

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-01192-SC
ADDRESS: 410 HILL AVENUE
(SCHOOL DISTRICT 51)

JULY 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

M. K. Tucker
M. TUCKER
DOE PROJECT ENGINEER

DATE

July 31 1985

REA01192:GJ:REA-GE002

8508150171 850731
PDR WASTE PDR
WM-54

TABLE OF CONTENTS

| <u>Section</u> | <u>Page</u> |
|---|-------------|
| 1.0 EXECUTIVE SUMMARY | 1 |
| 1.1 Introduction | 1 |
| 1.2 Evaluation and Recommendation | 1 |
| 2.0 PROPERTY DESCRIPTION | 2 |
| 2.1 General Description | 2 |
| 2.2 Existing Facilities and Structures | 2 |
| 3.0 RADIOLOGIC SURVEY | 4 |
| 3.1 Introduction | 4 |
| 3.2 Gamma Exposure-Rate Surveys | 4 |
| 3.2.1 Exterior Findings | 4 |
| 3.2.2 Interior Findings | 4 |
| 3.3 Boreholes, Soil Samples, and Other Measurements | 4 |
| 3.4 Radon/Radon Daughter Concentration | 5 |
| 3.5 Extent of Contamination | 5 |
| 4.0 RECOMMENDED REMEDIAL ACTION | 7 |
| 4.1 Decontamination and Restoration | 7 |
| 4.2 Evaluation of Recommended Remedial Action | 7 |
| 5.0 REFERENCES | 8 |
| 6.0 APPENDIX | 9 |

1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-01192-SC, is an office building and warehouse located at 410 Hill Avenue, Grand Junction, Colorado.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at this property. This assessment includes recommended remedial action, estimated volume of 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, 42 cu. yd.; interior, 0 cu. yd.

Estimated cost to perform remedial action, including dislocation when applicable, is \$4,601. Remedial action on this property will take approximately 8 days to complete.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 410 Hill Avenue, Grand Junction, Colorado

Zoning: Residential (RMF-32)

Lot Size: Approximately 21,875 sf (0.5 acre)

Legal Description: Lots 26 to 32, Block 30, City of Grand Junction, County of Mesa, State of Colorado

Point of Reference: This property is located approximately 2 miles northwest 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: | Alley |
| South: | Hill Avenue |
| East: | Single-family residence |
| West: | Fourth Street |

2.2 Existing Facilities and Structures

Primary Structure:

| | |
|--------------------|--|
| Type: | Single-story office building and warehouse |
| Size: | Approximately 8,002 sf |
| Construction Date: | 1938 |
| Construction: | Wood-frame with wood siding |
| Foundation: | Concrete stem wall and spread footing |
| Footing Depth: | Approximately 5' -0" to bottom of footing from grade |
| Basement: | Yes; partial basement |
| Crawl Space: | Yes; partial crawl space |
| Condition: | Good |

Other Structures:

| | |
|---------------|-------------------------------------|
| Type: | Single-story metal storage building |
| Size: | Approximately 1,744 sf |
| Construction: | Prefabricated metal building |

| | |
|---------------|---------------------------------|
| Foundation: | Concrete slab and footing |
| Condition: | Good |
| Type: | Single-story metal storage shed |
| Size: | Approximately 200 sf |
| Construction: | Metal-framed walls and roof |
| Foundation: | Concrete slab and footing |
| Condition: | Good |

General Remarks:

Structures, utilities, landscaping, and other special features of this property are included in Appendix Figure 2.2.

Historical Data:

This structure is not over 50 years old. Therefore, it does not meet the eligibility criteria for consideration of inclusion on the National Register of Historic Places.

3.0 RADIOLOGIC SURVEY

3.1 Introduction

Radiologic data were collected by Bendix at DOE ID No. GJ-01192-SC on May 6, 1985. Data collection methods were performed in accordance with procedures fully described in the Radiologic Support Operations Procedures Manual GJ-07(84) (Bendix Field Engineering Corporation, 1984). These data were evaluated to determine the areal and vertical extent of uranium mill tailings contamination at this property as well as any other contaminated material that may have originated from the millsite.

A review of historical information from the files of the Colorado Department of Health (CDH) and the inclusion data from Oak Ridge National Laboratory (ORNL) was conducted. These records indicate contamination associated with the city sidewalk.

The Bendix radiologic survey was designed to investigate the entire property, with emphasis on previously identified areas of contamination. Conclusions based upon data analyses are discussed in Section 3.5, Extent of Contamination. Photocopies of the Official Survey Report, Memo of Understanding, team leader notes, 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 15 uR/h
Highest Outside Gamma Reading (HOG): 64 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: 11 to 14 uR/h
Highest Inside Gamma Reading (HIG): 14 uR/h

Interior gamma exposure-rate measurements are summarized in Appendix Table 3.2. Appendix Figures 3.2a, 3.2b, and 3.3c show the 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 Figure 3.3. Data from these investigations are included in Appendix Table 3.1.

3.4 Radon/Radon Daughter Concentration (RDC)

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

3.5 Extent of Contamination

Appendix Figure 3.4 shows identified areas and estimated depths of contamination on this property, based on assessments of all measurements taken. As noted in this figure, areas recommended for remedial action that contain identified residual radioactive materials are:

- (AREA A) The soil under a portion of the 3-inch-thick city sidewalk west of the primary structure is contaminated. The total depth of contamination is 12 inches (approximately 49 sf).
- (AREA B) At the southwest corner of the primary structure, the soil under a section of the 4-inch-thick city sidewalk is contaminated to a total depth of 12 inches (approximately 42 sf).
- (AREA C) South of Area B, a small grass-covered area has contamination extending to a depth of 9 inches (approximately 7 sf).
- (AREA D) South of the primary structure, in the lawn, the depth of contamination is 12 inches (approximately 48 sf).
- (AREA E) Northeast of Area D, contamination extends to a depth of 6 inches. The ground cover is grass (approximately 28 sf).
- (AREA F) Contamination in the lawn south of Area E is 18 inches deep (approximately 36 sf).
- (AREA G) The 5-inch-thick city sidewalk south of the main entrance to the primary structure is contaminated to a total depth of 15 inches (approximately 195 sf).
- (AREA H) Adjacent to Area G on the east, the lawn is contaminated to a depth of 12 inches (approximately 30 sf).
- (AREA I) A section of the 6-inch-thick city sidewalk south of the primary structure has contamination extending to a total depth of 12 inches (approximately 90 sf).
- (AREA J) A small section of the lawn east of Area I is contaminated to a 15-inch depth (approximately 39 sf).
- (AREA K) South of the metal building, a gravelled area is contaminated to a depth of 15 inches (approximately 74 sf).
- (AREA L) South of Area K, the 6-inch-thick city sidewalk has contamination extending to a total depth of 18 inches (approximately 185 sf).

- (AREA M) A section of the lawn south of Area L is contaminated to a depth of 6 inches (approximately 32 sf).
- (AREA N) Adjacent to the south edge of the sidewalk (Area L), the lawn is contaminated to a depth of 15 inches (approximately 84 sf).

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

The recommended remedial action for this property, DOE ID No. GJ-01192-SC, includes removal of all areas identified as containing radioactive material (as discussed in Section 3.5 and shown in Appendix Figure 3.4) 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 \$4,601.

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 | 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 3.2a | Interior Gamma Exposure Rates |
| Figure 3.2b | Interior Gamma Exposure Rates |
| Figure 3.2c | Interior Gamma Exposure Rates |
| Figure 3.3 | Sample Locations |
| Figure 3.4 | Estimated Extent of Contamination |

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

Exterior Gamma Scan Field Map

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 1 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---------------------------|
| | | | | Tot. Ct | Spectr. | | |
| 1 | 124147 | 03 | TC | 2.8 | | * | Water line |
| | | 06 | TC | 3.4 | | * | Water at bottom |
| | | 09 | TC | 3.8 | | * | |
| | | 12 | TC | 3.8 | | * | DC = 0 inches |
| | | 15 | TC | 3.9 | | * | |
| | | 18 | TC | 4.0 | | * | |
| | | 21 | TC | 3.9 | | * | |
| | | 24 | TC | 3.9 | | * | |
| | | 27 | TC | 3.9 | | * | |
| | | 30 | TC | 3.9 | | * | |
| | | 33 | TC | 3.7 | | * | |
| | | 36 | TC | 3.7 | | * | |
| | | 39 | TC | 3.6 | | * | |
| | | 42 | TC | 3.6 | | * | |
| | | 45 | TC | 3.6 | | * | |
| | | 48 | TC | 3.6 | | * | |
| | | 51 | TC | 3.6 | | * | |
| | | 54 | TC | 3.6 | | * | |
| | | 57 | TC | 3.7 | | * | |
| | | 60 | TC | 3.6 | | * | |
| | | 63 | TC | 3.6 | | * | |
| | | 66 | TC | 3.6 | | * | |
| | | 69 | TC | 3.5 | | * | |
| | | 72 | TC | 3.4 | | * | |
| | | 75 | TC | 3.1 | | * | |
| 2 | 127270 | 03 | TC | 3.3 | | * | Two feet west of sidewalk |
| | | 06 | TC | 3.6 | | * | |
| | | 09 | TC | 3.8 | | * | |
| | | 12 | TC | 3.8 | | * | DC = 0 inches |
| | | 15 | TC | 3.8 | | * | |
| | | 18 | TC | 3.8 | | * | |
| | | 21 | TC | 3.8 | | * | |
| | | 24 | TC | 3.9 | | * | |
| | | 27 | TC | 3.8 | | * | |
| 3 | 130270 | 03 | TC | 15.8 | | * | Through sidewalk |
| | | 06 | BH | 19.3 | 11.6 | * | |
| | | 09 | TC | 14.6 | | * | |
| | | 12 | TC | 10.5 | | * | DC = 12 inches |
| | | 15 | TC | 6.1 | | * | Based on the |
| | | 18 | TC | 5.8 | | * | deconvolution graph |
| | | 21 | TC | 5.1 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 2 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---------------------|
| | | | | Tot. Ct | Spectr. | | |
| 3 | 130270 | 24 | TC | 5.0 | | * | |
| | | 27 | TC | 4.7 | | * | |
| | | 30 | BH | 4.5 | 2.6 | * | |
| | | 33 | TC | 4.3 | | * | |
| 4 | 140157 | 00 | DS | 5.6 | | * | South of sidewalk |
| | | 03 | TC | 5.1 | | * | |
| | | 06 | TC | 5.6 | | * | |
| | | 09 | TC | 4.8 | | * | DC = 9 inches |
| | | 12 | TC | 4.0 | | * | Based on the |
| | | 15 | TC | 3.9 | | * | deconvolution graph |
| | | 18 | TC | 3.8 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.6 | | * | |
| | | 27 | TC | 3.5 | | * | |
| | | 30 | TC | 3.3 | | * | |
| | | 33 | TC | 3.2 | | * | |
| | | 36 | TC | 3.1 | | * | |
| | | 39 | TC | 3.0 | | * | |
| | | 42 | TC | 3.0 | | * | |
| 5 | 140160 | 03 | TC | 16.5 | | * | Through sidewalk |
| | | 06 | TC | 31.6 | | * | |
| | | 09 | TC | 23.7 | | * | |
| | | 12 | TC | 15.2 | | * | DC = 12 inches |
| | | 15 | TC | 10.3 | | * | Based on the |
| | | 18 | TC | 8.1 | | * | deconvolution graph |
| | | 21 | TC | 6.6 | | * | |
| | | 24 | TC | 6.0 | | * | |
| | | 27 | TC | 5.4 | | * | |
| | | 30 | TC | 5.0 | | * | |
| | | 33 | TC | 4.6 | | * | |
| | | 36 | TC | 4.4 | | * | |
| | | 39 | TC | 4.3 | | * | |
| 6 | 143146 | 03 | TC | 2.9 | | * | Lawn |
| | | 06 | TC | 3.4 | | * | |
| | | 09 | TC | 3.7 | | * | DC = 0 inches |
| | | 12 | TC | 3.7 | | * | |
| | | 15 | TC | 3.7 | | * | |
| | | 18 | TC | 3.7 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.6 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 3 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|--|
| | | | | Tot. Ct | Spectr. | | |
| 6 | 143146 | 27 | TC | 3.7 | | * | |
| | | 30 | TC | 3.7 | | * | |
| 7 | 149147 | 00 | DS | 6.3 | | * | 5 feet south of sidewalk |
| | | 06 | DS | 4.0 | | * | |
| | | 03 | TC | 4.9 | | * | |
| | | 06 | TC | 5.3 | | * | |
| | | 09 | TC | 5.1 | | * | |
| | | 12 | TC | 4.5 | | * | DC = 12 inches Based on the deconvolution graph |
| | | 15 | TC | 4.1 | | * | |
| | | 18 | TC | 4.0 | | * | |
| | | 21 | TC | 3.9 | | * | |
| | | 24 | TC | 3.9 | | * | |
| | | 27 | TC | 3.9 | | * | |
| | | 30 | TC | 3.7 | | * | |
| | | 33 | TC | 3.6 | | * | |
| | | 36 | TC | 3.5 | | * | |
| 8 | 156147 | 00 | DS | 7.6 | | * | South of primary structure |
| | | 03 | TC | 5.2 | | * | |
| | | 06 | TC | 7.3 | | * | |
| | | 09 | TC | 8.5 | | * | |
| | | 12 | TC | 8.1 | | * | |
| | | 15 | TC | 6.9 | | * | DC = 18 inches Based on the deconvolution graph |
| | | 18 | TC | 5.4 | | * | |
| | | 21 | TC | 4.9 | | * | |
| | | 24 | TC | 4.5 | | * | |
| | | 27 | TC | 4.3 | | * | |
| | | 30 | TC | 4.1 | | * | |
| | | 33 | TC | 3.9 | | * | |
| | | 36 | TC | 3.7 | | * | |
| 9 | 156154 | 00 | DS | 3.7 | | * | South of primary structure |
| | | 03 | TC | 3.6 | | * | |
| | | 06 | TC | 4.0 | | * | |
| | | 09 | TC | 3.8 | | * | |
| | | 12 | TC | 3.8 | | * | DC = 6 inches Based on all available data |
| | | 15 | TC | 3.7 | | * | |
| | | 18 | TC | 3.7 | | * | |
| | | 21 | TC | 3.9 | | * | |
| | | 24 | TC | 3.8 | | * | |
| | | 27 | TC | 3.8 | | * | |
| | | 30 | TC | 3.7 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 4 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---|
| | | | | Tot. Ct | Spectr. | | |
| 9 | 156154 | 33 | TC | 3.6 | | * | |
| | | 36 | TC | 3.5 | | * | |
| 10 | 160150 | 03 | TC | 8.3 | | * | Through sidewalk |
| | | 06 | TC | 10.5 | | * | |
| | | 09 | TC | 9.3 | | * | |
| | | 12 | TC | 7.1 | | * | |
| | | 15 | TC | 5.8 | | * | DC = 15 inches Based on the deconvolution graph |
| | | 18 | TC | 5.4 | | * | |
| | | 21 | TC | 5.1 | | * | |
| | | 24 | TC | 4.8 | | * | |
| | | 27 | TC | 4.6 | | * | |
| | | 30 | TC | 4.3 | | * | |
| | | 33 | TC | 3.9 | | * | |
| | | 36 | TC | 3.8 | | * | |
| | | 39 | TC | 3.6 | | * | |
| | | 42 | TC | 3.5 | | * | |
| | | 45 | TC | 3.3 | | * | |
| | | 48 | TC | 3.1 | | * | |
| 11 | 168146 | 00 | DS | 4.4 | | * | South of primary structure |
| | | 03 | TC | 4.9 | | * | |
| | | 06 | TC | 6.2 | | * | |
| | | 09 | TC | 6.1 | | * | |
| | | 12 | TC | 5.4 | | * | DC = 12 inches Based on the deconvolution graph |
| | | 15 | TC | 4.9 | | * | |
| | | 18 | TC | 4.7 | | * | |
| | | 21 | TC | 4.4 | | * | |
| 12 | 168155 | 00 | DS | 4.4 | | * | South of primary structure |
| | | 06 | DS | 3.0 | | * | |
| 13 | 199230 | 03 | TC | 3.0 | | * | Sewer line |
| | | 06 | TC | 3.2 | | * | |
| | | 09 | TC | 3.5 | | * | DC = 0 inches |
| | | 12 | TC | 3.7 | | * | |
| | | 15 | TC | 3.7 | | * | |
| | | 18 | TC | 3.9 | | * | |
| | | 21 | TC | 4.0 | | * | |
| | | 24 | TC | 4.0 | | * | |
| | | 27 | TC | 3.9 | | * | |
| | | 30 | TC | 3.8 | | * | |
| | | 33 | TC | 3.7 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 5 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---------------------|
| | | | | Tot. Ct | Spectr. | | |
| 13 | 199230 | 36 | TC | 3.8 | | * | |
| | | 39 | TC | 3.8 | | * | |
| | | 42 | TC | 3.7 | | * | |
| | | 45 | TC | 3.9 | | * | |
| | | 48 | TC | 3.8 | | * | |
| | | 51 | TC | 3.7 | | * | |
| | | 54 | TC | 3.7 | | * | |
| | | 57 | TC | 3.7 | | * | |
| | | 60 | TC | 3.6 | | * | |
| 14 | 209146 | 03 | TC | 13.7 | | * | Through sidewalk |
| | | 06 | TC | 21.1 | | * | |
| | | 09 | TC | 14.6 | | * | |
| | | 12 | TC | 9.8 | | * | DC = 12 inches |
| | | 15 | TC | 7.2 | | * | Based on the |
| | | 18 | TC | 6.1 | | * | deconvolution graph |
| | | 21 | TC | 5.3 | | * | |
| | | 24 | TC | 4.8 | | * | |
| | | 27 | TC | 4.4 | | * | |
| | | 30 | TC | 4.2 | | * | |
| | | 33 | TC | 3.9 | | * | |
| | | 36 | TC | 3.8 | | * | |
| | | 39 | TC | 3.7 | | * | |
| 15 | 212145 | 00 | DS | 12.8 | | * | South of primary |
| | | 03 | TC | 8.0 | | * | structure |
| | | 06 | TC | 11.7 | | * | |
| | | 09 | TC | 12.4 | | * | |
| | | 12 | TC | 9.7 | | * | |
| | | 15 | TC | 7.0 | | * | DC = 15 inches |
| | | 18 | TC | 5.8 | | * | Based on the |
| | | 21 | TC | 5.0 | | * | deconvolution graph |
| | | 24 | TC | 4.5 | | * | |
| | | 27 | TC | 4.2 | | * | |
| | | 30 | TC | 3.9 | | * | |
| | | 33 | TC | 3.8 | | * | |
| 16 | 212154 | 00 | DS | 10.1 | | * | South of primary |
| | | 06 | DS | 5.4 | | * | structure |
| | | 12 | DS | 3.5 | | * | |
| 17 | 224156 | 03 | TC | 3.2 | | * | Water line |
| | | 06 | TC | 3.3 | | * | DC = 0 inches |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 6 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|-----------------|
| | | | | Tot. Ct | Spectr. | | |
| 17 | 224156 | 09 | TC | 3.4 | | * | |
| | | 12 | TC | 3.5 | | * | |
| | | 15 | TC | 3.6 | | * | |
| | | 18 | TC | 3.5 | | * | |
| | | 21 | TC | 3.5 | | * | |
| | | 24 | TC | 3.4 | | * | |
| | | 27 | TC | 3.4 | | * | |
| | | 30 | TC | 3.4 | | * | |
| | | 33 | TC | 3.4 | | * | |
| | | 36 | TC | 3.4 | | * | |
| | | 39 | TC | 3.5 | | * | |
| | | 42 | TC | 3.4 | | * | |
| | | 45 | TC | 3.4 | | * | |
| | | 48 | TC | 3.3 | | * | |
| | | 51 | TC | 3.4 | | * | |
| | | 54 | TC | 3.4 | | * | |
| | | 57 | TC | 3.5 | | * | |
| | | 60 | TC | 3.5 | | * | |
| 18 | 227236 | 00 | DS | 1.1 | | * | Gas line |
| | | 27 | DS | 1.5 | | * | |
| 19 | 237218 | 03 | TC | 3.2 | | * | Water line |
| | | 06 | TC | 3.4 | | * | East of primary |
| | | 09 | TC | 3.7 | | * | structure |
| | | 12 | TC | 3.8 | | * | |
| | | 15 | TC | 3.8 | | * | DC = 0 inches |
| | | 18 | TC | 3.8 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.6 | | * | |
| | | 27 | TC | 3.6 | | * | |
| | | 30 | TC | 3.6 | | * | |
| | | 33 | TC | 3.7 | | * | |
| | | 36 | TC | 3.8 | | * | |
| | | 39 | TC | 3.8 | | * | |
| | | 42 | TC | 3.8 | | * | |
| | | 45 | TC | 3.8 | | * | |
| | | 48 | TC | 3.7 | | * | |
| | | 51 | TC | 3.5 | | * | |
| | | 54 | TC | 3.5 | | * | |
| | | 57 | TC | 3.4 | | * | |
| | | 60 | TC | 3.4 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 7 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---------------------|
| | | | | Tot. Ct | Spectr. | | |
| 20 | 250260 | 00 | DS | <1.0 | | * | Background |
| | | 03 | TC | 3.3 | | * | |
| | | 06 | TC | 3.7 | | * | |
| | | 09 | TC | 3.9 | | * | DC = 0 inches |
| | | 12 | TC | 3.9 | | * | |
| | | 15 | TC | 4.0 | | * | |
| | | 18 | BH | 4.0 | 1.3 | * | |
| | | 21 | TC | 4.0 | | * | |
| | | 24 | TC | 4.0 | | * | |
| | | 27 | TC | 4.0 | | * | |
| | | 30 | TC | 3.9 | | * | |
| 21 | 280154 | 00 | DS | 3.0 | | * | Grass |
| | | 03 | TC | 3.9 | | * | |
| | | 06 | TC | 4.0 | | * | DC = 6 inches |
| | | 09 | TC | 4.0 | | * | Based on all |
| | | 12 | TC | 4.1 | | * | available data |
| | | 15 | TC | 4.1 | | * | |
| | | 18 | TC | 4.1 | | * | |
| | | 21 | TC | 4.1 | | * | |
| | | 24 | TC | 4.2 | | * | |
| | | 27 | TC | 4.2 | | * | |
| | | 30 | TC | 4.0 | | * | |
| | | 33 | TC | 3.9 | | * | |
| 22 | 280163 | 00 | DS | 31.6 | | * | By sidewalk |
| | | 06 | DS | 12.8 | | * | |
| | | 03 | TC | 13.6 | | * | |
| | | 06 | TC | 18.6 | | * | |
| | | 09 | TC | 19.8 | | * | |
| | | 12 | TC | 16.1 | | * | DC = 15 inches |
| | | 15 | TC | 11.8 | | * | Based on the |
| | | 18 | TC | 9.4 | | * | deconvolution graph |
| | | 21 | TC | 7.6 | | * | |
| | | 24 | TC | 6.8 | | * | |
| | | 27 | TC | 6.1 | | * | |
| | | 30 | TC | 5.7 | | * | |
| | | 33 | TC | 5.4 | | * | |
| | | 36 | TC | 5.1 | | * | |
| | | 39 | TC | 4.8 | | * | |
| | | 42 | TC | 4.7 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 8 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|--|
| | | | | Tot. Ct | Spectr. | | |
| 23 | 290160 | 03 | TC | 50.9 | | * | South of metal building |
| | | 06 | TC | 50.1 | | * | |
| | | 09 | TC | 31.0 | | * | |
| | | 12 | TC | 20.2 | | * | DC = 18 inches Based on the deconvolution graph |
| | | 15 | TC | 15.6 | | * | |
| | | 18 | TC | 11.7 | | * | |
| | | 21 | TC | 9.2 | | * | |
| | | 24 | TC | 8.0 | | * | |
| | | 27 | TC | 7.1 | | * | |
| | | 30 | TC | 6.3 | | * | |
| | | 33 | TC | 5.8 | | * | |
| | | 36 | TC | 5.5 | | * | |
| 24 | 295152 | 03 | TC | 2.8 | | * | South of sidewalk |
| | | 06 | TC | 3.1 | | * | |
| | | 09 | TC | 3.3 | | * | DC = 0 inches |
| | | 12 | TC | 3.5 | | * | |
| | | 15 | TC | 3.6 | | * | |
| | | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.7 | | * | |
| | | 24 | TC | 3.7 | | * | |
| 25 | 300163 | 00 | DS | 22.9 | | * | By sidewalk |
| | | 06 | DS | 28.0 | | * | |
| 26 | 300266 | 03 | TC | 3.0 | | * | Sewer line |
| | | 06 | TC | 3.2 | | * | |
| | | 09 | TC | 3.4 | | * | DC = 0 inches |
| | | 12 | TC | 3.5 | | * | |
| | | 15 | TC | 3.6 | | * | |
| | | 18 | TC | 3.6 | | * | |
| | | 21 | TC | 3.6 | | * | |
| | | 24 | TC | 3.5 | | * | |
| | | 27 | TC | 3.6 | | * | |
| | | 30 | TC | 3.6 | | * | |
| | | 33 | TC | 3.6 | | * | |
| | | 36 | TC | 3.5 | | * | |
| | | 39 | TC | 3.5 | | * | |
| | | 42 | TC | 3.5 | | * | |
| | | 45 | TC | 3.6 | | * | |
| | | 48 | TC | 3.6 | | * | |
| | | 51 | TC | 3.5 | | * | |

Radium Concentrations at Exterior Locations

DOE ID #GJ-01192-SC

410 Hill Avenue

Page 9 of 9

| Loc # | Grid Location | Depth (in.) | Meas. Type | In Situ Ra-226 (pCi/g) | | Chem Ra-226 (pCi/g) | Comments |
|-------|---------------|-------------|------------|------------------------|---------|---------------------|---------------------|
| | | | | Tot. Ct | Spectr. | | |
| 26 | 300266 | 54 | TC | 3.5 | | * | |
| | | 57 | TC | 3.5 | | * | |
| | | 60 | TC | 3.3 | | * | |
| | | 63 | TC | 3.4 | | * | |
| 27 | 306264 | 00 | DS | <1.0 | | * | Gas line |
| | | 22 | DS | <1.0 | | * | |
| 28 | 307155 | 03 | TC | 17.8 | | * | South of sidewalk |
| | | 06 | TC | 24.3 | | * | |
| | | 09 | TC | 22.3 | | * | |
| | | 12 | TC | 16.7 | | * | |
| | | 15 | TC | 11.8 | | * | DC = 15 inches |
| | | 18 | TC | 9.3 | | * | Based on the |
| | | 21 | TC | 7.3 | | * | deconvolution graph |
| | | 24 | TC | 6.2 | | * | |
| | | 27 | TC | 5.6 | | * | |
| | | 30 | TC | 5.3 | | * | |
| | | 33 | TC | 5.1 | | * | |

Measurement Types:

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

Notes: DC = Depth of Contamination
 * = No Soil Sample Taken
 [n] = Reading Taken n-Inches
 Above Floor or Ground
 Date of Survey = 05-06-85
 Team Leader = BJF

| 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) |
|-------------------|---|--------------------------------------|-------------------------------------|--|-------------------------------|---------------------------|
| CRAWL SPACE | 00 | - | - | 10 | 15-16 | 15 |
| GROUND FLOOR | * | * | * | * | 11-14 | * |
| METAL BUILDING | * | * | * | * | 11-14 | * |
| METAL SHED | * | * | * | * | 11-13 | * |

=====

* The CDH and ORNL data indicate the absence of interior contamination at this property. This information was investigated by performing a walking gamma scan. These areas and the ranges of gamma measurements are shown in Appendix Figures 3.2b and 3.2c. Exposure rates for the crawl space are shown in Appendix Figure 3.2a.

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-01192-SC

Page 1 of 2

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|--------------------|-------------------------|-----------|------------------|-----------|--------------------|
| EXTERIOR | | | | | |
| Concrete | | | | | |
| A | 7 x 7 = | 49 | x 0.3 = | 15 | |
| B | 7 x 6 = | 42 | x 0.3 = | 13 | |
| G | 13 x 15 = | 195 | x 0.4 = | 78 | |
| I | 6 x 15 = | 90 | x 0.5 = | 45 | |
| L | 37 x 5 = | 185 | x 0.5 = | 93 | |
| Volume of Concrete | | | | = 244 | = 244/27 = 9 |
| Contaminated Fill | | | | | |
| A | 7 x 7 = | 49 | x 0.7 = | 34 | |
| B | 7 x 6 = | 42 | x 0.7 = | 29 | |
| C | 7 x 1 = | 7 | x 0.8 = | 6 | |
| D | 8 x 6 = | 48 | x 1.0 = | 48 | |
| E | 7 x 4 = | 28 | x 0.5 = | 14 | |
| F | 9 x 4 = | 36 | x 1.5 = | 54 | |
| G | 13 x 15 = | 195 | x 0.9 = | 176 | |
| H | 2 x 15 = | 30 | x 1.0 = | 30 | |
| I | 6 x 15 = | 90 | x 0.5 = | 45 | |
| J | 3 x 13 = | 39 | x 1.3 = | 51 | |
| K | 37 x 2 = | 74 | x 1.3 = | 96 | |

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-01192-SC

| <u>AREA</u> | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-----------------------------|-------------------------|-----------|------------------|-----------|--------------------|
| L | 37 x 5 = | 185 | x 1.0 = | 185 | |
| M | 8 x 4 = | 32 | x 0.5 = | 16 | |
| N | 28 x 3 = | 84 | x 1.3 = | 109 | |
| | | | | 893 | |
| Volume of Contaminated Fill | | | | = | 893/27 = 33 |
| | | | | | 42 |
| TOTAL VOLUME - EXTERIOR | | | | | = 42 |

See Appendix Figure 3.4 For Areas

=====

Table 4.2
Estimated Cost of Decontamination and Restoration
DOE ID No. GJ-01192-SC

Page 1 of 1

EXTERIOR

| | |
|--|--------|
| Remove concrete sidewalks 561 sf @ \$1.50/sf | \$ 842 |
| Remove identified residual radioactive material (machine-open) 33 cy @ \$14.50/cy | 479 |
| Replace roadbase 22 cy @ \$11.50/cy | 253 |
| Replace topsoil 10 cy @ \$9.50/cy | 95 |
| Install sod 304 sf @ \$.50/sf | 152 |
| Install gravel 1 cy @ \$13.50/cy | 14 |
| Install 4" concrete sidewalks 561 sf @ \$1.50/sf | 842 |

TOTAL EXTERIOR \$ 2,677

ACCESS CONTROL 400

SUBTOTAL \$ 3,077

CONTINGENCY @ 15% 462

SUBTOTAL \$ 3,539

CONTRACTOR OVERHEAD & PROFIT @ 30% 1,062

GRAND TOTAL \$ 4,601

RDJ:071085

REA01192/REA-GE002/LMR

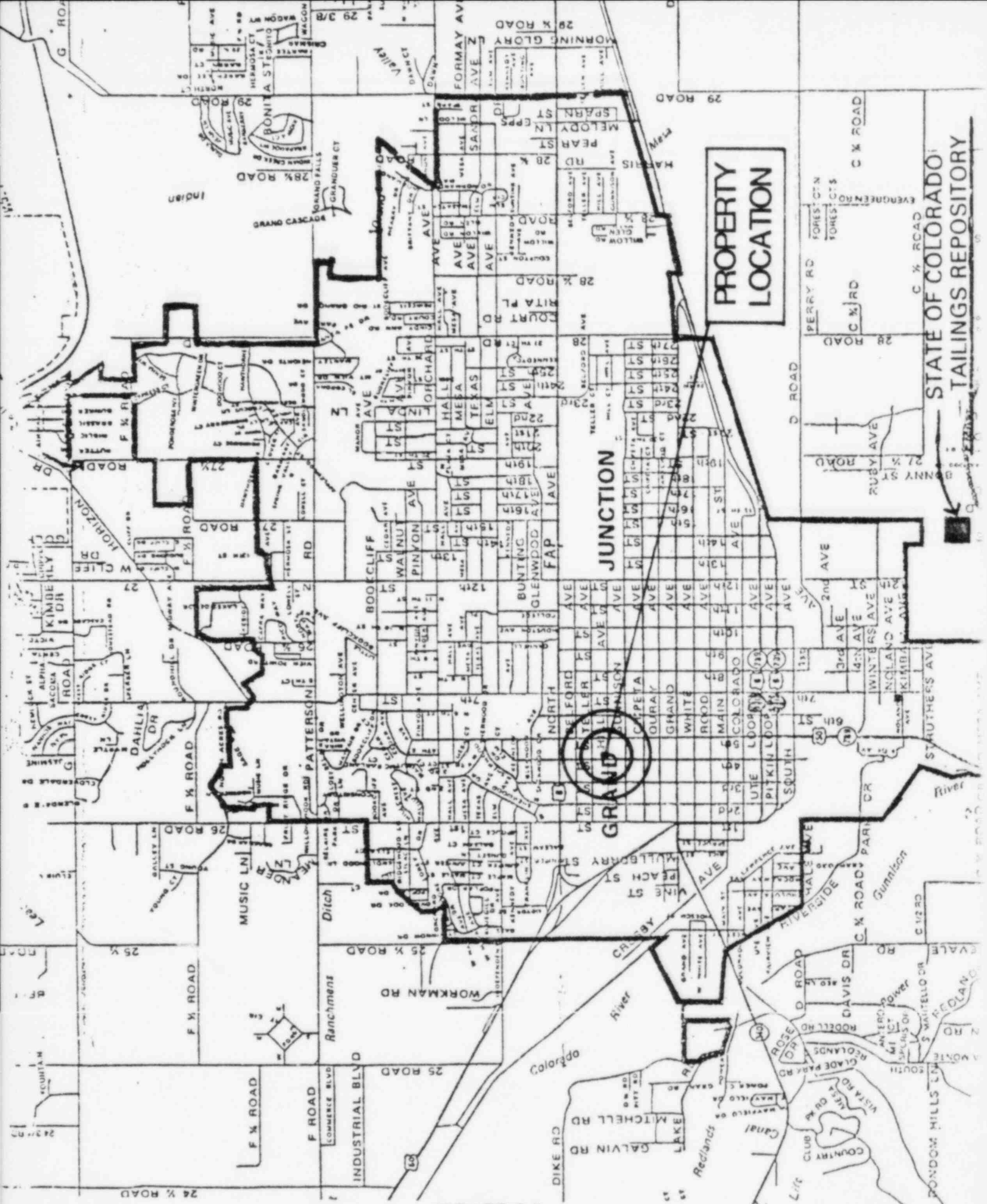
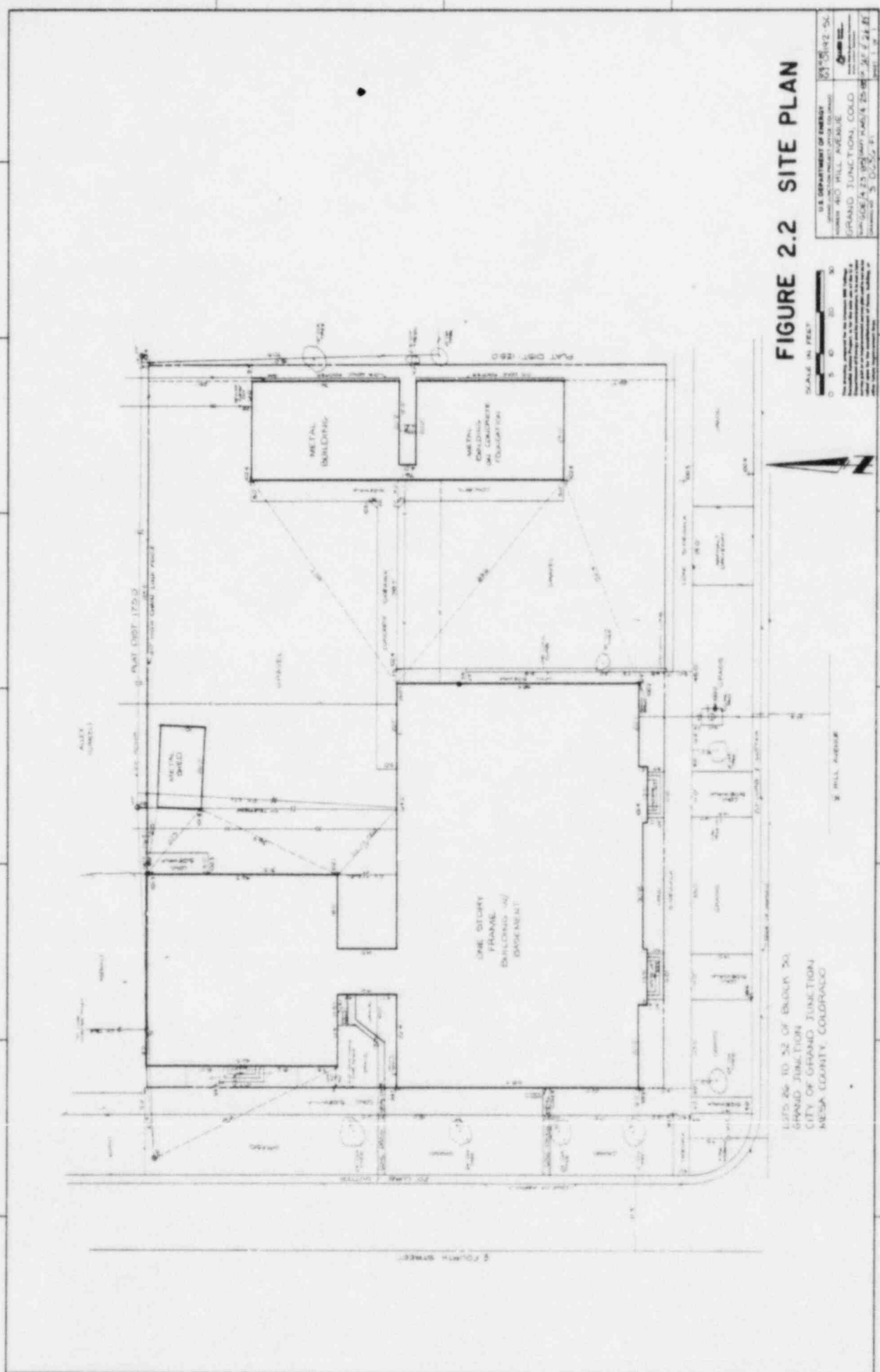
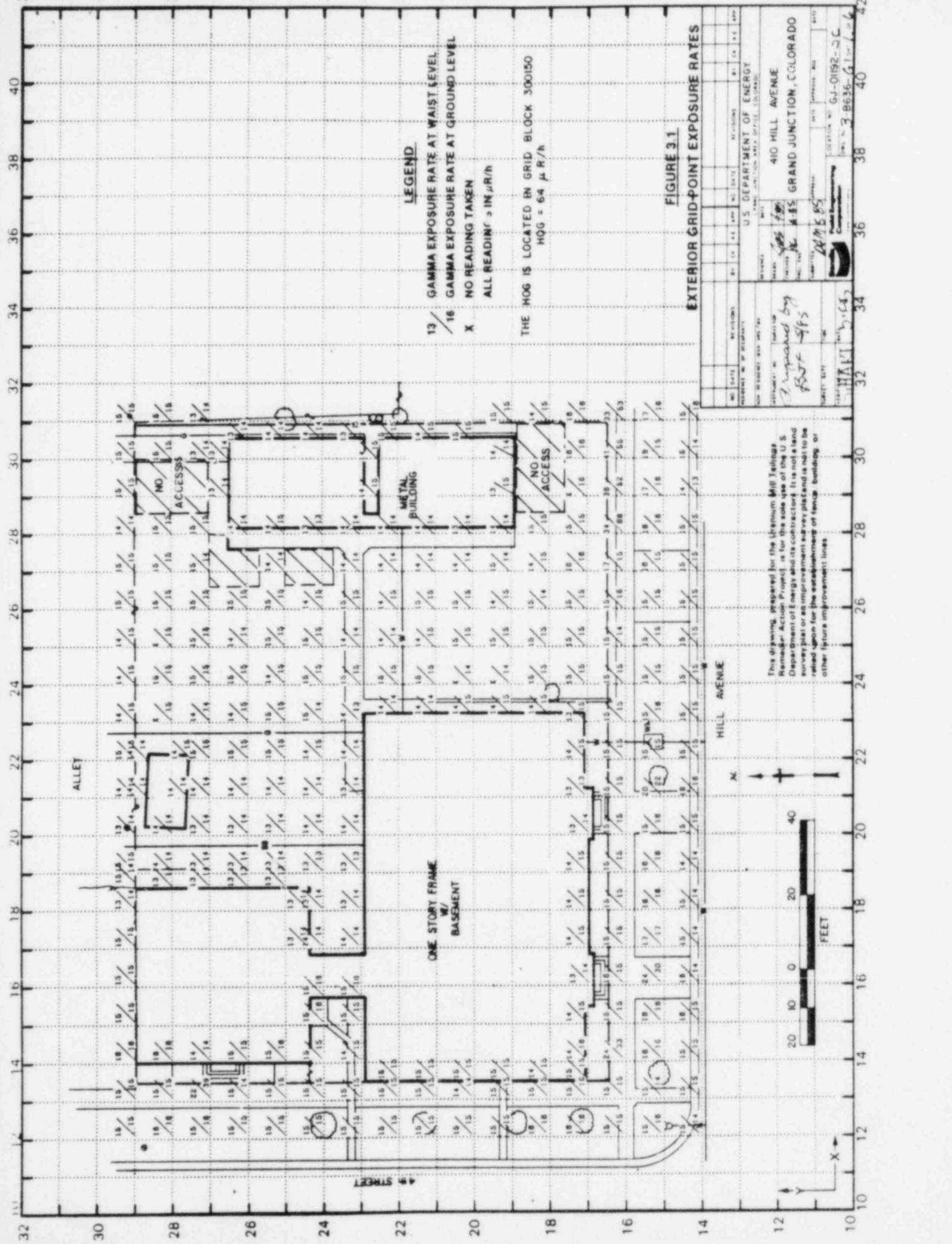


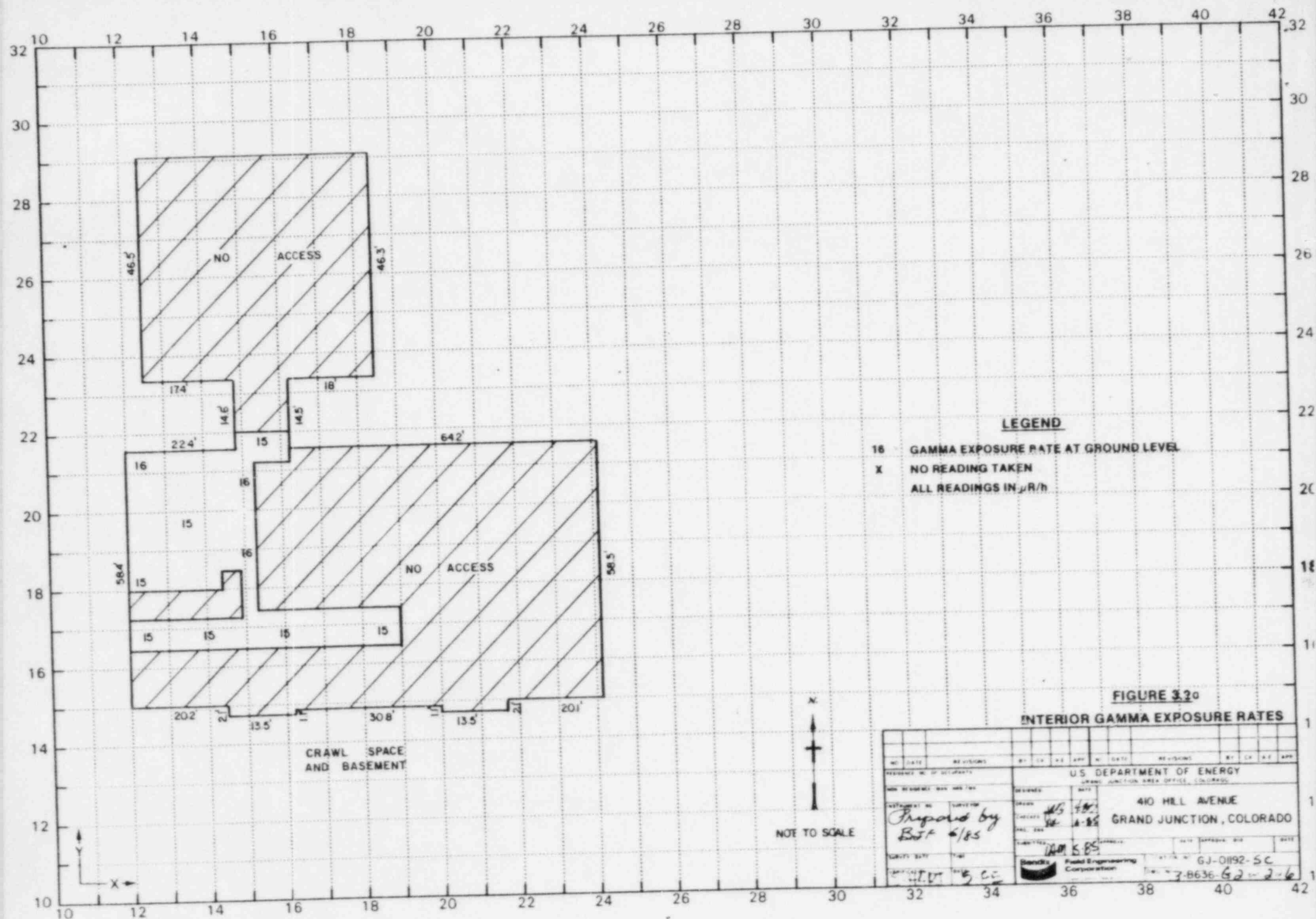
FIGURE 2.1
VICINITY MAP

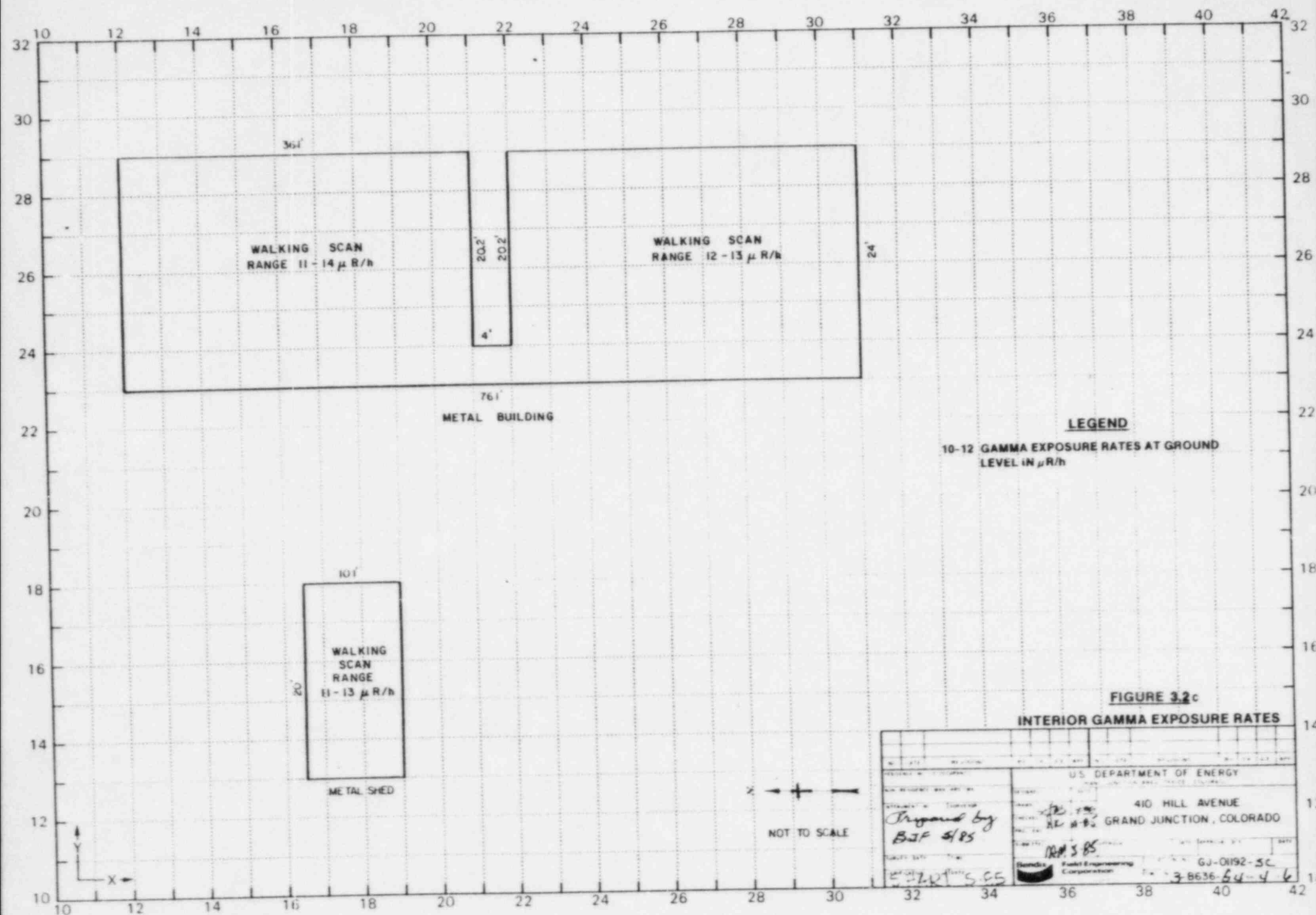


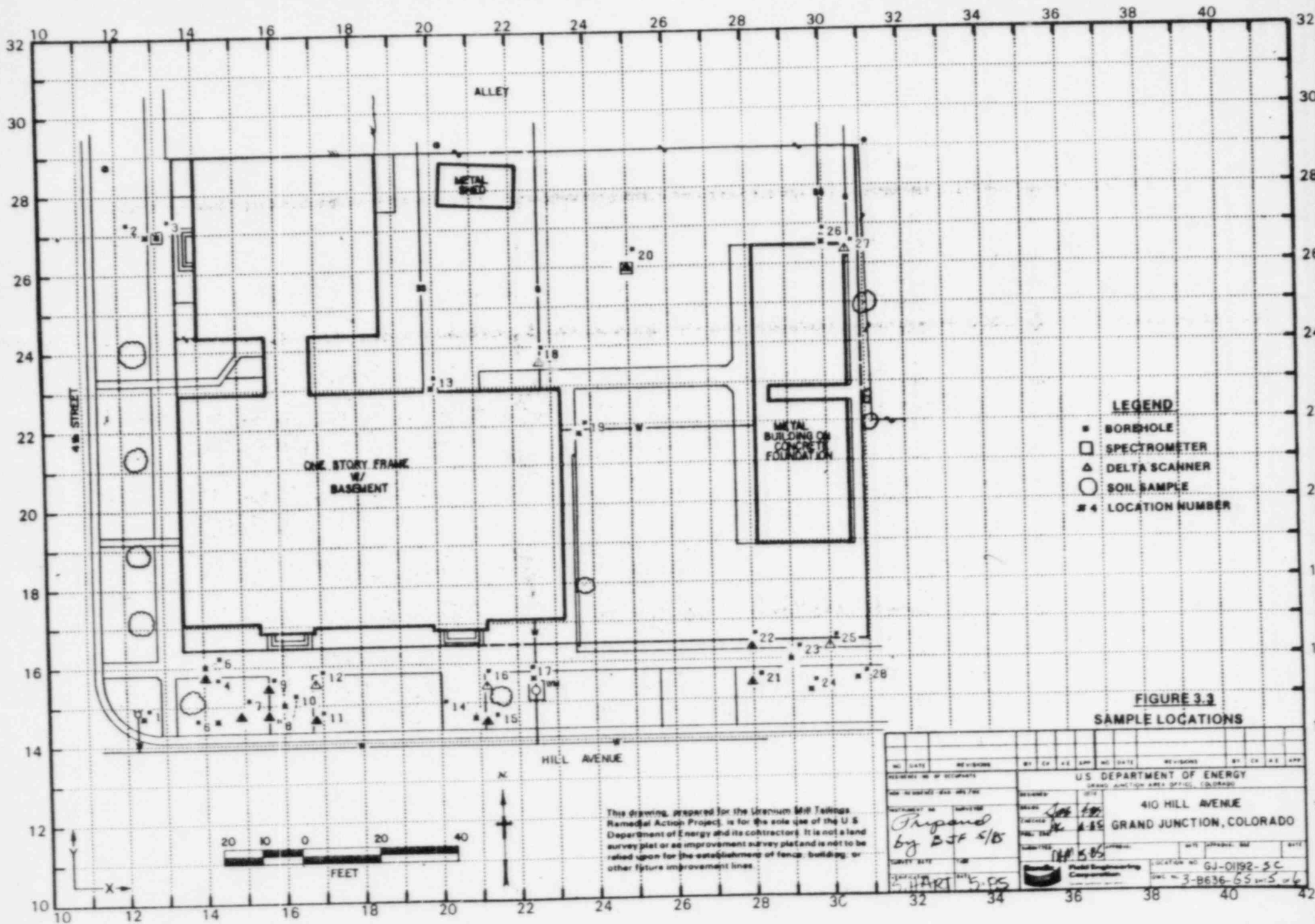


This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plot or an improvement survey plot and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

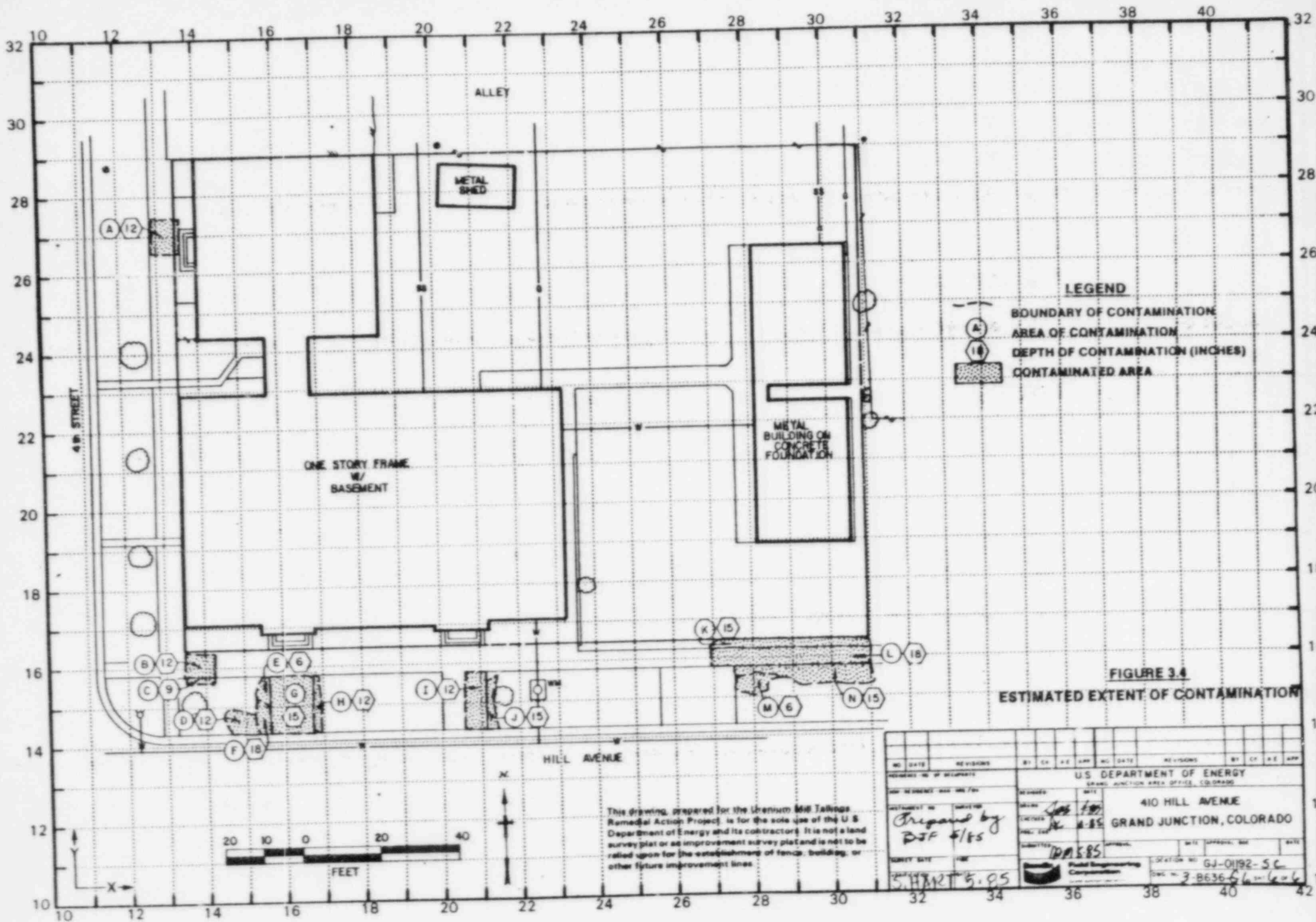
| | | | | | | |
|---|-----------|----|------|----------|----|------|
| NO. DATE | REVISIONS | BY | DATE | NO. DATE | BY | DATE |
| U.S. DEPARTMENT OF ENERGY OFFICE OF ENVIRONMENTAL HEALTH, SAFETY AND HAZARDOUS WASTE 410 HILL AVENUE GRAND JUNCTION, COLORADO 81501 DRAWN BY: <i>W.B. 8/85</i> CHECKED BY: <i>W.B. 8/85</i> PROJECT NO.: <i>3-8636-61</i> DRAWING NO.: <i>3-8636-61-1</i> | | | | | | |







| NO. | DATE | REVISIONS | BY | CHK | A.E. | APP. | NO. | DATE | REVISIONS | BY | CHK | A.E. | APP. |
|---|------|-----------|----|-----|------|------|---|------|-----------|----|-----|------|------|
| PREPARED BY: <i>BJF 5/8</i> SURVEY SITE: <i>CHART 5.05</i> | | | | | | | U.S. DEPARTMENT OF ENERGY GRAND JUNCTION AREA OFFICE, COLORADO 410 HILL AVENUE GRAND JUNCTION, COLORADO LOCATION NO: GJ-01192-SC DOW: 3-B636-55-5-5-6 | | | | | | |



This drawing, prepared for the Shenandoah Valley Tailings Remedial Action Project, is for the sole use of the U.S. Department of Energy and its contractors. It is not a land survey plat or an improvement survey plat and is not to be relied upon for the establishment of fence, building, or other future improvement lines.

3/85

DOE ID NO. GJ-01192-SC

Date May 15, 1985

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

Official Survey Report

Property Address 410 Hill Avenue

Property Owner School District #51 (Mesa County)

Address of Owner (if different from above)

Report Prepared By Billie J. Foust

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

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

☒ 1 Residual radioactive materials found at the following locations:

☒ 1 In open areas.

☒ 1 Under or around exterior improvements.

☐ 1 Under or around a typically nonoccupied structure.

☐ 1 Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

☐ 1 Levels of radiation from residual radioactive materials, if any, do not exceed EPA Standards and no action is required under the Uranium Mill Tailings Remedial Action Project.

☒ 1 Levels of radiation from residual radioactive materials exceed EPA Standards such that Remedial Action is recommended and will be accomplished, with your consent, as soon as budget and schedule permit.

cc:

G. A. Franz, III, GJ/CDH

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 14 uR/h
HOG = 64 uR/h



Bendix
Aerospace

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

May 20, 1985

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

ATTN: Jon Luellen

Dear Jon:

The following comments are in order regarding the technical review for GJ-01192-SC (410 Hill Avenue) which I received in the mail May 20, 1985.

1. The grid point reading at 306230 should be 13/15. It was entered into the computer incorrectly.
2. The depths for boreholes #5 (140160) and #23 (290160) were called the way we have been directed to call them at this point in time. If the contamination is deeper, it will be removed during remedial action.

Thank you for your time and comments. If you have any further questions, please call me at 242-8621, ext. 435.

Very truly yours,

A handwritten signature in cursive script that reads "Billie J. Foust".

Billie J. Foust
RAD Group Leader



Bendix
Aerospace

Memorandum

Bendix Field Engineering Corporation
Grand Junction Operations
Grand Junction, Colorado

Date: May 6, 1985

To: Files

From: Billie Foust *BJF*

Subject: Team Leader Notes - GJ-01192-SC (410 Hill Avenue)

Owners: School District #51

Weather: Rainy

Occupancy: These are office buildings. The occupancy is unknown.

Field Crew

B. Foust

B. Moody

S. Larsen

S. Southern

M. Dexter

P. Tuhey

H. Mattison

A. Raabe

Instruments

Scintillometers: C-1181, C-1208, C-1127, C-1128

Deltas: C-3938, C-3936

PRS-1 Total Counts: C-4005, C-3957

Borehole Gad-6: C-3361

The entire property was gridded and the walking scan and grid point survey were performed.

Several locations were flagged for coring. The sidewalks have been patched and it appears that tailings were used underneath them. We will need at least five cores.

The interiors were surveyed and no contamination was found. The large building has a partial basement with a crawl space that was mostly inaccessible. The other buildings are slab on grade.

All utility lines were investigated. They are not contaminated.

All personnel were alpha scanned.

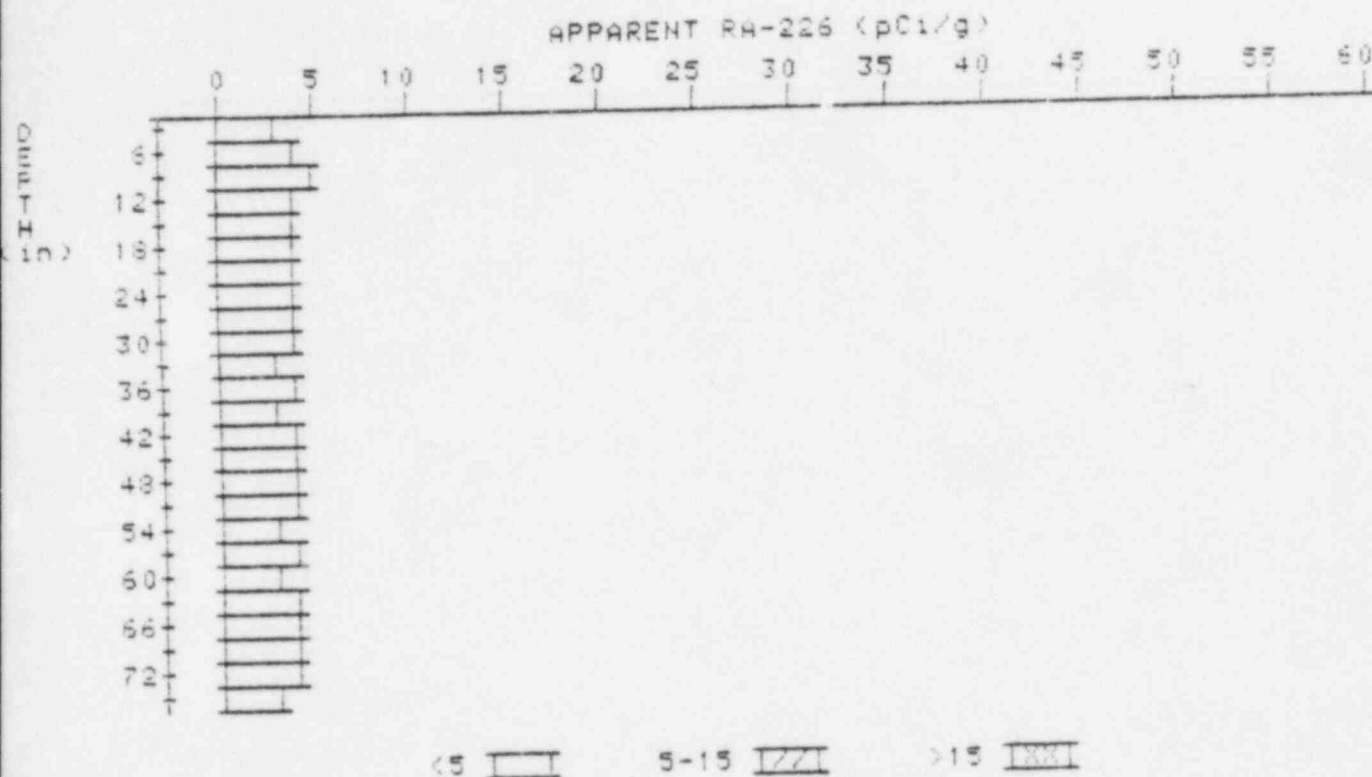
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

1

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 1

LOCATION: 124147



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 2.8 | 2.8 |
| 6 | 3.4 | 3.8 |
| 9 | 3.8 | 4.8 |
| 12 | 3.8 | 3.8 |
| 15 | 3.9 | 3.9 |
| 18 | 4.0 | 4.4 |
| 21 | 3.9 | 3.7 |
| 24 | 3.9 | 3.9 |
| 27 | 3.9 | 3.9 |
| 30 | 3.9 | 4.6 |
| 33 | 3.7 | 3.6 |
| 36 | 3.7 | 3.9 |
| 39 | 3.6 | 3.4 |
| 42 | 3.6 | 3.6 |

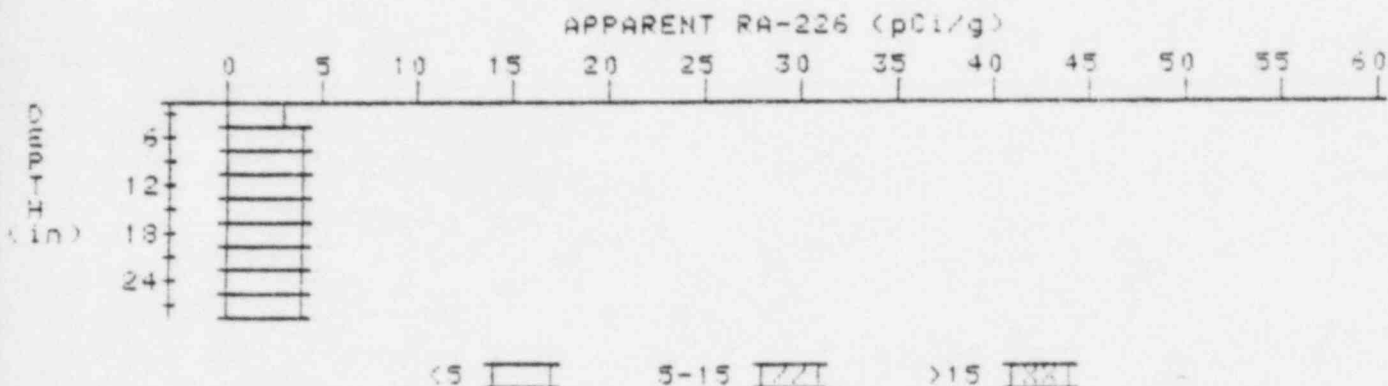
45
48
51
54
57
60
63
66
69
72
75

3.6
3.6
3.6
3.6
3.7
3.6
3.6
3.6
3.5
3.4
3.1

3.6
3.6
3.6
3.4
4.1
3.4
3.6
3.6
3.5
3.6
3.1

APPARENT RADIUM-226 CONCENTRATION 2 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 2
LOCATION: 127270



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.3 | 3.3 |
| 6 | 3.6 | 3.8 |
| 9 | 3.8 | 4.2 |
| 12 | 3.8 | 3.8 |
| 15 | 3.8 | 3.8 |
| 18 | 3.8 | 3.8 |
| 21 | 3.8 | 3.6 |
| 24 | 3.9 | 4.3 |
| 27 | 3.8 | 3.8 |

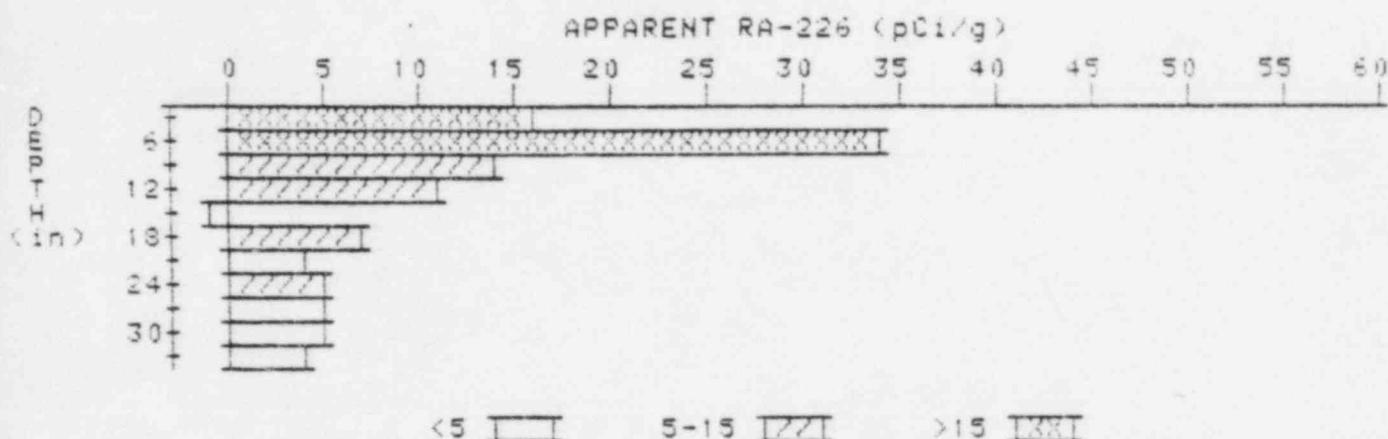
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

3

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 3

LOCATION: 130270



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 15.3 | 15.3 |
| 6 | 19.3 | 33.9 |
| 9 | 14.6 | 13.5 |
| 12 | 10.5 | 11.0 |
| 15 | 6.1 | -1.2 |
| 18 | 5.8 | 6.5 |
| 21 | 5.1 | 4.0 |
| 24 | 5.0 | 5.4 |
| 27 | 4.7 | 4.5 |
| 30 | 4.5 | 4.5 |
| 33 | 4.3 | 4.3 |

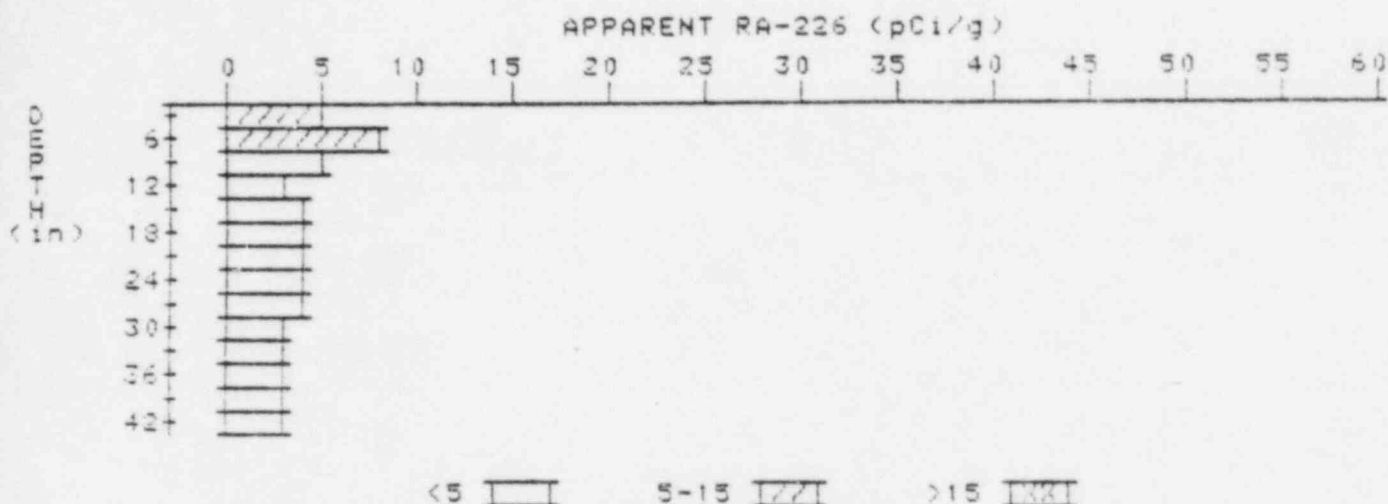
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

4

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 4

LOCATION: 140157



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 5.1 | 5.1 |
| 6 | 5.6 | 7.9 |
| 9 | 4.3 | 4.3 |
| 12 | 4.0 | 2.8 |
| 15 | 3.9 | 3.9 |
| 18 | 3.8 | 3.8 |
| 21 | 3.7 | 3.7 |
| 24 | 3.6 | 3.6 |
| 27 | 3.5 | 3.7 |
| 30 | 3.3 | 3.1 |
| 33 | 3.2 | 3.2 |
| 36 | 3.1 | 3.1 |
| 39 | 3.0 | 2.8 |
| 42 | 3.0 | 3.0 |

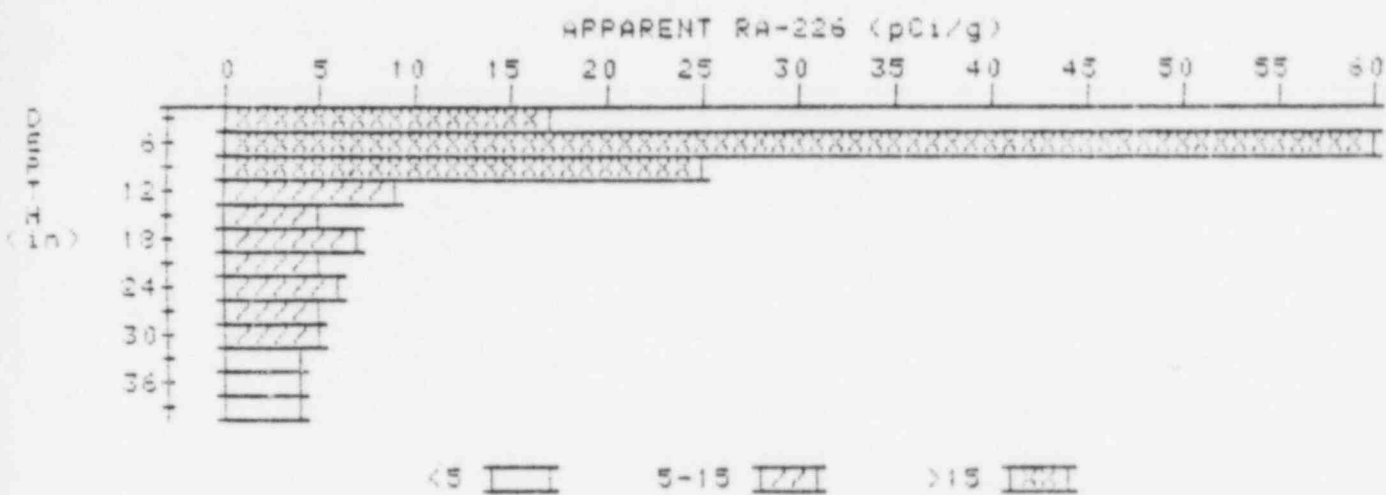
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

5

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 5

LOCATION: 140160



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 16.5 | 16.5 |
| 6 | 31.6 | 72.5 |
| 9 | 23.7 | 24.3 |
| 12 | 15.2 | 8.8 |
| 15 | 10.3 | 5.5 |
| 18 | 8.1 | 6.9 |
| 21 | 6.6 | 5.0 |
| 24 | 6.0 | 6.0 |
| 27 | 5.4 | 5.0 |
| 30 | 5.0 | 5.0 |
| 33 | 4.6 | 4.2 |
| 36 | 4.4 | 4.2 |
| 39 | 4.3 | 4.3 |

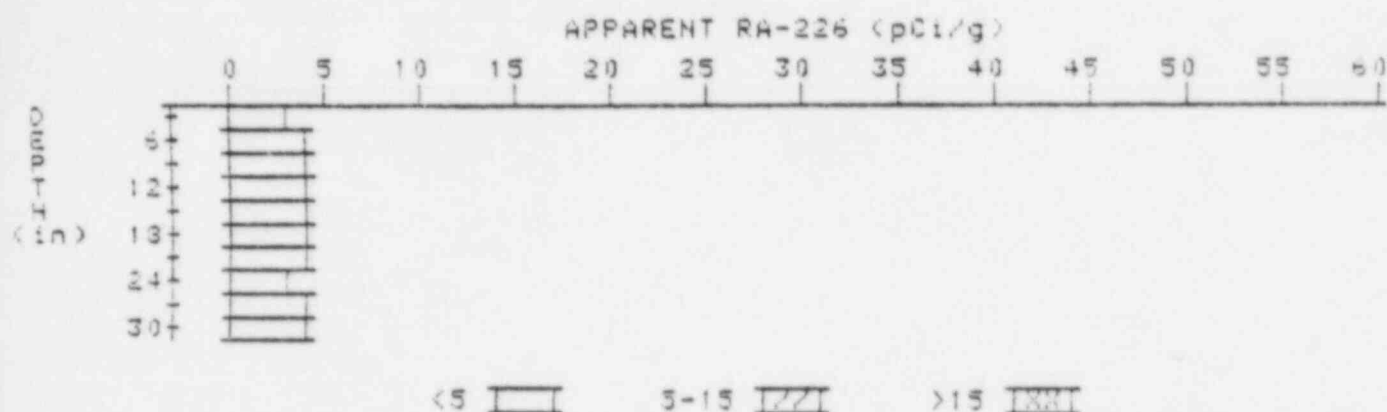
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

6

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 6

LOCATION: 143146



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 2.9 | 2.9 |
| 6 | 3.4 | 3.6 |
| 9 | 3.7 | 4.2 |
| 12 | 3.7 | 3.7 |
| 15 | 3.7 | 3.7 |
| 18 | 3.7 | 3.7 |
| 21 | 3.7 | 3.9 |
| 24 | 3.6 | 3.2 |
| 27 | 3.7 | 3.9 |
| 30 | 3.7 | 3.7 |

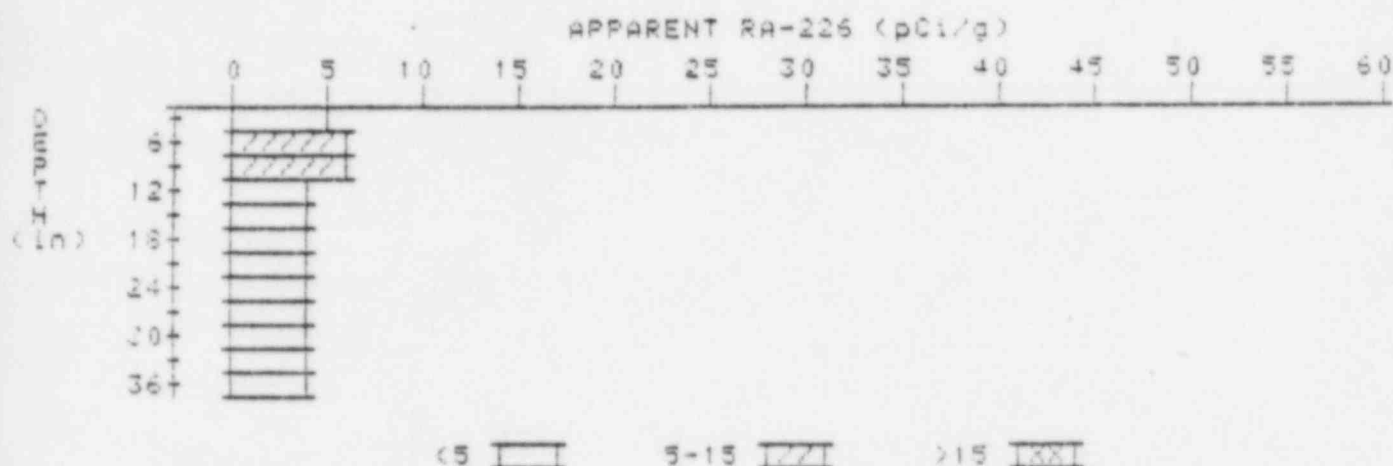
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

7

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 7

LOCATION: 149147



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 4.9 | 4.9 |
| 6 | 5.3 | 6.4 |
| 9 | 5.1 | 5.8 |
| 12 | 4.5 | 4.1 |
| 15 | 4.1 | 3.6 |
| 18 | 4.0 | 4.0 |
| 21 | 3.9 | 3.7 |
| 24 | 3.9 | 3.9 |
| 27 | 3.9 | 4.3 |
| 30 | 3.7 | 3.8 |
| 33 | 3.6 | 3.6 |
| 36 | 3.5 | 3.8 |

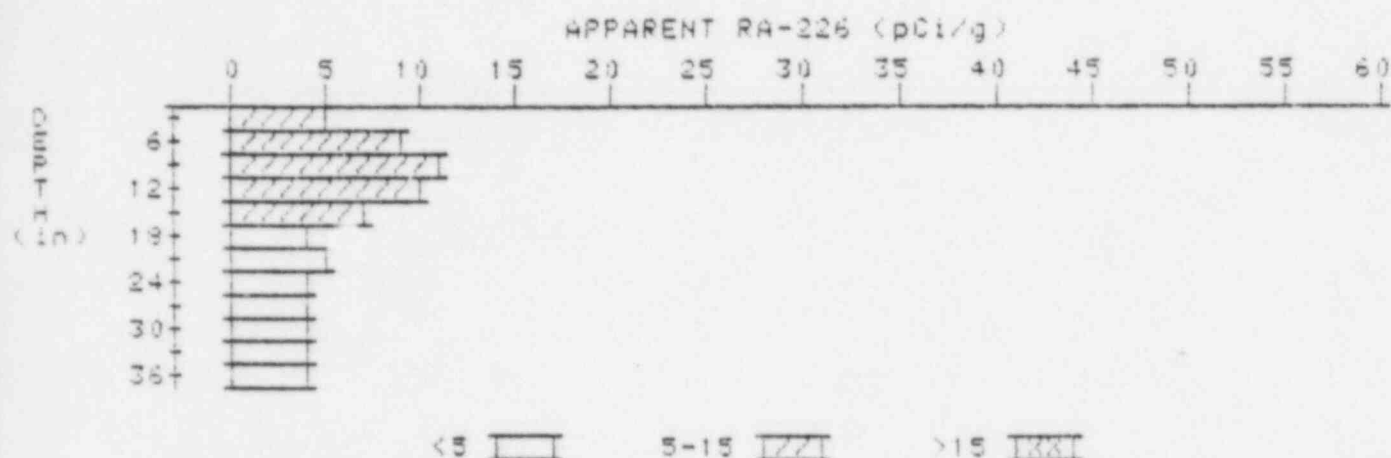
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

8

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 8

LOCATION: 156147



| Depth (in) | Apparent Radium-226 (pCi/g) | Apparent Radium-226 (pCi/g) |
|---------------|-----------------------------------|-----------------------------------|
| | Undeconvolved | Deconvolved |
| 3 | 5.2 | 5.2 |
| 6 | 7.3 | 8.9 |
| 9 | 8.5 | 11.3 |
| 12 | 8.1 | 9.5 |
| 15 | 6.9 | 7.4 |
| 18 | 5.4 | 3.6 |
| 21 | 4.9 | 4.7 |
| 24 | 4.5 | 4.1 |
| 27 | 4.3 | 4.3 |
| 30 | 4.1 | 4.1 |
| 33 | 3.9 | 3.9 |
| 36 | 3.7 | 3.7 |

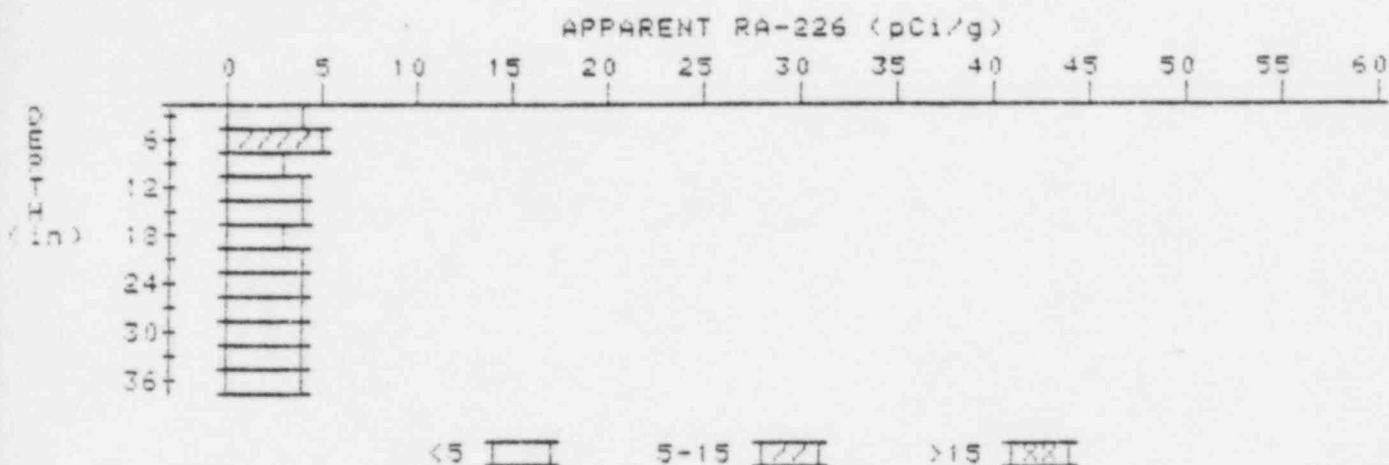
APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 9

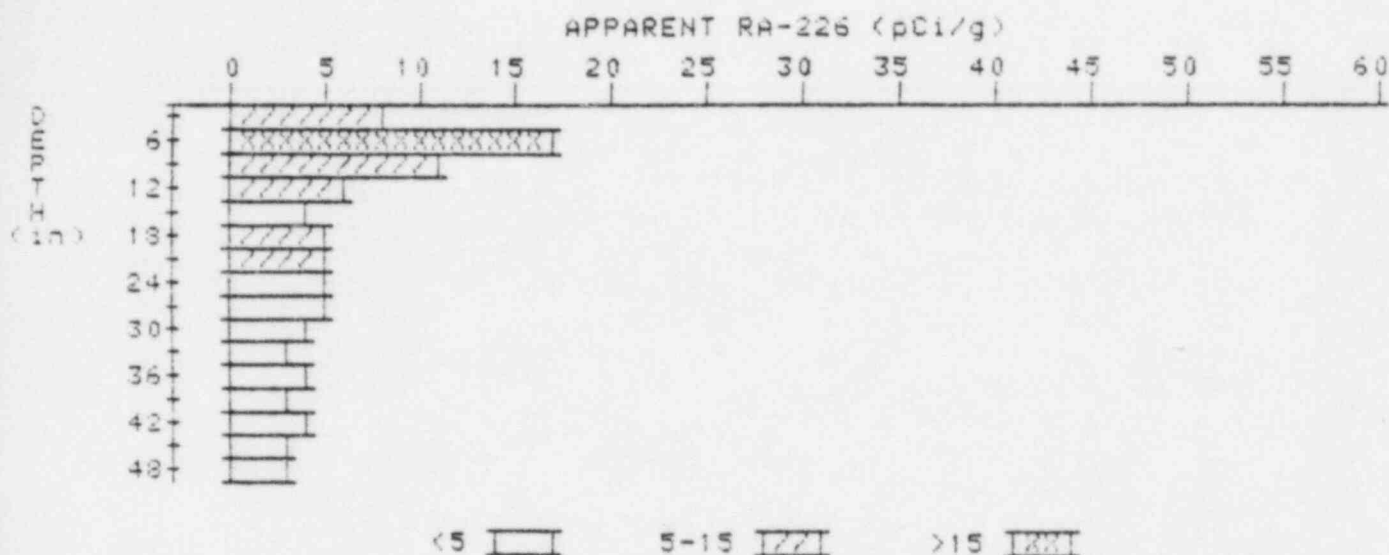
LOCATION: 156154



| Depth (in) | Apparent Radium-226 (pCi/g) | Apparent Radium-226 (pCi/g) |
|---------------|-----------------------------------|-----------------------------------|
| | Undeconvolved | Deconvolved |
| 3 | 3.6 | 3.6 |
| 6 | 4.0 | 5.1 |
| 9 | 3.8 | 3.4 |
| 12 | 3.8 | 4.0 |
| 15 | 3.7 | 3.5 |
| 18 | 3.7 | 3.3 |
| 21 | 3.9 | 4.4 |
| 24 | 3.8 | 3.6 |
| 27 | 3.8 | 4.0 |
| 30 | 3.7 | 3.7 |
| 33 | 3.6 | 3.6 |
| 36 | 3.5 | 3.5 |

APPARENT RADIUM-226 CONCENTRATION 10 DECONVOLUTION GRAPH

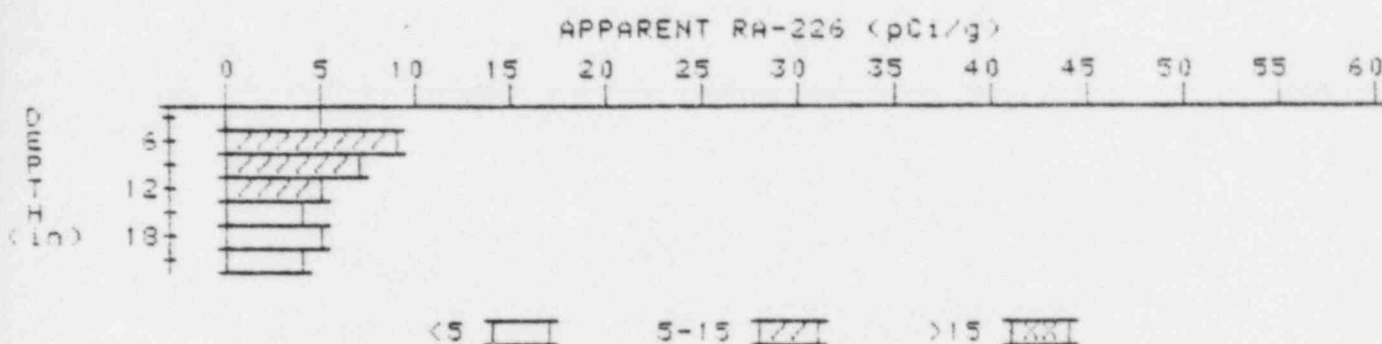
PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 10
LOCATION: 160150



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 8.3 | 8.3 |
| 6 | 10.5 | 16.5 |
| 9 | 9.3 | 11.1 |
| 12 | 7.1 | 5.5 |
| 15 | 5.3 | 4.2 |
| 18 | 5.4 | 5.2 |
| 21 | 5.1 | 5.1 |
| 24 | 4.3 | 4.6 |
| 27 | 4.6 | 4.3 |
| 30 | 4.3 | 4.5 |
| 33 | 3.9 | 3.4 |
| 36 | 3.3 | 4.0 |
| 39 | 3.6 | 3.4 |
| 42 | 3.5 | 3.7 |
| 45 | 3.3 | 3.3 |
| 48 | 3.1 | 3.1 |

APPARENT RADIUM-226 CONCENTRATION 11 DECONVOLUTION GRAPH

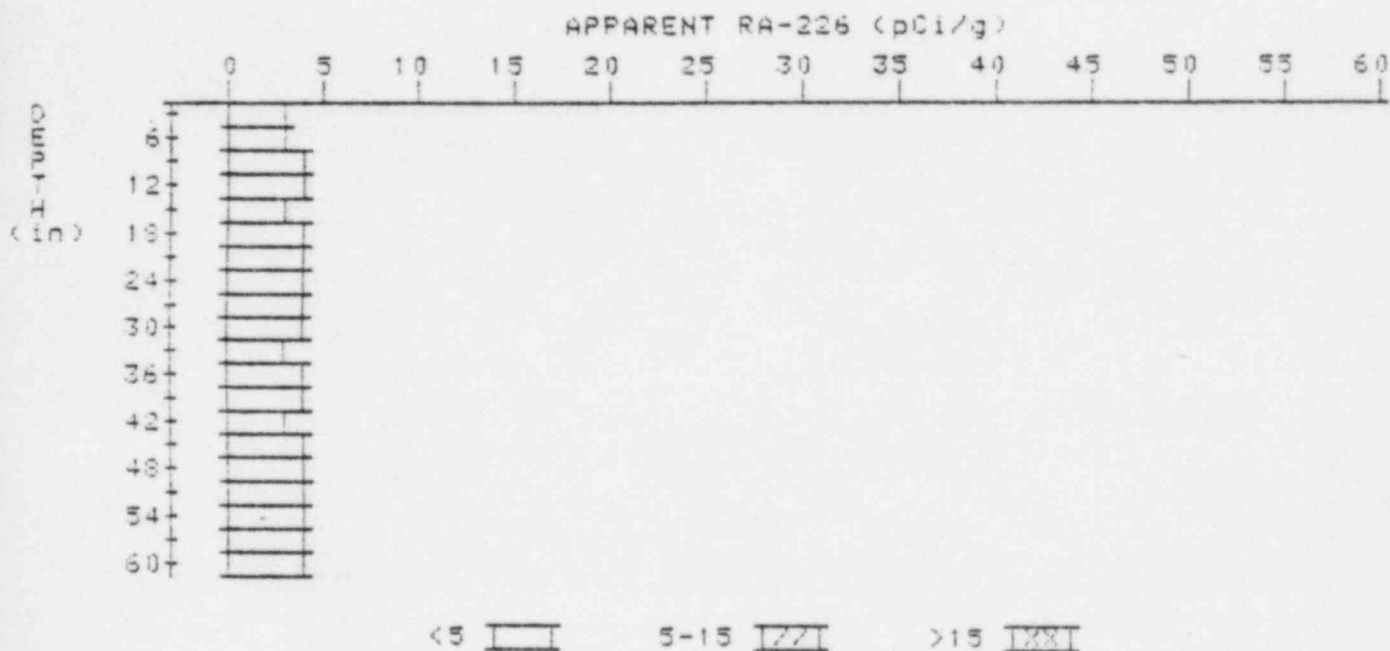
PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 11
LOCATION: 168146



| Depth (in) | Apparent Radium-226 (pCi/g) | Apparent Radium-226 (pCi/g) |
|---------------|-----------------------------------|-----------------------------------|
| | Undeconvolved | Deconvolved |
| 3 | 4.9 | 4.9 |
| 6 | 6.2 | 8.7 |
| 9 | 6.1 | 7.2 |
| 12 | 5.4 | 5.0 |
| 15 | 4.9 | 4.4 |
| 18 | 4.7 | 4.9 |
| 21 | 4.4 | 4.4 |

APPARENT RADIUM-226 CONCENTRATION 13 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 13
LOCATION: 199230



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.0 | 3.0 |
| 6 | 3.2 | 3.0 |
| 9 | 3.5 | 3.7 |
| 12 | 3.7 | 4.1 |
| 15 | 3.7 | 3.3 |
| 18 | 3.9 | 4.1 |
| 21 | 4.0 | 4.2 |
| 24 | 4.0 | 4.2 |
| 27 | 3.9 | 3.9 |
| 30 | 3.8 | 3.8 |
| 33 | 3.7 | 3.6 |
| 36 | 3.8 | 4.0 |
| 39 | 3.8 | 4.0 |
| 42 | 3.7 | 3.2 |
| 45 | 3.9 | 4.4 |
| 48 | 3.8 | 3.8 |
| 51 | 3.7 | 3.5 |
| 54 | 3.7 | 3.4 |

57
60

3.7
3.6

3.9
3.6

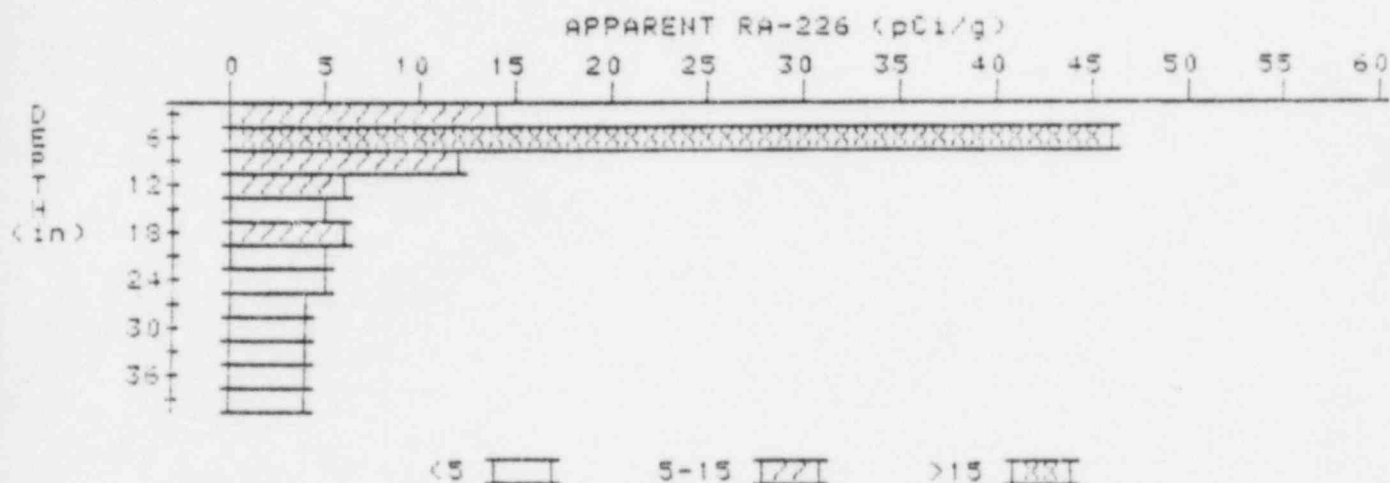
APPARENT RADIUM-226 CONCENTRATION 14

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 14

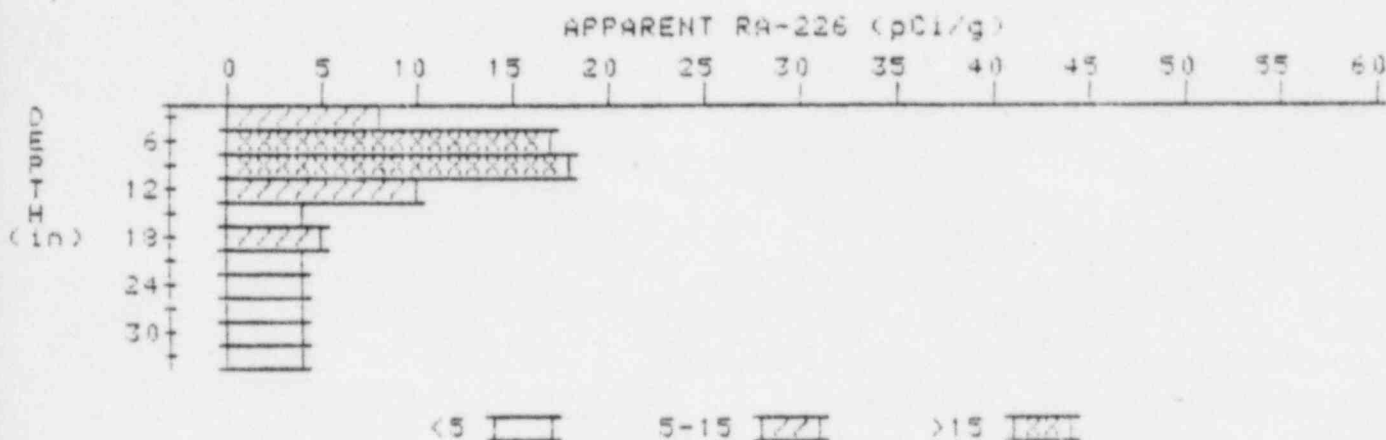
LOCATION: 209146



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 13.7 | 13.7 |
| 6 | 21.1 | 45.8 |
| 9 | 14.6 | 11.6 |
| 12 | 9.8 | 5.9 |
| 15 | 7.2 | 4.5 |
| 18 | 6.1 | 5.6 |
| 21 | 5.3 | 4.8 |
| 24 | 4.8 | 4.6 |
| 27 | 4.4 | 4.0 |
| 30 | 4.2 | 4.4 |
| 33 | 3.9 | 3.8 |
| 36 | 3.8 | 3.8 |
| 39 | 3.7 | 3.7 |

APPARENT RADIUM-226 CONCENTRATION 15 DECONVOLUTION GRAPH

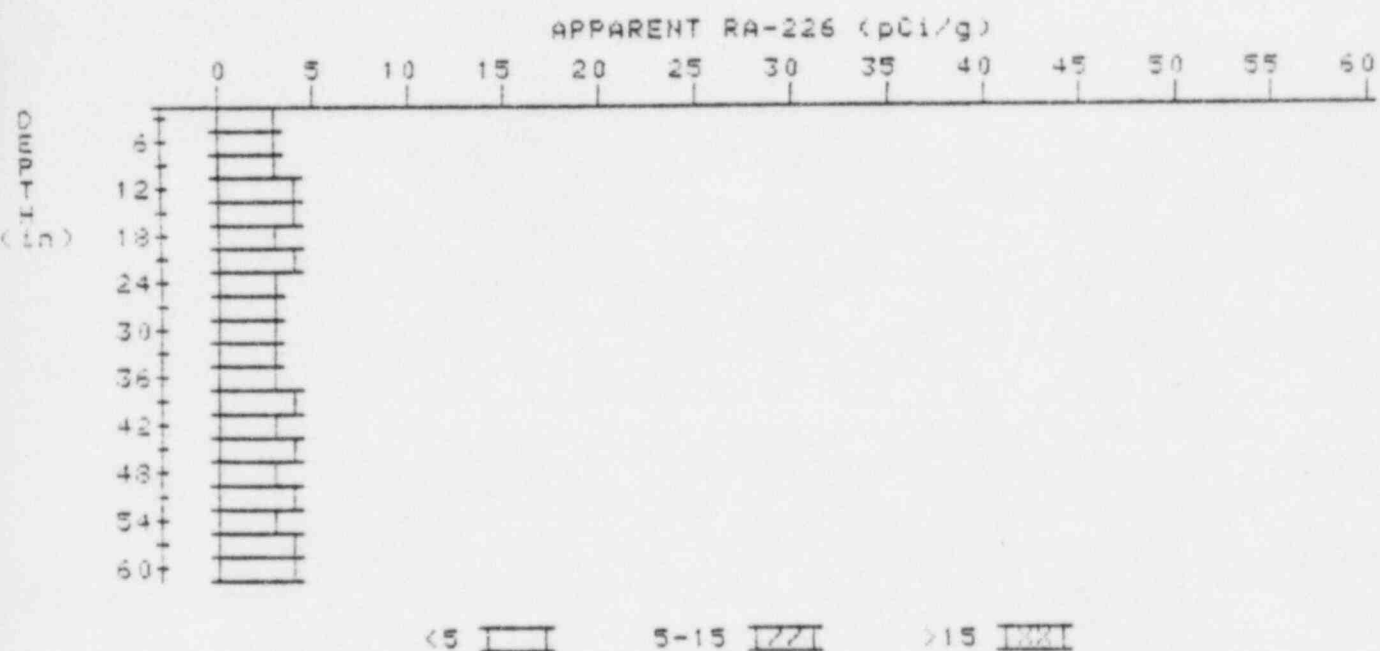
PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 15
LOCATION: 212145



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 8.0 | 8.0 |
| 6 | 11.7 | 17.0 |
| 9 | 12.4 | 18.4 |
| 12 | 9.7 | 9.7 |
| 15 | 7.0 | 4.3 |
| 18 | 5.8 | 5.1 |
| 21 | 5.0 | 4.5 |
| 24 | 4.5 | 4.1 |
| 27 | 4.2 | 4.2 |
| 30 | 3.9 | 3.5 |
| 33 | 3.8 | 3.8 |

APPARENT RADIUM-226 CONCENTRATION 17 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 17
LOCATION: 224156



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.2 | 3.2 |
| 6 | 3.3 | 3.3 |
| 9 | 3.4 | 3.4 |
| 12 | 3.5 | 3.5 |
| 15 | 3.6 | 4.0 |
| 18 | 3.8 | 3.3 |
| 21 | 3.8 | 3.7 |
| 24 | 3.4 | 3.2 |
| 27 | 3.4 | 3.4 |
| 30 | 3.4 | 3.4 |
| 33 | 3.4 | 3.4 |
| 36 | 3.4 | 3.2 |
| 39 | 3.5 | 3.4 |
| 42 | 3.4 | 3.2 |
| 45 | 3.4 | 3.6 |
| 48 | 3.3 | 2.9 |
| 51 | 3.4 | 3.6 |
| 54 | 3.4 | 3.2 |

57
60

3.5
3.5

3.7
3.5

APPARENT RADIUM-226 CONCENTRATION 19 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 19
LOCATION: 237218



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.2 | 3.2 |
| 6 | 3.4 | 3.2 |
| 9 | 3.7 | 4.1 |
| 12 | 3.8 | 4.0 |
| 15 | 3.8 | 3.8 |
| 18 | 3.8 | 4.0 |
| 21 | 3.7 | 3.7 |
| 24 | 3.6 | 3.4 |
| 27 | 3.6 | 3.6 |
| 30 | 3.6 | 3.4 |
| 33 | 3.7 | 3.7 |
| 36 | 3.8 | 4.0 |
| 39 | 3.8 | 3.8 |
| 42 | 3.8 | 3.8 |
| 45 | 3.8 | 4.0 |
| 48 | 3.7 | 3.9 |
| 51 | 3.5 | 3.1 |
| 54 | 3.5 | 3.7 |

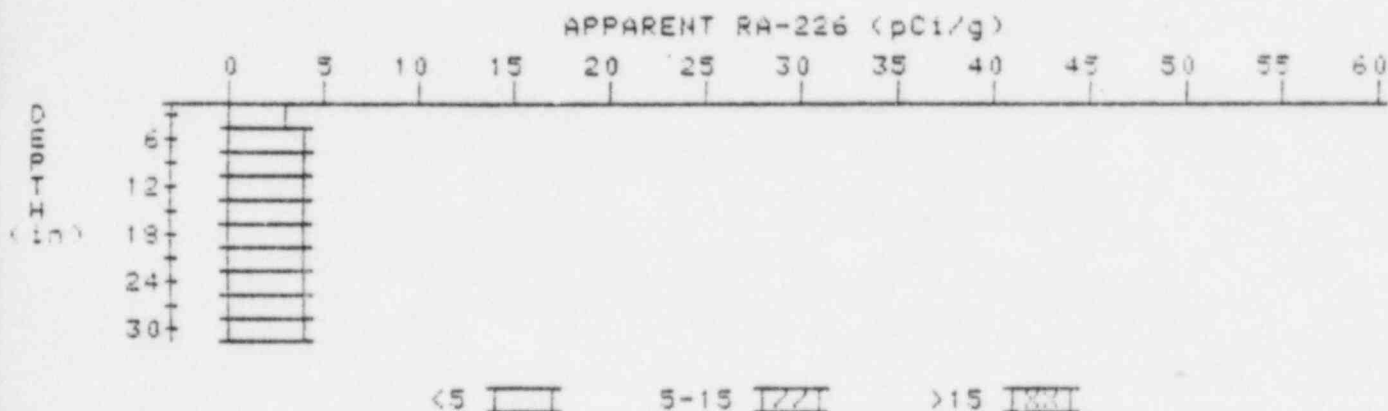
57
60

3.4
3.4

3.2
3.4

APPARENT RADIUM-226 CONCENTRATION 20 DECONVOLUTION GRAPH

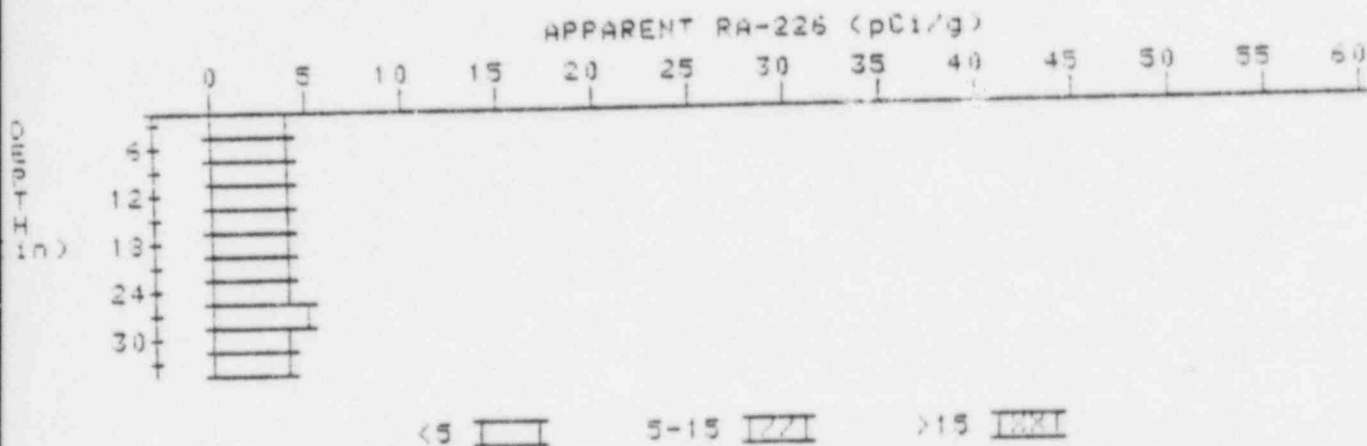
PROPERTY NUMBER: GJ-01192-3C
HOLE NUMBER: 20
LOCATION: 250260



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.3 | 3.3 |
| 6 | 3.7 | 4.1 |
| 9 | 3.9 | 4.3 |
| 12 | 3.9 | 3.7 |
| 15 | 4.0 | 4.2 |
| 18 | 4.0 | 4.0 |
| 21 | 4.0 | 4.0 |
| 24 | 4.0 | 4.0 |
| 27 | 4.0 | 4.2 |
| 30 | 3.9 | 3.9 |

APPARENT RADIUM-226 CONCENTRATION 21 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 21
LOCATION: 280154



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.9 | 3.9 |
| 6 | 4.0 | 4.2 |
| 9 | 4.0 | 3.8 |
| 12 | 4.1 | 4.3 |
| 15 | 4.1 | 4.1 |
| 18 | 4.1 | 4.1 |
| 21 | 4.1 | 3.9 |
| 24 | 4.2 | 4.0 |
| 27 | 4.2 | 4.1 |
| 30 | 4.0 | 3.8 |
| 33 | 3.9 | 3.9 |

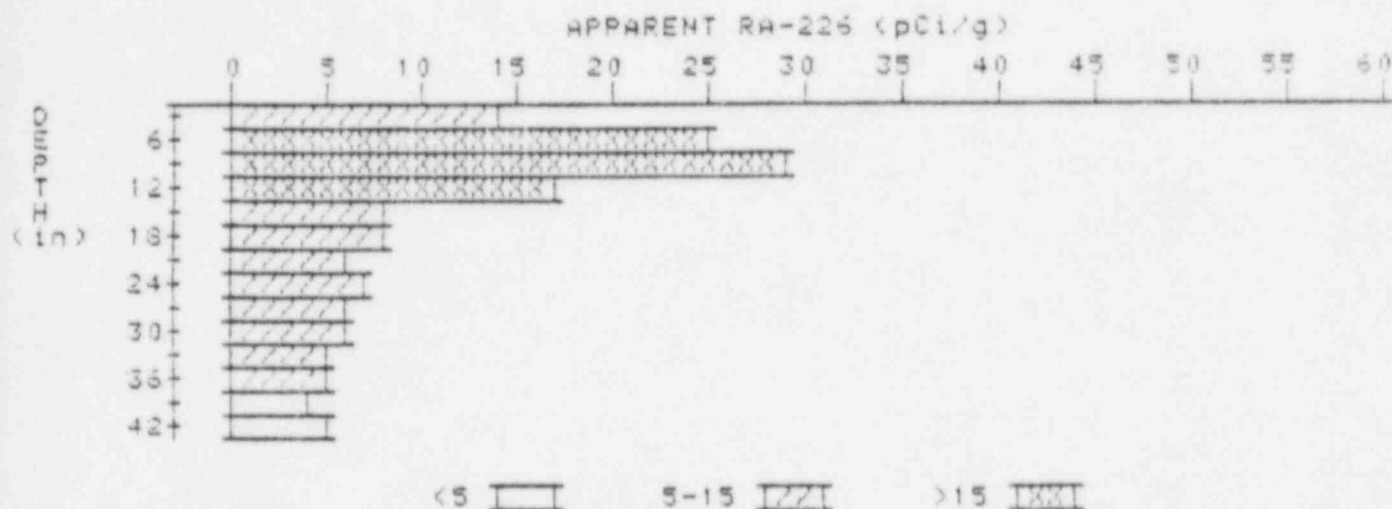
APPARENT RADIUM-226 CONCENTRATION 22

DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC

HOLE NUMBER: 22

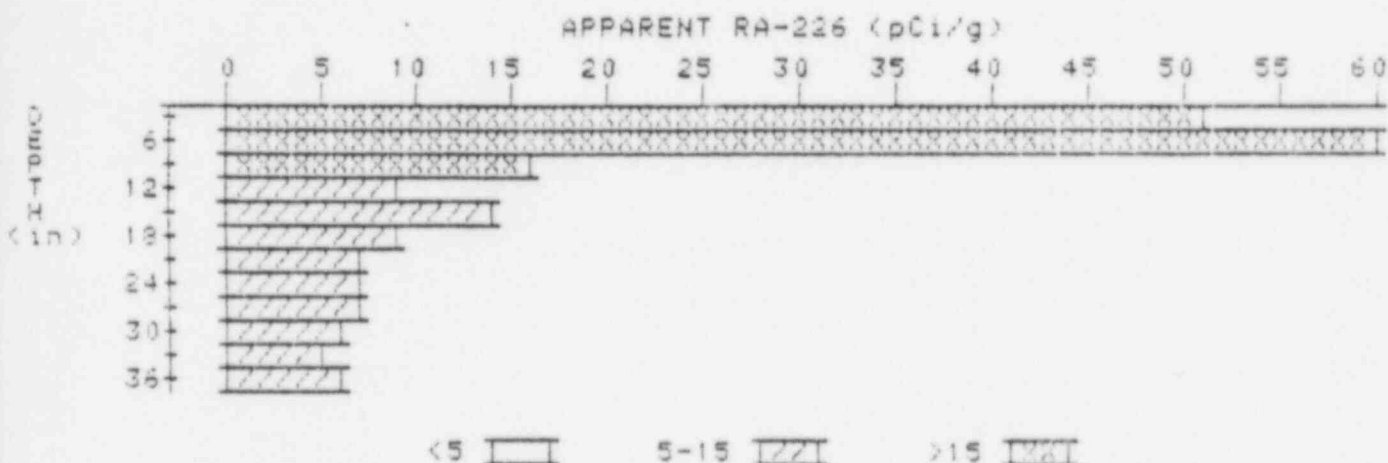
LOCATION: 280163



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| ===== | ===== | ===== |
| 3 | 13.6 | 13.6 |
| 6 | 19.6 | 25.4 |
| 9 | 19.3 | 28.5 |
| 12 | 16.1 | 17.2 |
| 15 | 11.8 | 8.4 |
| 18 | 9.4 | 8.3 |
| 21 | 7.6 | 8.3 |
| 24 | 6.8 | 6.6 |
| 27 | 6.1 | 5.8 |
| 30 | 5.7 | 5.6 |
| 33 | 5.4 | 5.4 |
| 36 | 5.1 | 5.1 |
| 39 | 4.8 | 4.4 |
| 42 | 4.7 | 4.7 |

APPARENT RADIUM-226 CONCENTRATION 23 DECONVOLUTION GRAPH

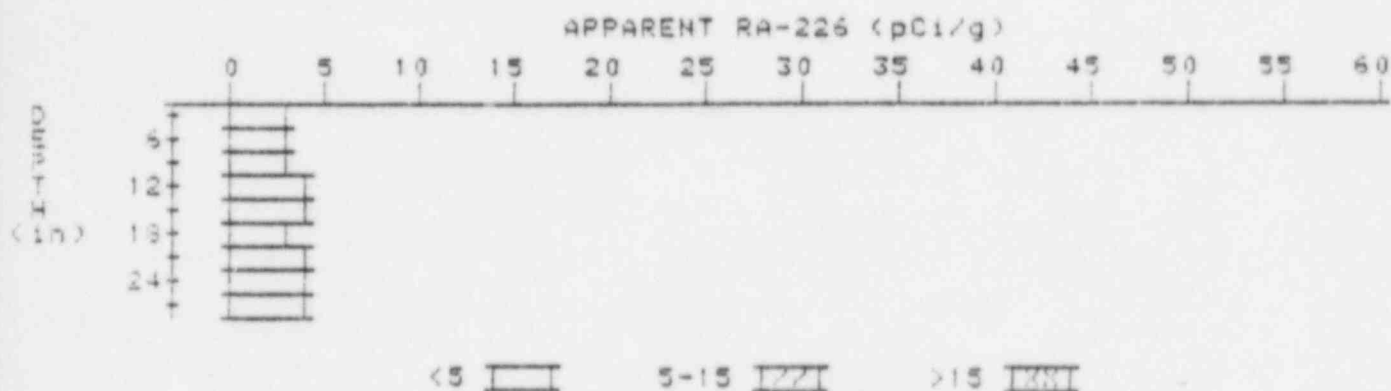
PROPERTY NUMBER: GJ-01192-3C
HOLE NUMBER: 23
LOCATION: 290160



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 50.9 | 50.9 |
| 6 | 50.1 | 32.6 |
| 9 | 31.0 | 16.2 |
| 12 | 20.2 | 9.2 |
| 15 | 15.6 | 14.4 |
| 18 | 11.7 | 9.2 |
| 21 | 9.2 | 6.9 |
| 24 | 8.0 | 7.8 |
| 27 | 7.1 | 6.9 |
| 30 | 6.3 | 6.6 |
| 33 | 5.9 | 6.4 |
| 36 | 5.5 | 6.6 |

APPARENT RADIUM-226 CONCENTRATION 24 DECONVOLUTION GRAPH

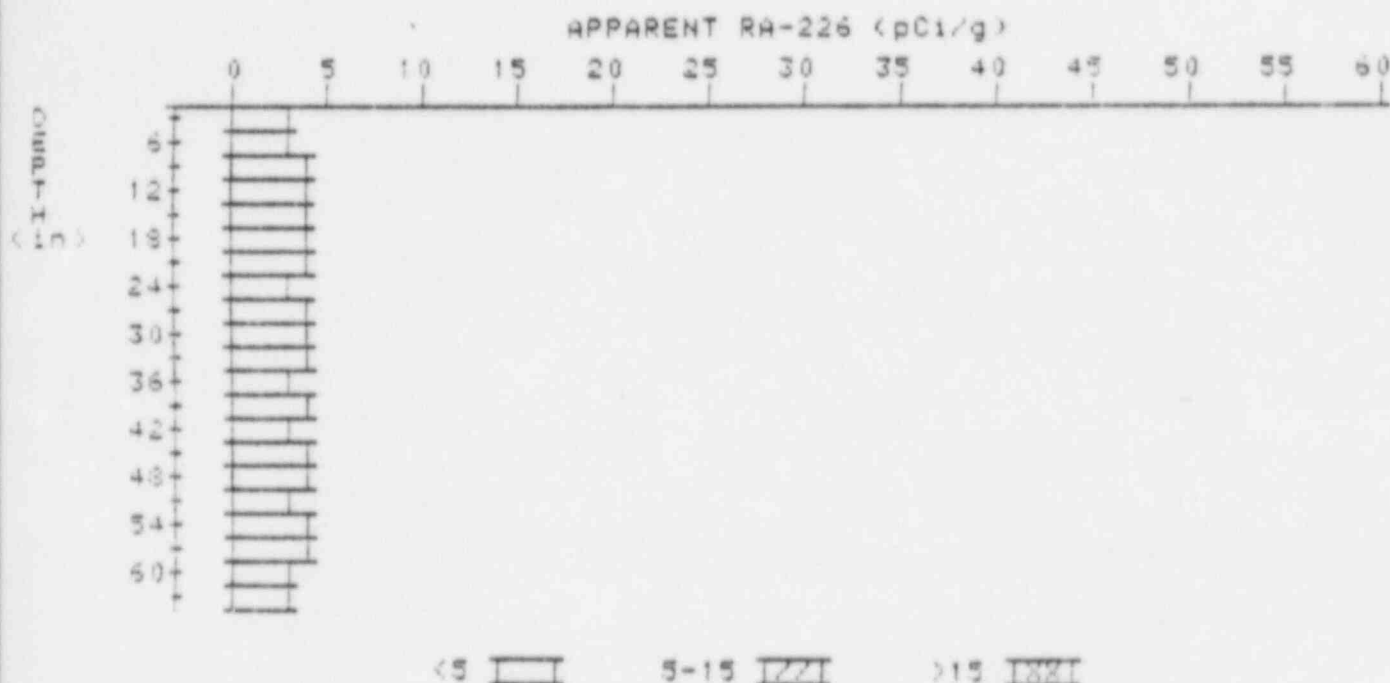
PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 24
LOCATION: 295152



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 2.9 | 2.9 |
| 6 | 3.1 | 3.3 |
| 9 | 3.3 | 3.3 |
| 12 | 3.5 | 3.7 |
| 15 | 3.6 | 3.9 |
| 18 | 3.6 | 3.4 |
| 21 | 3.7 | 3.9 |
| 24 | 3.7 | 4.1 |
| 27 | 3.5 | 3.5 |

APPARENT RADIUM-226 CONCENTRATION 26 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 26
LOCATION: 300266



| Depth (in) | Apparent Radium-226 (pCi/g) Undeconvolved | Apparent Radium-226 (pCi/g) Deconvolved |
|---------------|--|--|
| 3 | 3.0 | 3.0 |
| 6 | 3.2 | 3.2 |
| 9 | 3.4 | 3.5 |
| 12 | 3.5 | 3.8 |
| 15 | 3.5 | 3.8 |
| 18 | 3.5 | 3.8 |
| 21 | 3.5 | 3.8 |
| 24 | 3.8 | 3.1 |
| 27 | 3.5 | 3.8 |
| 30 | 3.5 | 3.8 |
| 33 | 3.5 | 3.8 |
| 36 | 3.5 | 3.3 |
| 39 | 3.5 | 3.8 |
| 42 | 3.5 | 3.3 |
| 45 | 3.5 | 3.8 |
| 48 | 3.5 | 3.8 |
| 51 | 3.5 | 3.4 |

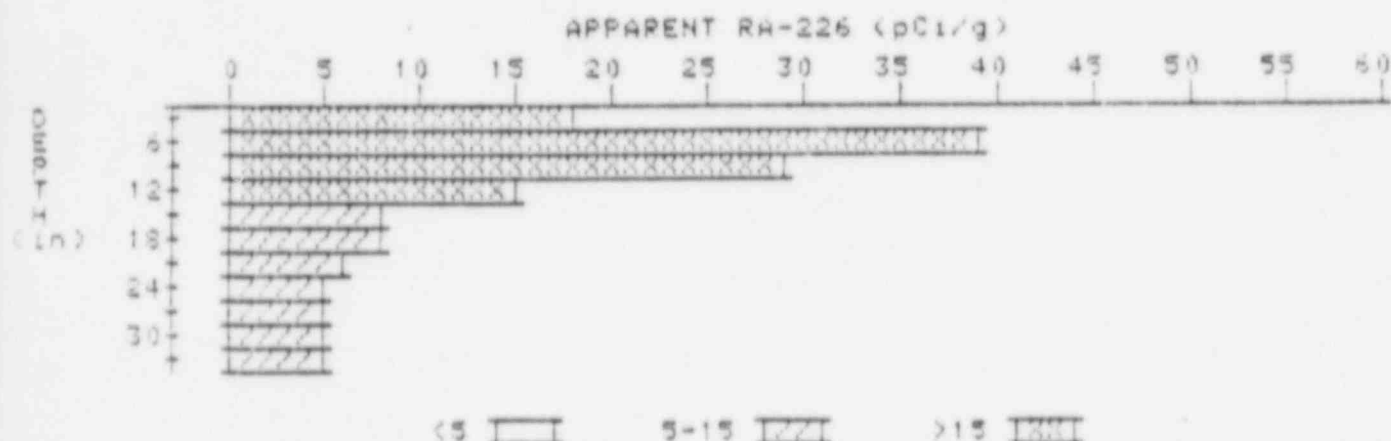
54
57
50
53

54
57
50
53

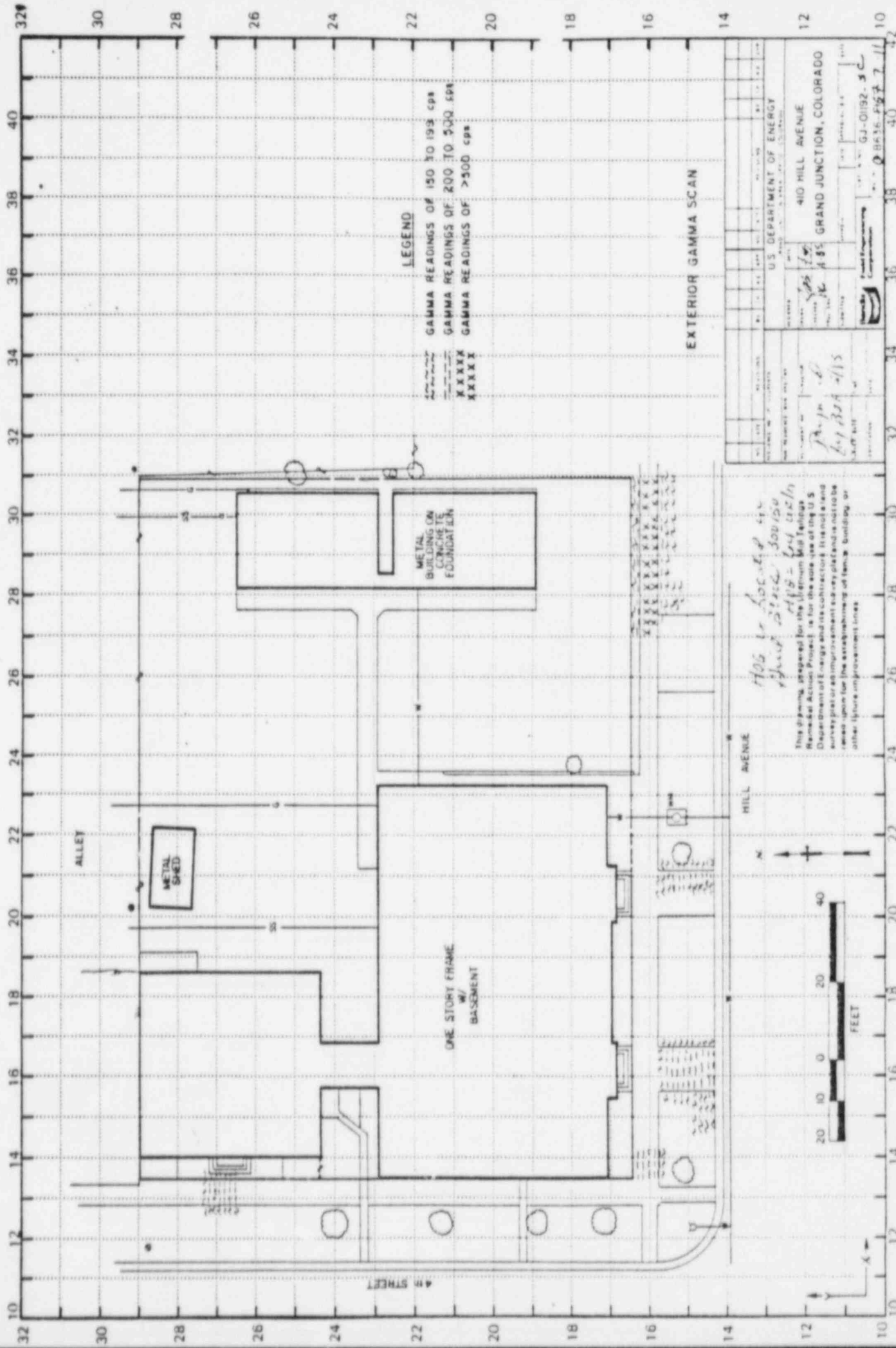
54
57
50
53

APPARENT RADIUM-226 CONCENTRATION 28 DECONVOLUTION GRAPH

PROPERTY NUMBER: GJ-01192-SC
HOLE NUMBER: 28
LOCATION: 307155



| Depth (in) | Apparent Radium-226 (pCi/g) | Apparent Radium-226 (pCi/g) |
|---------------|-----------------------------------|-----------------------------------|
| | Undeconvolved | Deconvolved |
| 3 | 17.8 | 17.8 |
| 6 | 24.3 | 39.4 |
| 9 | 22.3 | 28.7 |
| 12 | 16.7 | 15.5 |
| 15 | 11.8 | 7.5 |
| 18 | 9.3 | 8.4 |
| 21 | 7.3 | 5.7 |
| 24 | 6.2 | 5.3 |
| 27 | 5.6 | 5.1 |
| 30 | 5.3 | 5.1 |
| 33 | 5.1 | 5.1 |



LEGEND

GAMMA READINGS OF 150 TO 199 cps

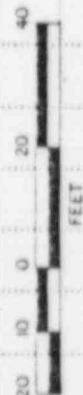
GAMMA READINGS OF 200 TO 500 cps

GAMMA READINGS OF >500 cps

EXTERIOR GAMMA SCAN

HILL AVENUE

N



This drawing, prepared for the Uranium Mill Tailings Remedial Action Project, is for the use of the U.S. Department of Energy and its contractors. It is not a land survey or an engineering survey plan and is not to be used for the establishing of fence, building, or other future improvements.

Handwritten notes:
H05 is located in
H05 = 104 12/10

U.S. DEPARTMENT OF ENERGY

410 HILL AVENUE

GRAND JUNCTION, COLORADO

GJ-0192-3C

JUL 7 1967

J. J. B. 115