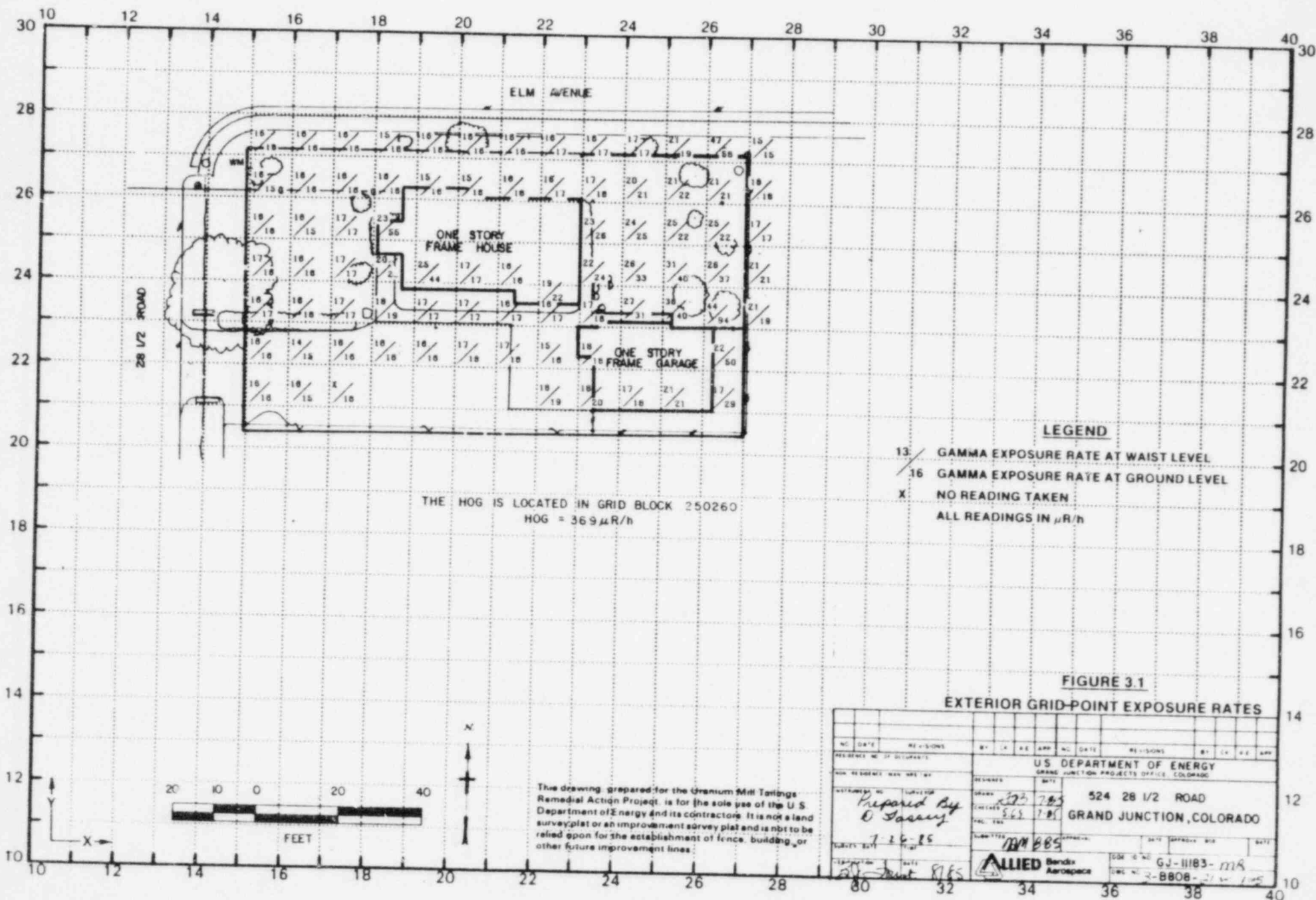


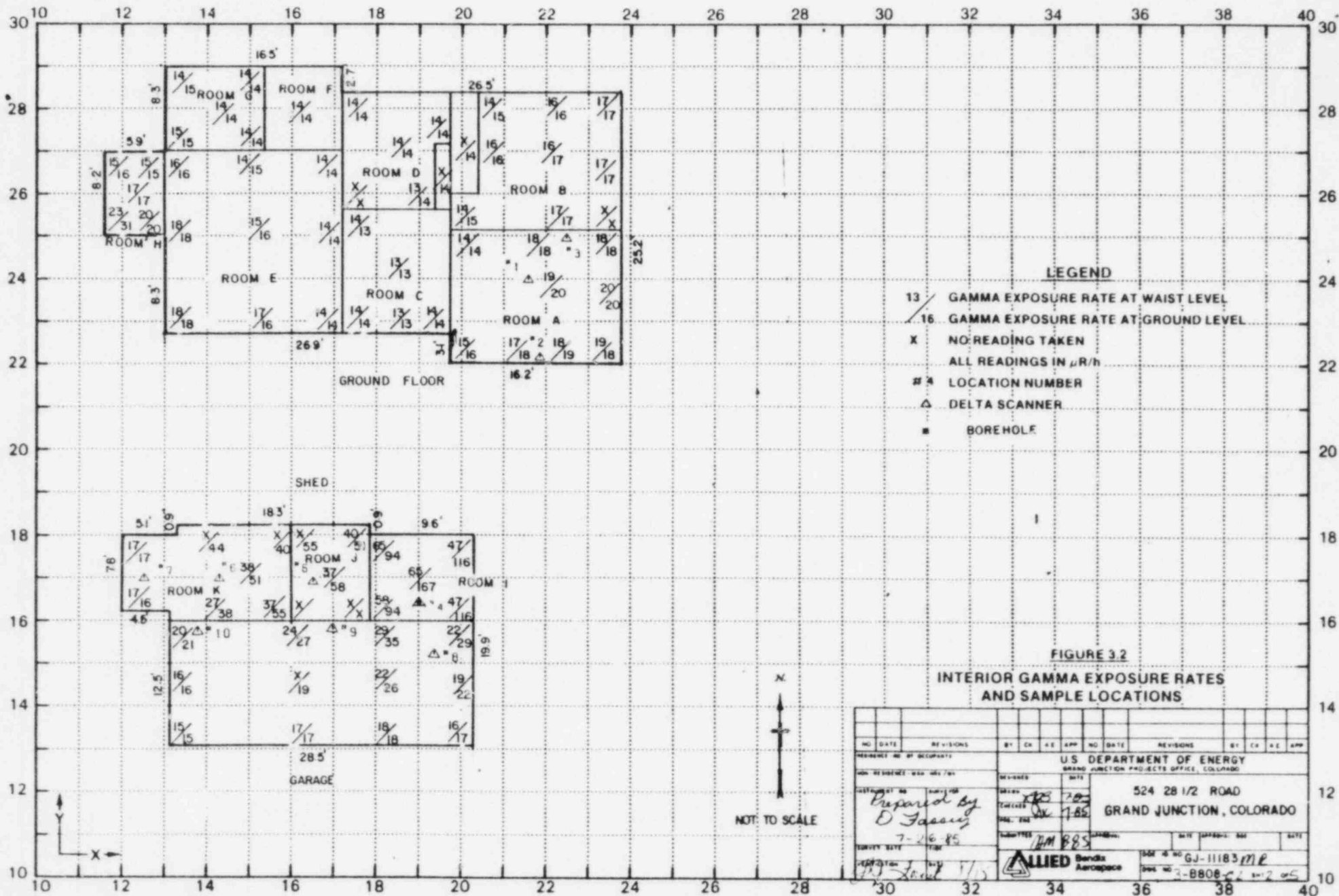
FIGURE 2.2 SITE PLAN

Tax Schedule No 2943-074-16-018

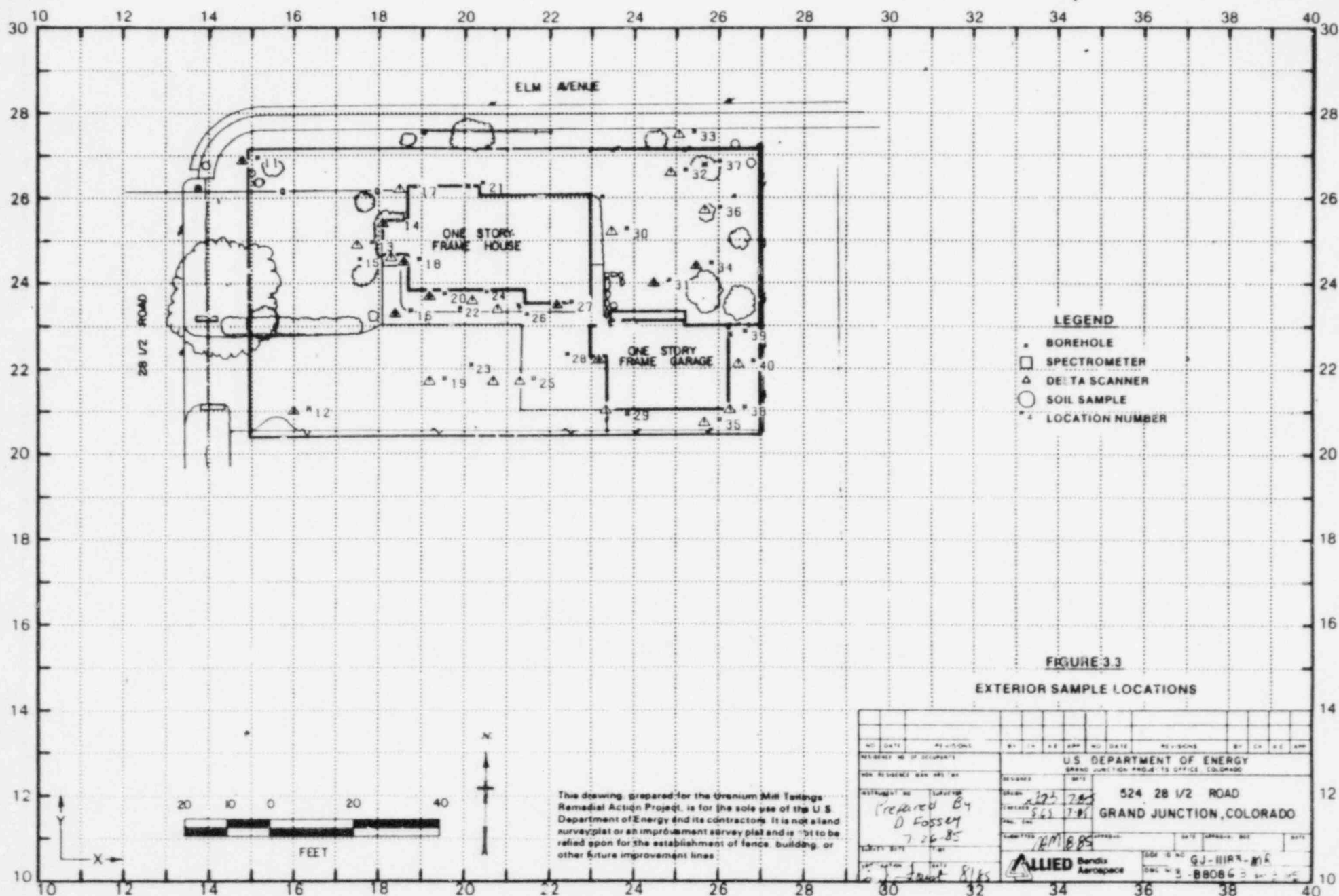
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|--|--------------------------|
| U.S. DEPARTMENT OF ENERGY GRAND JUNCTION PROJECT OFFICE, COLORADO | DOI ID NO GJ 11183 MR |
| ADDRESS 524 28 1/2 ROAD GRAND JUNCTION, COLORADO | ALRED |
| SURV ELS 17985 UNIT 154 17985 | DATE 11/1/85 |
| DATE 11/1/85 | BY 3-28000-F1 |

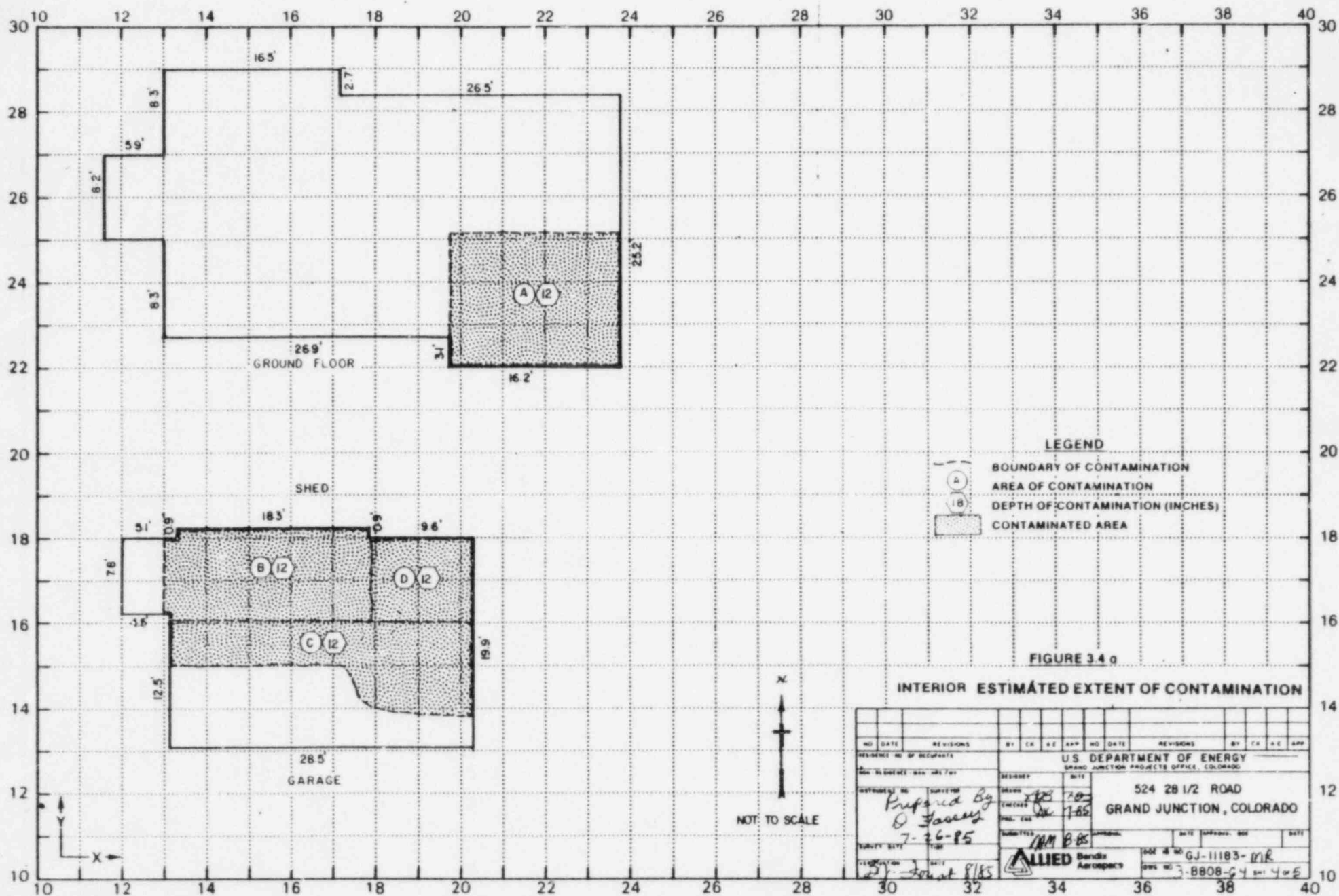
This drawing prepared for the Uranium Mill Tailings
Remedial Action Project is for the sole use of the U.S.
Department of Energy and is not to be used for any
survey plan or improvement project and is not to be
relied upon for the establishment of title, building, or
other future improvement lines.

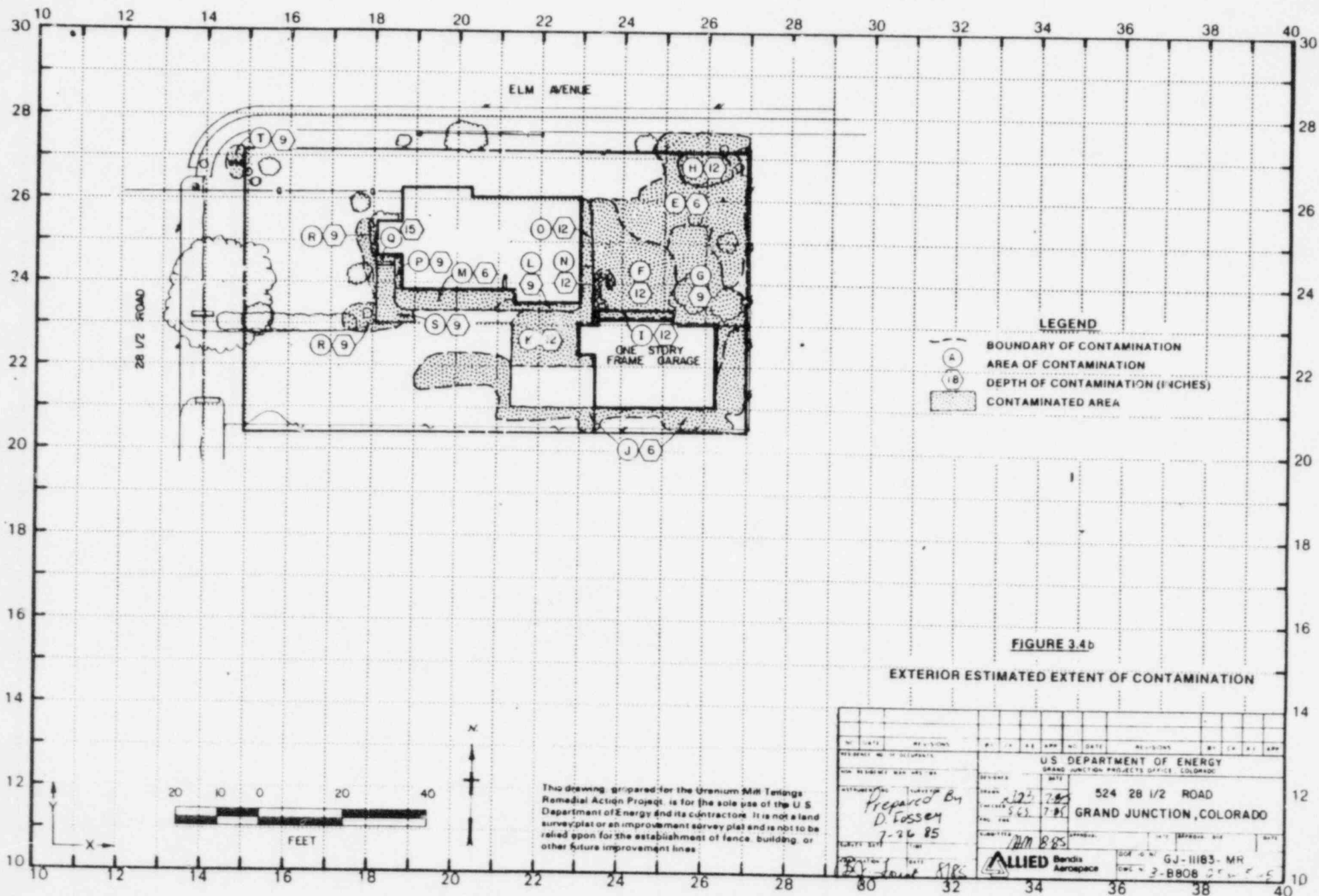




| NO. DATE | | REVISIONS | | BY | | CH | | A.E. | | APP | | NO. | | DATE | | REVISIONS | | BY | | CH | | A.E. | | APP | |
|--------------------------|--|-----------|--|----|--|----|--|------|--|-----|--|--|--|------|--|-----------|--|----|--|----|--|------|--|-----|--|
| PRESENT NO. OF OCCUPANTS | | | | | | | | | | | | U.S. DEPARTMENT OF ENERGY | | | | | | | | | | | | | |
| NON-RESIDENTIAL USE ONLY | | | | | | | | | | | | BRAND JUNCTION PROJECTS OFFICE, COLORADO | | | | | | | | | | | | | |
| INSTRUMENT NO. | | | | | | | | | | | | 524 28 1/2 ROAD | | | | | | | | | | | | | |
| PREPARED BY | | | | | | | | | | | | GRAND JUNCTION, COLORADO | | | | | | | | | | | | | |
| 7-26-85 | | | | | | | | | | | | DATE | | | | | | | | | | | | | |
| SURVEY DATE | | | | | | | | | | | | DATE | | | | | | | | | | | | | |
| REVISION | | | | | | | | | | | | DATE | | | | | | | | | | | | | |
| ALLIED | | | | | | | | | | | | Bendix Aerospace | | | | | | | | | | | | | |
| GJ-11183 MP | | | | | | | | | | | | 3-8808 | | | | | | | | | | | | | |







MEMORANDUM

ALLIED Bendix
Aerospace

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: July 15, 1985

To: Files

From: Daniel Fossey

Subject: Team Leader Notes - GJ-11183-MR

Address: 524 28-1/2 Road

Owner: Jesus Ruiz

Telephone: 245-6774

Arrival: 8:15 AM

Team Members

| | |
|-------------------------|-----------|
| D. Fossey (Team Leader) | P. Hardy |
| V. Hebel | D. Dow |
| S. Larsen | S. Garcia |
| D. Bell | |

Instruments

See Equipment Operational Summary sheet

Colorado Department of Health (CDH) and Oak Ridge National Laboratory (ORNL) data indicates elevated gamma readings in the yard east of the primary structure, a portion of the garage floor, and the concrete porch west of the primary structure. The exterior gamma scan confirmed these findings.

At 9:00 AM D. Herrera took my place as team leader so I could return to the compound to attend a Team Leader Training class. I returned to the site and D. Herrera returned to the compound at 12:00 PM.

Team Leader Notes
Daniel Fossey
GJ-11183-MR
July 15, 1985
Page 2

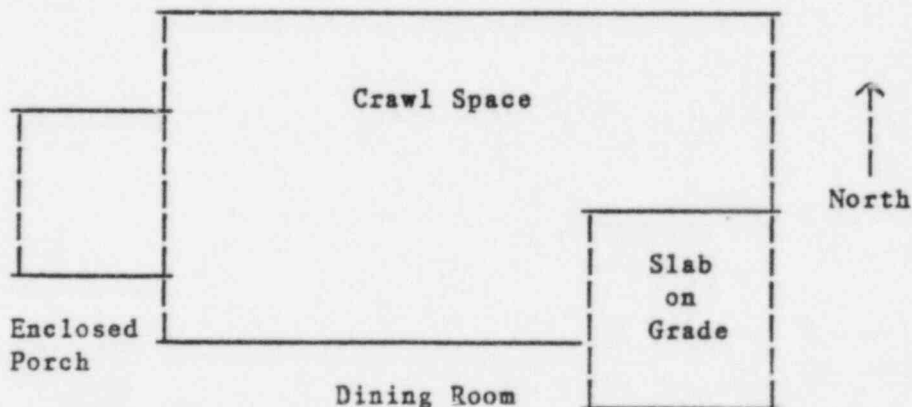
While conducting the exterior gamma scan, a reading of 19,000 counts per second (cps) was recorded in grid block 250240. Further investigation revealed a point source which appeared to be uranium ore. After removing the point source, the high gamma reading of 4,500 was recorded.

The interior gamma survey showed slightly elevated gamma readings in the dining room, southeast portion of the primary structure. These elevated readings were investigated with a delta scanner.

The sewer and water lines were located by the team members.

There was no access to the crawl space of the primary structure. The crawl space had a height of less than 12 inches.

A portion of the primary structure is a slab-on-grade. This is an addition to the primary structure. The property owner stated that he did not know when this addition was built.



Team members completed the survey at 2:30 PM. D. Dow and S. Larsen were sent to 1620 North 16th Street to help M. Heronema complete his survey. The rest of the team members returned to the compound.

All team members were alpha scanned before leaving the property.

Team Leader Notes
Daniel Fossey
GJ-11183-MR
July 15, 1985
Page 3

Revisit

Date: July 22, 1985

Team Members

D. Fossey (Team Leader) V. Hebel
T. Unrein

The purpose of the revisit is to confirm data taken in the yard east of the primary structure. Apparently three sample location flags were placed incorrectly during the initial survey (15 July 1985). The data was retaken for the three locations in question.

There were also three additional interior sample locations taken in the garage to define the extent of contamination.

Revisit

Date: August 1, 1985

Team Members

D. Fossey (Team Leader)
T. Flores

The purpose of this revisit was to check for contamination beneath the sidewalk south of the primary structure, and beneath a portion of the concrete slab west of the garage. Both of these areas were found to not be contaminated.

APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

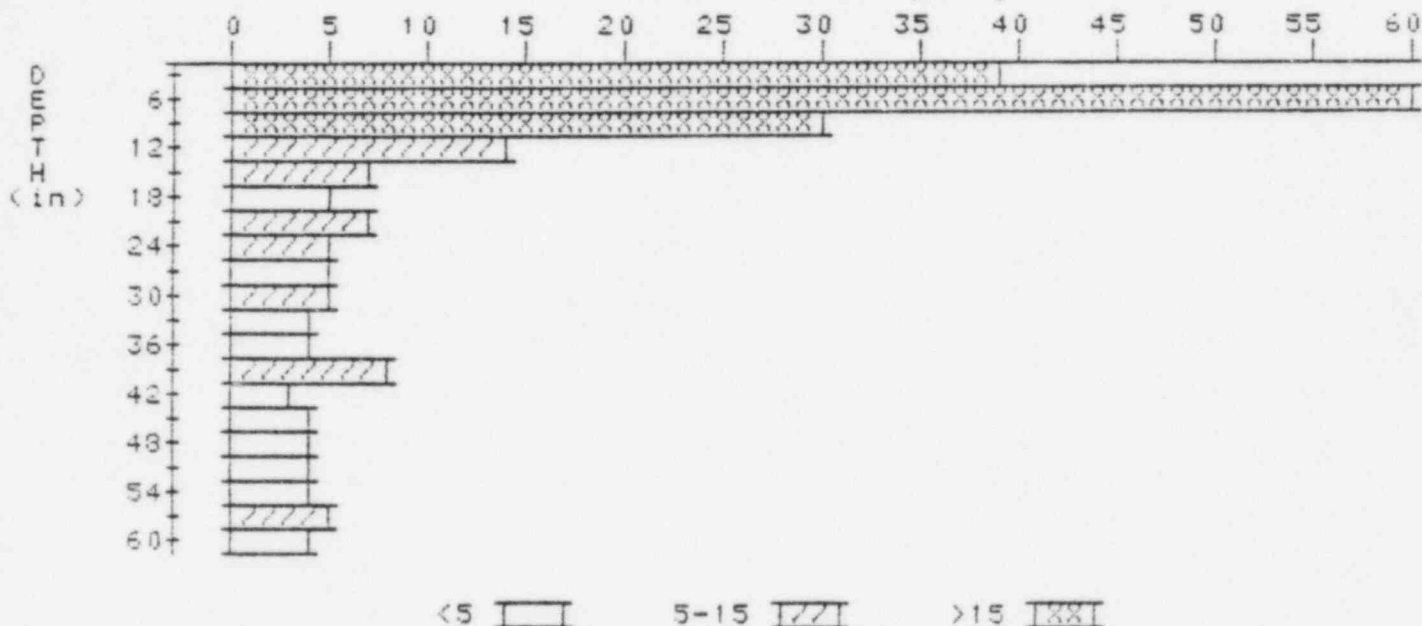
4

PROPERTY NUMBER: GJ-11133-MR

HOLE NUMBER: 4

LOCATION:

APPARENT RA-226 (pCi/g)



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 39.4 | 39.4 |
| 6 | 44.2 | 74.9 |
| 9 | 31.8 | 29.7 |
| 12 | 20.6 | 14.0 |
| 15 | 13.1 | 7.1 |
| 18 | 9.0 | 4.6 |
| 21 | 7.4 | 6.7 |
| 24 | 6.2 | 5.3 |
| 27 | 5.5 | 5.0 |
| 30 | 5.1 | 5.1 |
| 33 | 4.7 | 4.0 |
| 36 | 4.7 | 3.8 |
| 39 | 5.2 | 7.7 |
| 42 | 4.3 | 3.1 |
| 45 | 4.1 | 3.7 |
| 48 | 4.1 | 3.9 |
| 51 | 4.2 | 4.4 |
| 54 | 4.2 | 3.8 |

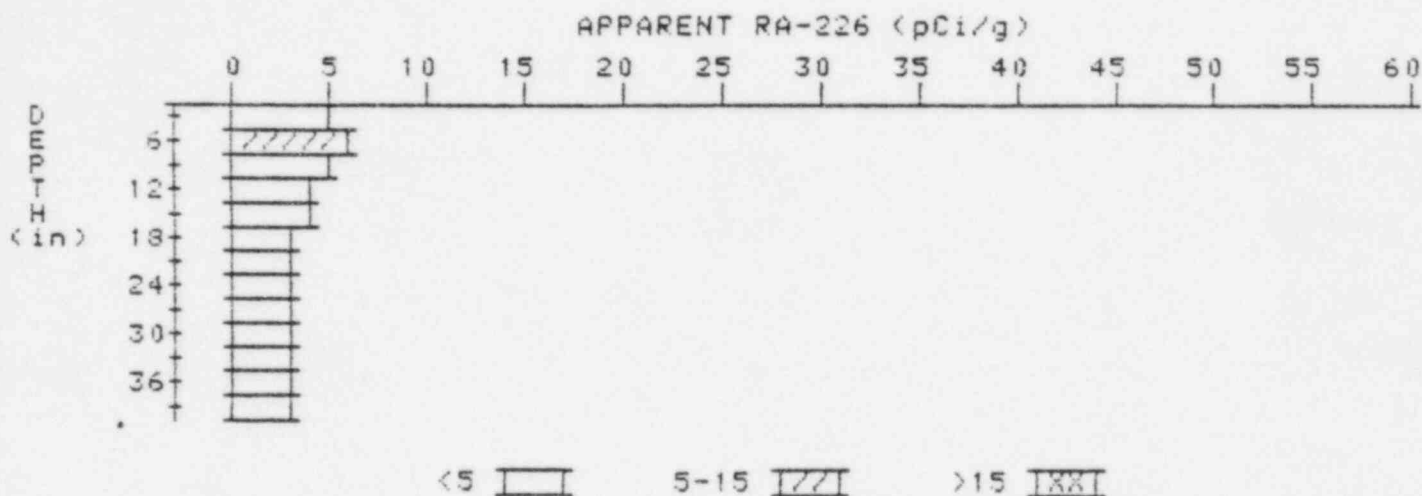
57
60

4.4
4.2

5.1
4.2

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

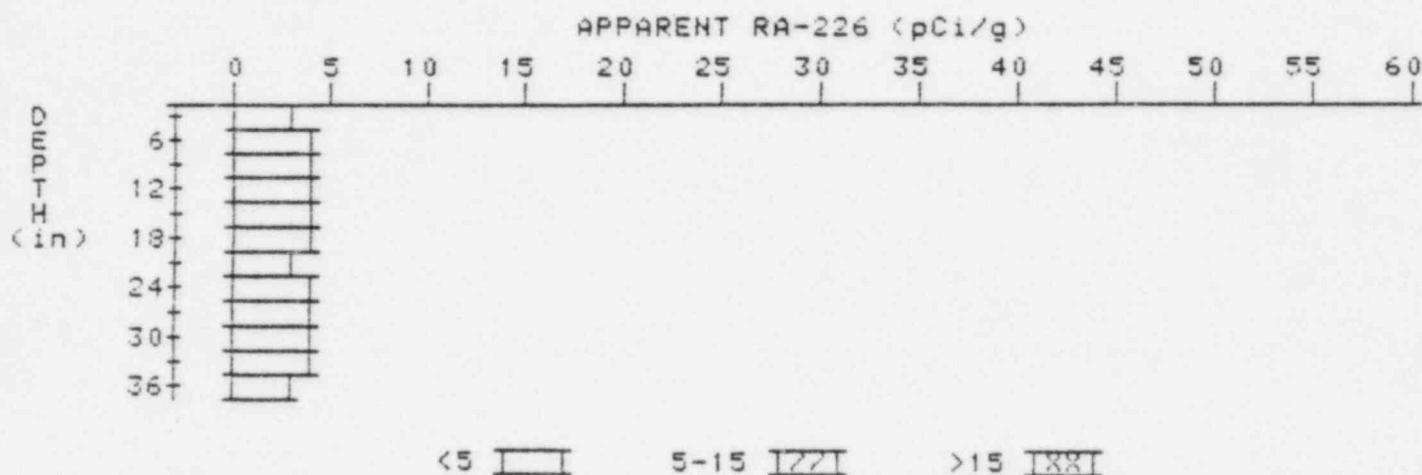
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 11
LOCATION: 148269



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 4.8 | 4.8 |
| 6 | 5.1 | 6.3 |
| 9 | 4.7 | 4.9 |
| 12 | 4.2 | 3.8 |
| 15 | 3.9 | 3.9 |
| 18 | 3.6 | 3.4 |
| 21 | 3.4 | 3.2 |
| 24 | 3.3 | 3.3 |
| 27 | 3.2 | 3.0 |
| 30 | 3.2 | 3.4 |
| 33 | 3.1 | 3.1 |
| 36 | 3.0 | 2.8 |
| 39 | 3.0 | 3.0 |

APPARENT RADIUM-226 CONCENTRATION 12 DECONVOLUTION GRAPH

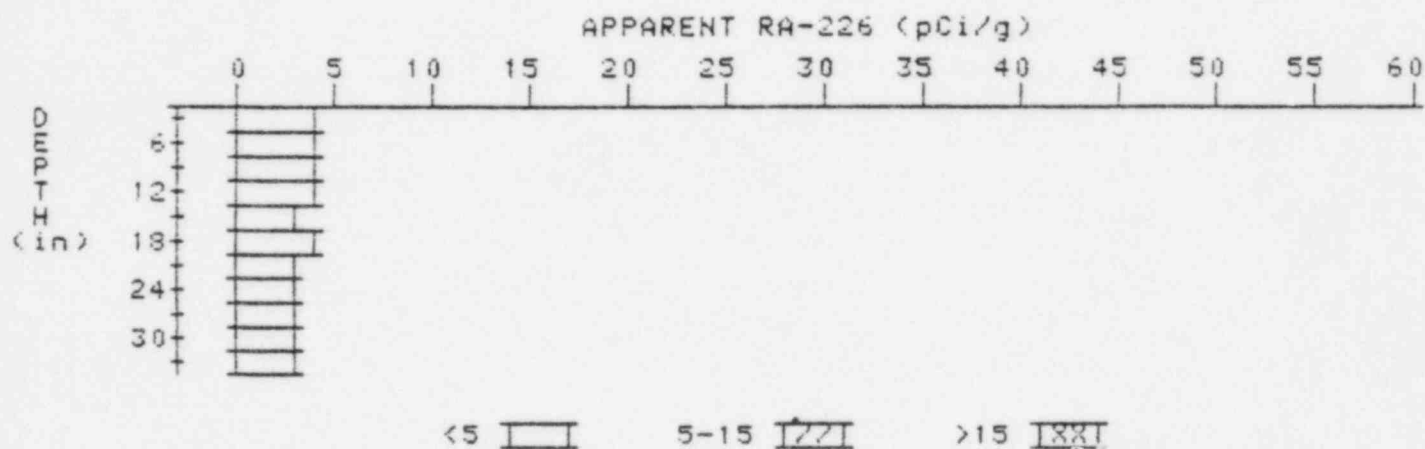
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 12
LOCATION: 160210



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

APPARENT RADIUM-226 CONCENTRATION 14 DECONVOLUTION GRAPH

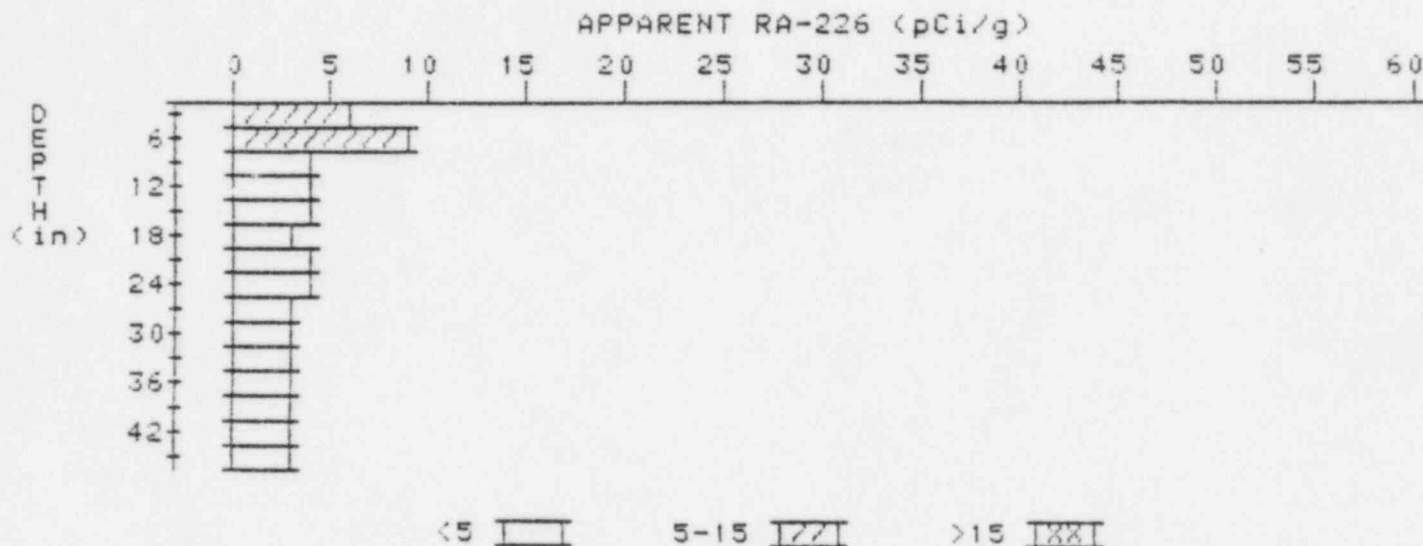
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 14
LOCATION: 181254



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

APPARENT RADIUM-226 CONCENTRATION 16 DECONVOLUTION GRAPH

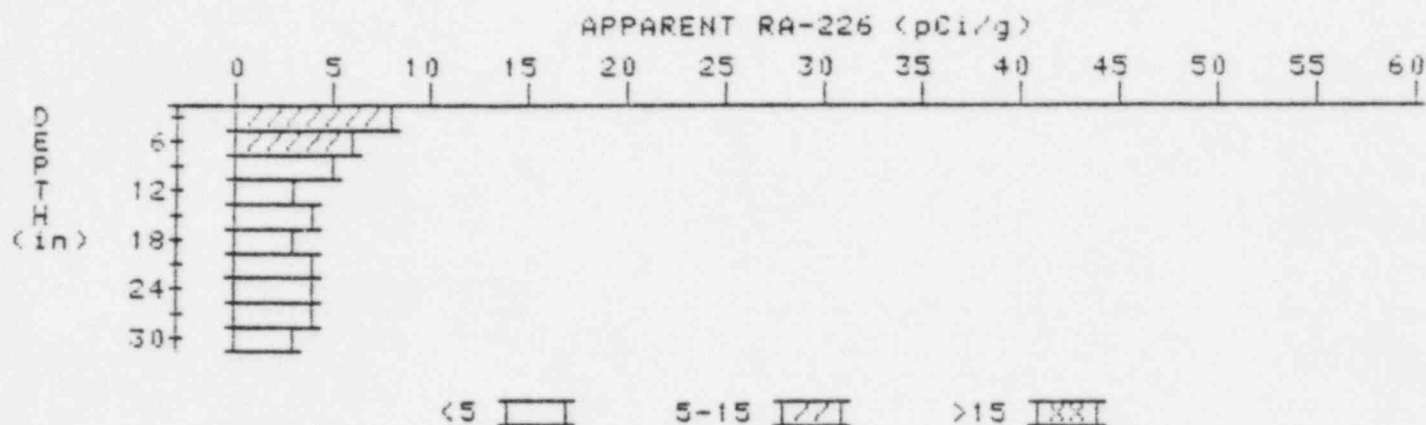
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 16
LOCATION: 184233



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 5.6 | 5.6 |
| 6 | 6.2 | 9.4 |
| 9 | 5.0 | 4.1 |
| 12 | 4.3 | 3.8 |
| 15 | 3.9 | 3.7 |
| 18 | 3.6 | 3.2 |
| 21 | 3.5 | 3.3 |
| 24 | 3.4 | 3.5 |
| 27 | 3.2 | 2.7 |
| 30 | 3.3 | 3.5 |
| 33 | 3.3 | 3.3 |
| 36 | 3.3 | 3.3 |
| 39 | 3.3 | 3.3 |
| 42 | 3.3 | 3.3 |
| 45 | 3.3 | 3.3 |

APPARENT RADIUM-226 CONCENTRATION 18 DECONVOLUTION GRAPH

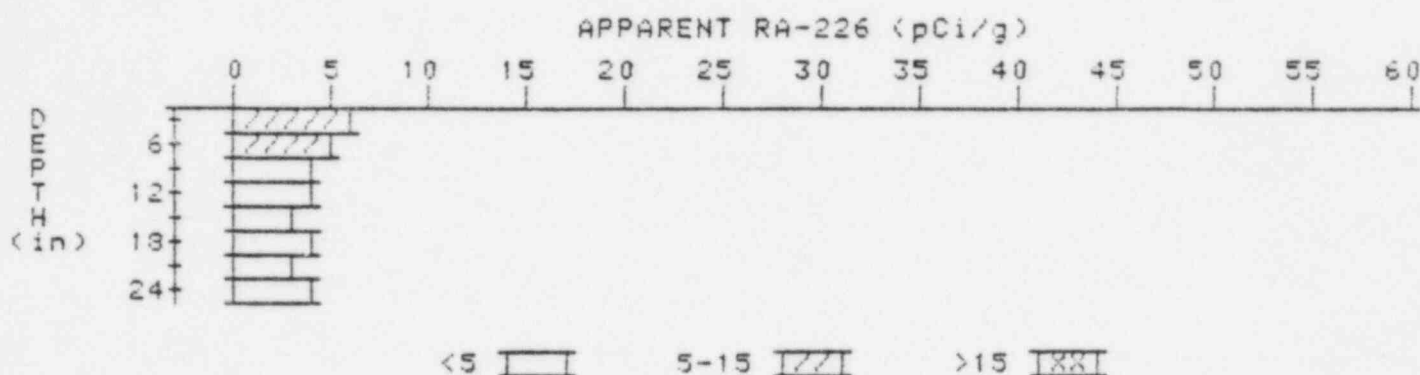
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 18
LOCATION: 186245



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| ===== | ===== | ===== |
| 3 | 7.6 | 7.6 |
| 6 | 6.2 | 5.7 |
| 9 | 5.1 | 4.6 |
| 12 | 4.3 | 3.4 |
| 15 | 4.0 | 4.0 |
| 18 | 3.7 | 3.2 |
| 21 | 3.7 | 3.9 |
| 24 | 3.6 | 3.6 |
| 27 | 3.5 | 3.5 |
| 30 | 3.4 | 3.4 |

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

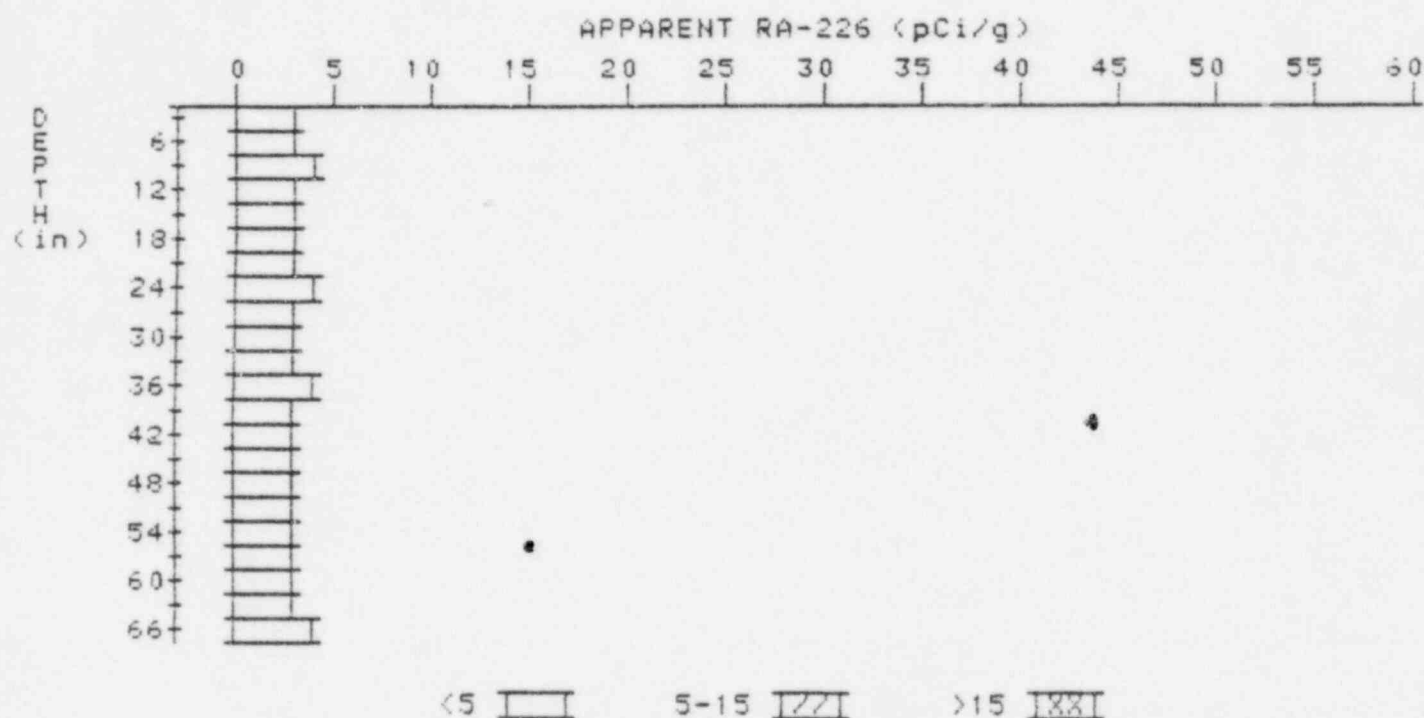
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 20
LOCATION: 192237



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 6.4 | 6.4 |
| 6 | 5.4 | 5.0 |
| 9 | 4.6 | 4.2 |
| 12 | 4.0 | 3.6 |
| 15 | 3.6 | 2.9 |
| 18 | 3.6 | 4.0 |
| 21 | 3.4 | 2.9 |
| 24 | 3.5 | 3.5 |

APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 21
LOCATION: 201263



| Depth (in) | Apparent Radium-226 (pCi/g) Underconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|---|--|
| 3 | 3.1 | 3.1 |
| 6 | 3.3 | 3.5 |
| 9 | 3.4 | 3.6 |
| 12 | 3.4 | 3.4 |
| 15 | 3.4 | 3.4 |
| 18 | 3.4 | 3.4 |
| 21 | 3.4 | 3.4 |
| 24 | 3.4 | 3.8 |
| 27 | 3.2 | 2.7 |
| 30 | 3.3 | 3.5 |
| 33 | 3.3 | 3.1 |
| 36 | 3.4 | 3.9 |
| 39 | 3.3 | 3.1 |
| 42 | 3.3 | 3.3 |
| 45 | 3.3 | 3.3 |
| 48 | 3.3 | 3.3 |

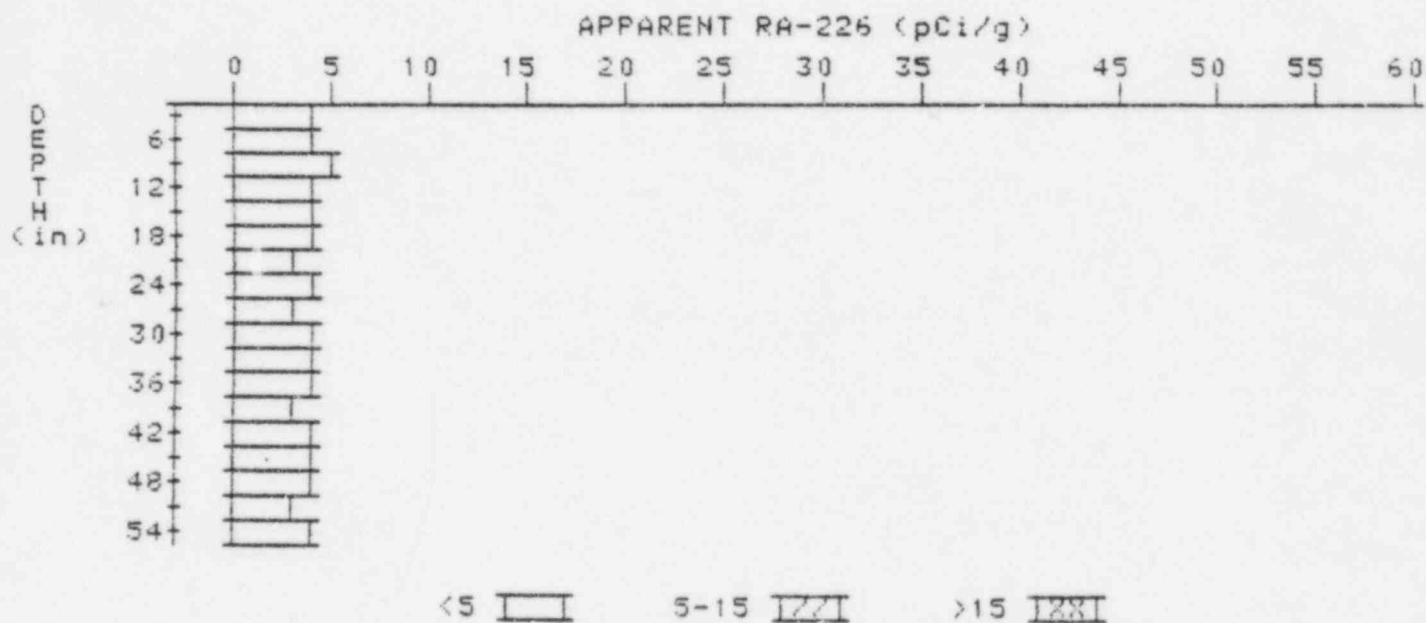
51
54
57
50
63
66

3.3
3.3
3.3
3.3
3.4
3.5

3.3
3.3
3.3
3.1
3.4
3.5

APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

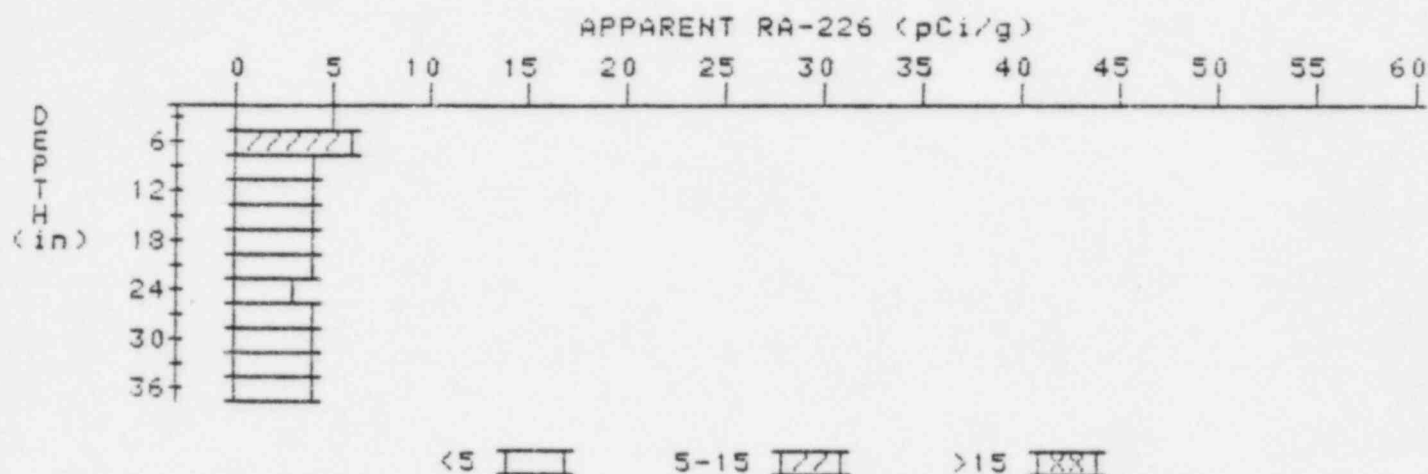
PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 26
LOCATION: 213235



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 4.4 | 4.4 |
| 6 | 4.4 | 4.4 |
| 9 | 4.4 | 4.9 |
| 12 | 4.1 | 3.9 |
| 15 | 3.9 | 3.7 |
| 18 | 3.8 | 4.2 |
| 21 | 3.5 | 3.0 |
| 24 | 3.5 | 3.5 |
| 27 | 3.5 | 3.3 |
| 30 | 3.6 | 3.8 |
| 33 | 3.6 | 3.6 |
| 36 | 3.6 | 3.6 |
| 39 | 3.6 | 3.4 |
| 42 | 3.7 | 3.9 |
| 45 | 3.7 | 3.6 |
| 48 | 3.6 | 3.6 |
| 51 | 3.5 | 3.0 |
| 54 | 3.7 | 3.7 |

APPARENT RADIUM-226 CONCENTRATION 27 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 27
LOCATION: 22235



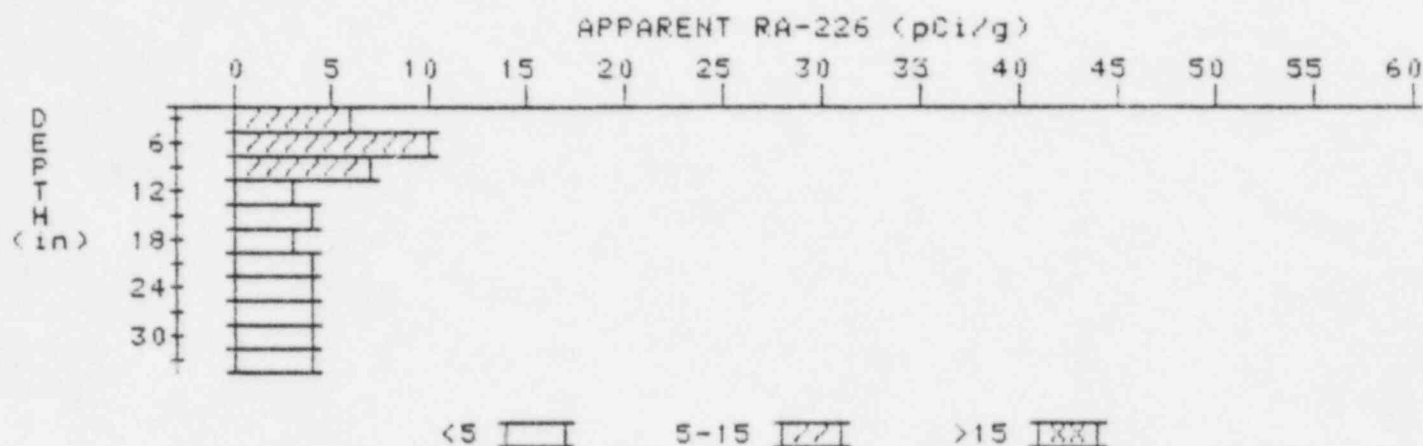
| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 4.7 | 4.7 |
| 6 | 4.9 | 6.0 |
| 9 | 4.5 | 4.5 |
| 12 | 4.1 | 3.7 |
| 15 | 3.9 | 3.7 |
| 18 | 3.8 | 3.8 |
| 21 | 3.7 | 3.7 |
| 24 | 3.6 | 3.4 |
| 27 | 3.6 | 3.6 |
| 30 | 3.6 | 3.6 |
| 33 | 3.6 | 3.6 |
| 36 | 3.6 | 3.6 |

APPARENT RADIUM-226 CONCENTRATION 28 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR

HOLE NUMBER: 28

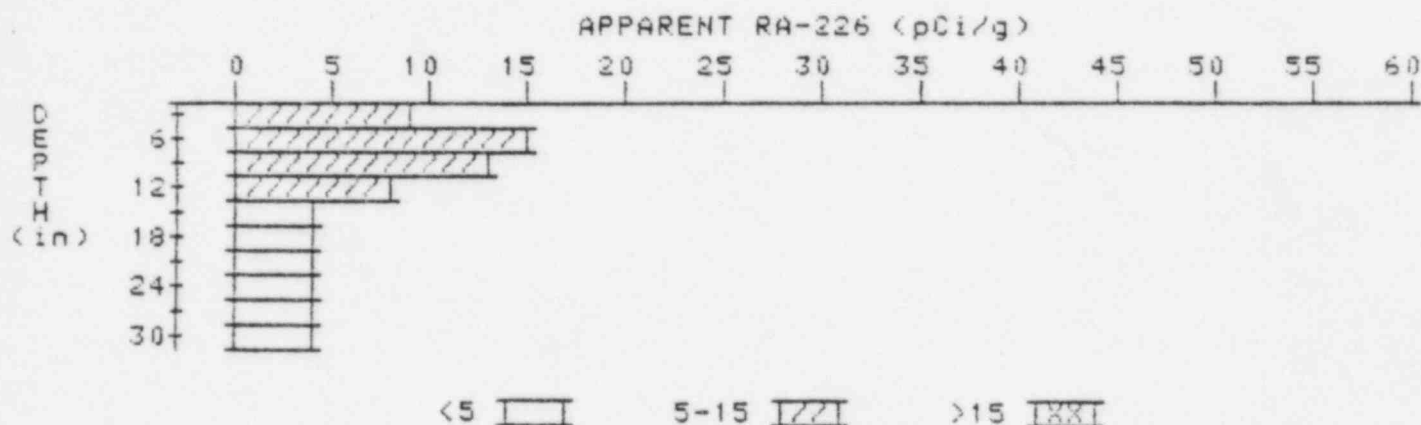
LOCATION: 232222



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 5.8 | 5.8 |
| 6 | 6.7 | 9.7 |
| 9 | 5.9 | 6.6 |
| 12 | 4.7 | 3.5 |
| 15 | 4.2 | 3.8 |
| 18 | 3.9 | 3.4 |
| 21 | 3.9 | 4.1 |
| 24 | 3.8 | 3.6 |
| 27 | 3.8 | 4.0 |
| 30 | 3.7 | 3.9 |
| 33 | 3.5 | 3.5 |

APPARENT RADIUM-226 CONCENTRATION 31 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 31
LOCATION: 245240



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 8.8 | 8.8 |
| 6 | 10.6 | 14.7 |
| 9 | 10.1 | 13.1 |
| 12 | 7.9 | 7.5 |
| 15 | 5.9 | 4.1 |
| 18 | 4.9 | 4.0 |
| 21 | 4.4 | 4.2 |
| 24 | 4.0 | 3.6 |
| 27 | 3.8 | 3.8 |
| 30 | 3.6 | 3.6 |

APPARENT RADIUM-226 CONCENTRATION 34

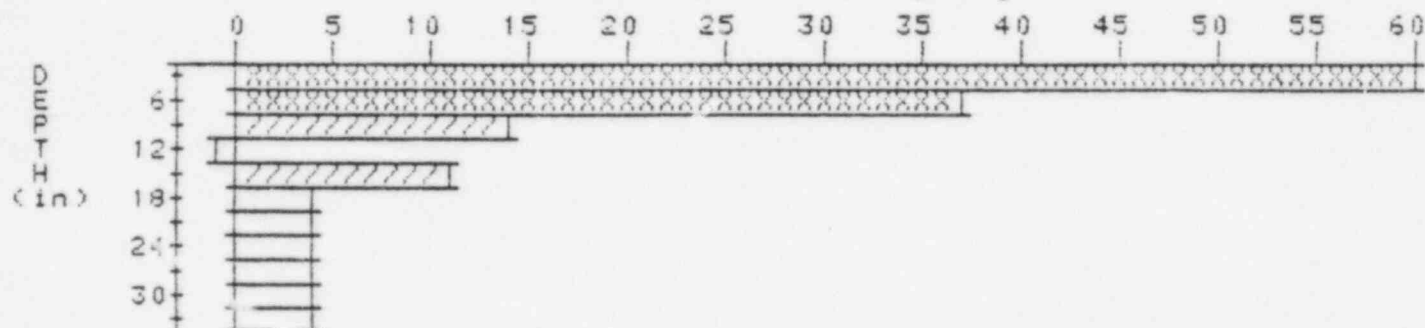
DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR

HOLE NUMBER: 34

LOCATION: 255244

APPARENT RA-226 (pCi/g)

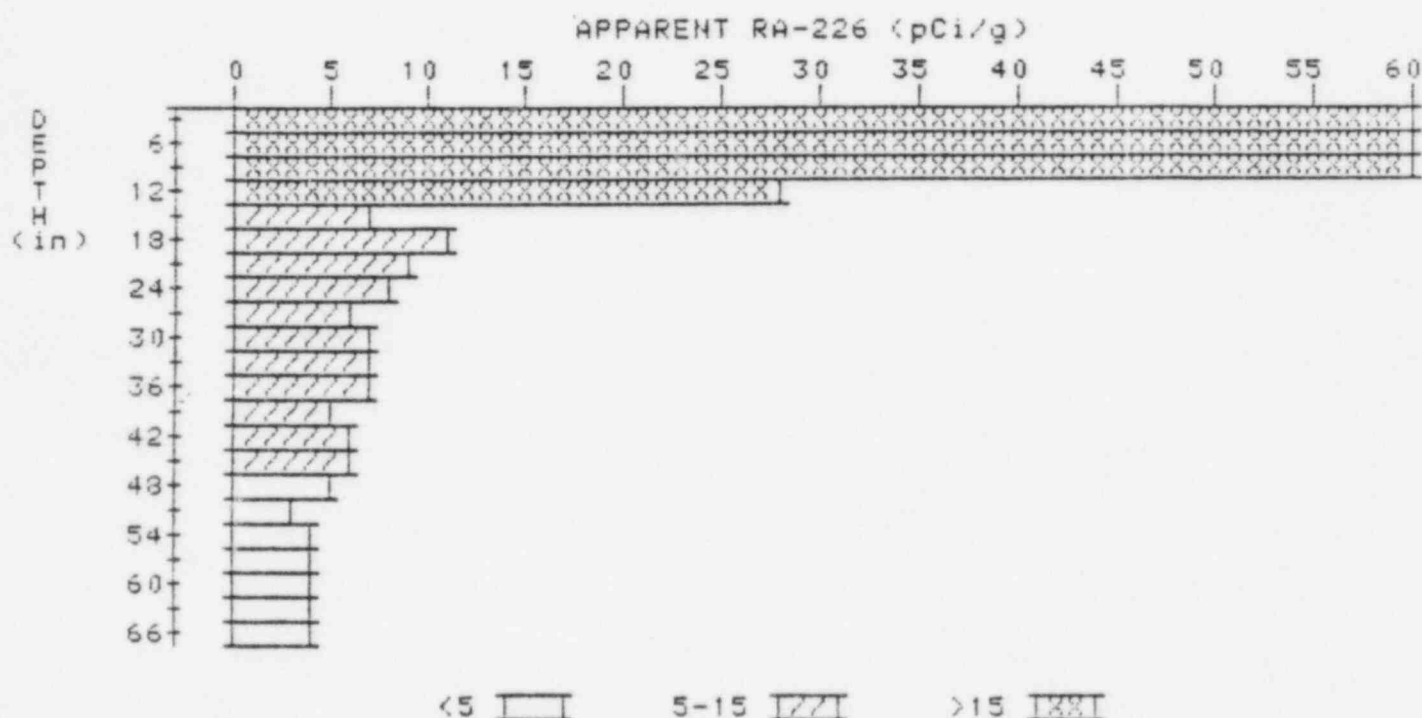


<5  5-15  >15 

| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 63.4 | 63.4 |
| 6 | 42.0 | 36.3 |
| 9 | 23.5 | 14.1 |
| 12 | 10.3 | -10.5 |
| 15 | 3.3 | 10.3 |
| 18 | 6.2 | 3.5 |
| 21 | 5.1 | 4.2 |
| 24 | 4.5 | 4.0 |
| 27 | 4.2 | 3.3 |
| 30 | 4.1 | 4.1 |
| 33 | 4.0 | 4.0 |

APPARENT RADIUM-226 CONCENTRATION 37 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11133-MR
HOLE NUMBER: 37
LOCATION: 257263



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 147.4 | 147.4 |
| 6 | 135.6 | 193.7 |
| 9 | 91.1 | 79.0 |
| 12 | 53.4 | 28.0 |
| 15 | 30.0 | 7.2 |
| 18 | 19.4 | 10.7 |
| 21 | 13.7 | 9.4 |
| 24 | 10.4 | 8.1 |
| 27 | 8.4 | 6.4 |
| 30 | 7.5 | 6.6 |
| 33 | 7.1 | 7.1 |
| 36 | 6.7 | 7.4 |
| 39 | 5.9 | 5.0 |
| 42 | 5.6 | 5.6 |
| 45 | 5.3 | 5.7 |
| 48 | 4.8 | 5.0 |

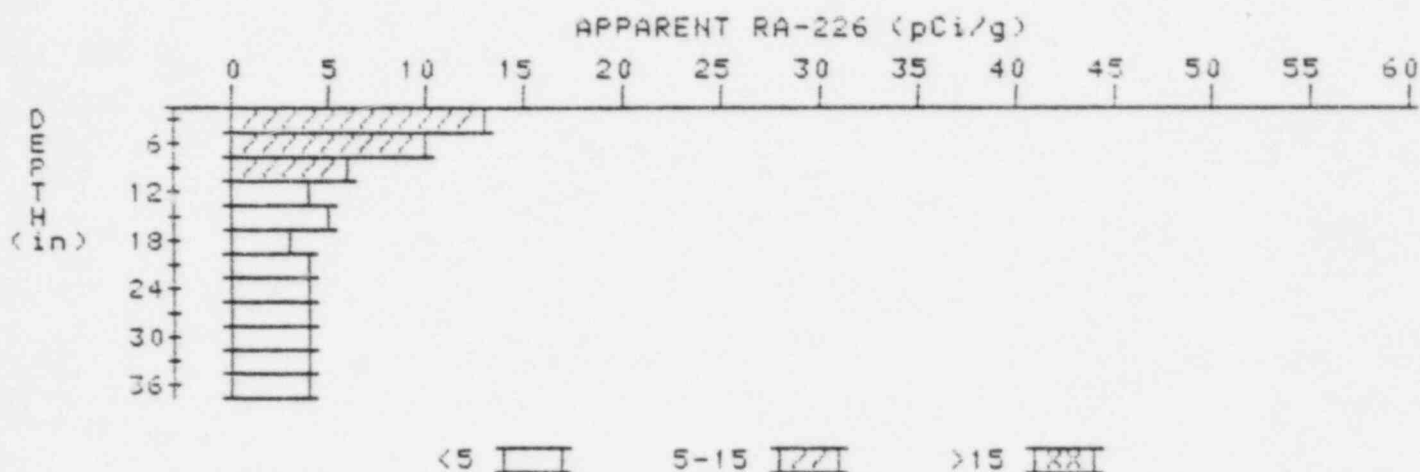
51
54
57
60
63
66

4.2
4.1
4.0
4.0
4.1
4.4

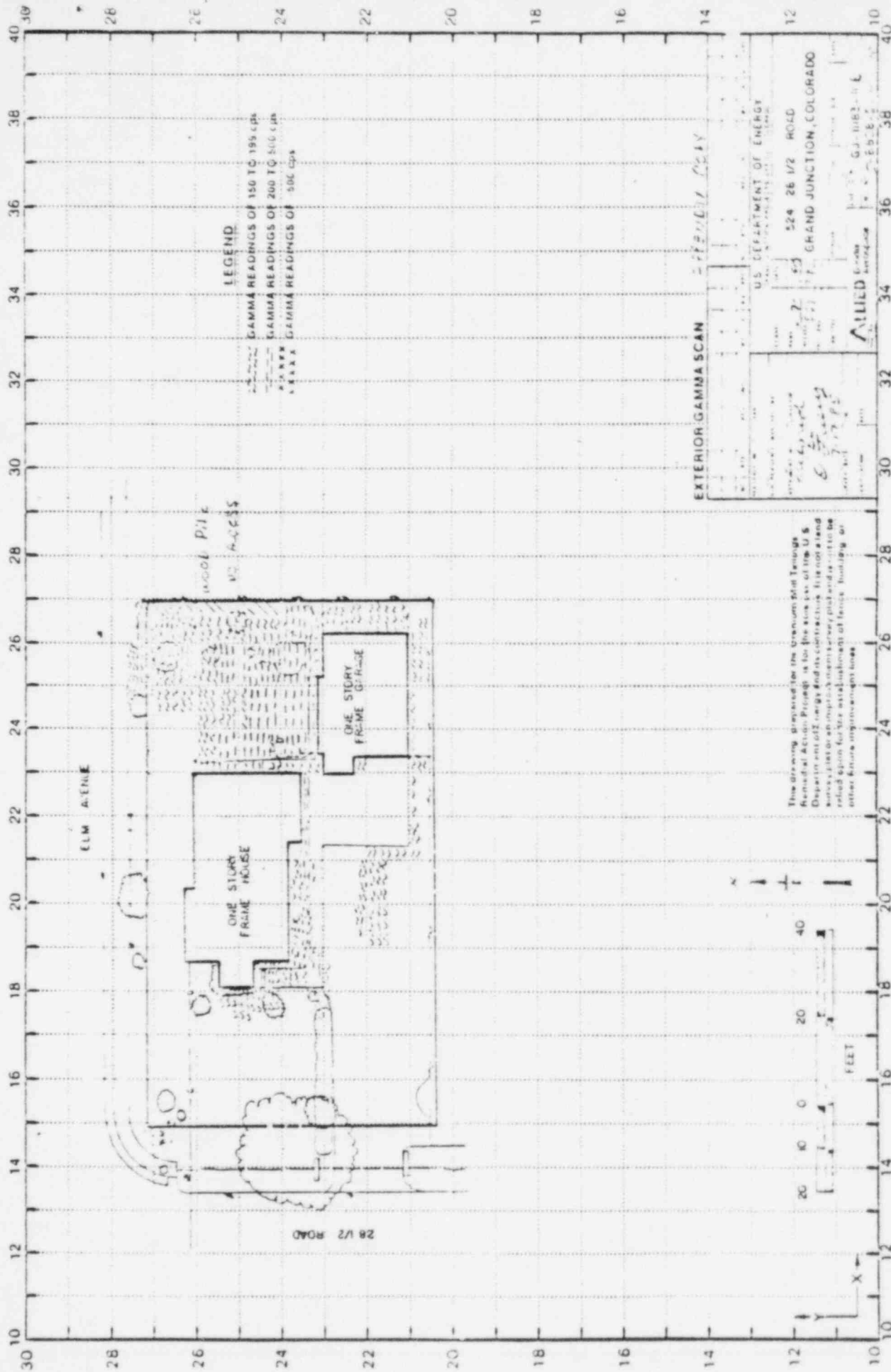
3.3
4.1
3.0
3.0
3.7
4.4

APPARENT RADIUM-226 CONCENTRATION 39 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-11183-MR
HOLE NUMBER: 39
LOCATION: 263228



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 12.6 | 12.6 |
| 6 | 10.2 | 10.4 |
| 9 | 7.7 | 6.5 |
| 12 | 5.9 | 4.3 |
| 15 | 5.0 | 4.3 |
| 18 | 4.2 | 3.1 |
| 21 | 4.0 | 4.0 |
| 24 | 3.8 | 3.6 |
| 27 | 3.7 | 3.5 |
| 30 | 3.7 | 3.7 |
| 33 | 3.7 | 3.5 |
| 36 | 3.8 | 3.8 |



EXTERIOR GAMMA SCAN

28 1/2 ROAD

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other precise measurements.

U.S. DEPARTMENT OF ENERGY

28 1/2 ROAD

GRAND JUNCTION, COLORADO

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28 1/2 ROAD

28 1/2 ROAD