

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-12163-RS  
ADDRESS: 1410 WALNUT AVENUE

AUGUST 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

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

*M.K. Tucker* *6500H*

M. TUCKER  
DOE PROJECT ENGINEER

DATE

*August 8, 1985*

REAL2163:REA-615

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## **1.0 EXECUTIVE SUMMARY**

### **1.1 Introduction**

The location, DOE ID No. GJ-12163-RS, is a single-family residence located at 1410 Walnut Avenue, Grand Junction, Colorado.

The purpose of this assessment is to evaluate the extent of uranium millsite contamination at this property and present a recommendation based on this assessment.

### **1.2 Evaluation and Recommendation**

It is recommended that no remedial action be performed on this property (as discussed in Section 4.0) and that a Property Completion Report be prepared for use in the DOE certification process. The identified residual radioactive material found on this property is tailings; the estimated volume is: exterior, 5 cu. yd.; interior, 0 cu. yd.

## 2.0 PROPERTY DESCRIPTION

### 2.1 General Description

Address: 1410 Walnut Avenue, Grand Junction, Colorado

Zoning: Residential (RSF-8)

Lot Size: Approximately 11,250 sf (0.25 acres)

Legal Description: The west 90 feet of the south 125 feet of the west 1/2 of lot 20, block 6, Fairmount Subdivision, section 12, T1S, R1W, U.M., City of Grand Junction, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 2 mile(s) north 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: | Walnut Avenue           |
| East:  | Single-family residence |
| West:  | Single-family residence |

### 2.2 Existing Facilities and Structures

Primary Structure:

|                    |   |
|--------------------|---|
| Type:              | Single-story residence                            |
| Size:              | Approximately 884 sf                              |
| Construction Date: | Post 1940s  |
| Construction:      | Wood-frame  |
| Foundation:        | Concrete wall on spread footing                   |
| Footing Depth:     | Approximately 68" to bottom of footing from grade |
| Basement:          | Yes - full  |
| Crawl Space:       | None  |
| Condition:         | Good  |

Other Structures:

|               |                        |
|---------------|------------------------|
| Type:         | Garage                 |
| Size:         | Approximately 300 sf   |
| Construction: | Wood-frame             |
| Foundation:   | Concrete slab-on-grade |
| 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-12163-RS on July 9, 1985. Data collection methods were performed in accordance with procedures fully described in the Radiologic Support Operations Procedures Manual GJ-07(84) (Bendix Field Engineering Corporation, 1984). These data were evaluated to determine the areal and vertical extent of uranium mill tailings contamination at this property as well as any other contaminated material that may have originated from the millsite.

A review of historical information from the files of the Colorado Department of Health (CDH) and the inclusion data from Oak Ridge National Laboratory (ORNL) was conducted. These records indicate contaminated material along the east boundary of the property, and a small isolated area adjacent to the south side of the primary structure.

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, 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): 26 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: 15 to 17 uR/h  
Highest Inside Gamma Reading (HIG): 17 uR/h

Interior gamma exposure-rate measurements are summarized in Appendix Table 3.2.

#### 3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figure 3.2. 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 3.3 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) Surface Material: Soil  
Direction From Primary Structure: Northeast and east  
Total Depth of Contamination: 12 inches  
Comments: 2 isolated deposits in garden  
Approximate Square Footage: 88
- (Area B) Surface Material: Soil  
Direction From Primary Structure: East  
Total Depth of Contamination: 6 inches  
Comments: 2 isolated deposits in garden  
Approximate Square Footage: 88
- (Area C) Surface Material: Concrete  
Direction From Primary Structure: Northeast  
Total Depth of Contamination: 4 inches  
Other (height or thickness): 4 x 18 x 24 (inches)  
Comments: Pre-poured concrete block is contaminated  
Approximate Square Footage: 4
- (Area D) Surface Material: Concrete  
Direction From Primary Structure: South  
Total Depth of Contamination: 10 inches  
Other (height or thickness): 4 x 18 x 24 (inches)  
Comments: Pre-poured concrete block and the underlying soil are contaminated  
Approximate Square Footage: 6

#### 4.0 RECOMMENDED REMEDIAL ACTION

##### 4.1 Decontamination and Restoration

It is recommended that no remedial action be performed and that an indoor RDC measurement 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 no-action recommendation will be considered valid, and a Property Completion Report will be prepared for DOE certification.

##### 4.2 Evaluation of Recommended Remedial Action

The recommendation that no remedial action be performed on this property is made because the levels of radioactivity on this property fall below the EPA Standards (40 CFR 192) when averaged over 100 m<sup>2</sup>.

The EPA Standards are:

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

Appendix Table 4.1 presents the area and volume calculations of contamination present on the property. The average radium concentration for this property is 3.4 pCi/g which falls below the allowable EPA Standard, including background, of 7 pCi/g for this area. Appendix Table 4.2 presents the calculations for concentrations of Radium-226 in soil for this location.



## 5.0 REFERENCES

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

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

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

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

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

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

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

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

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

## 6.0 APPENDIX

This Appendix contains the following:

Appendix Tables:

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

Appendix Figures:

|            |  |
|------------|--|
| Figure 2.1 | Vicinity Map                               |
| Figure 2.2 | Site Plan                                  |
| Figure 3.1 | Exterior Grid-Point Exposure Rates         |
| Figure 3.2 | Exterior Sample Locations                  |
| Figure 3.3 | Exterior Estimated Extent of Contamination |

Official Survey Report

Team Leader Notes

Deconvolution Graph (Apparent Radium-226 Concentration)

Exterior Gamma Scan Map

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12163-RS

1410 Walnut Avenue

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     | 168300        | 00          | DS         | 5.5                    |         | *                   | Flower bed east of primary structure |
|       |               | 06          | DS         | 4.6                    |         | *                   |                                      |
|       |               | 12          | DS         | 1.4                    |         | *                   |                                      |
| 2     | 190240        | 00          | DS         | 1.2                    |         | *                   | Background                           |
| 3     | 199299        | 00          | DS         | 2.5                    |         | *                   | Flower bed                           |
| 4     | 204260        | 00          | DS         | 1.6                    |         | *                   | Bottom of steps to fruit cellar      |
| 5     | 207267        | 00          | DS         | 6.9                    |         | *                   | On concrete                          |
|       |               | 04          | DS         | 2.4                    |         | *                   | Beneath concrete                     |
| 6     | 213267        | 00          | DS         | 2.4                    |         | *                   | Gas line                             |
|       |               | 10          | DS         | 1.8                    |         | *                   |                                      |
| 7     | 220299        | 00          | DS         | 6.2                    |         | *                   | Flower bed                           |
|       |               | 06          | DS         | 1.3                    |         | *                   |                                      |
| 8     | 234301        | 00          | DS         | 5.6                    |         | *                   | Flower bed                           |
|       |               | 06          | DS         | 4.1                    |         | *                   |                                      |
|       |               | 10          | DS         | 1.4                    |         | *                   |                                      |
| 9     | 241239        | 03          | TC         | 2.9                    |         | *                   | Background Foundation                |
|       |               | 06          | TC         | 3.0                    |         | *                   |                                      |
|       |               | 09          | TC         | 3.2                    |         | *                   | DC = 0 inches                        |
|       |               | 12          | TC         | 3.3                    |         | *                   |                                      |
|       |               | 15          | TC         | 3.4                    |         | *                   |                                      |
|       |               | 18          | TC         | 3.5                    |         | *                   |                                      |
|       |               | 21          | TC         | 3.5                    |         | *                   |                                      |
|       |               | 24          | TC         | 3.4                    |         | *                   |                                      |
|       |               | 27          | TC         | 3.3                    |         | *                   |                                      |
|       |               | 30          | TC         | 3.2                    |         | *                   |                                      |
|       |               | 33          | TC         | 3.4                    |         | *                   |                                      |
|       |               | 36          | TC         | 3.2                    |         | *                   |                                      |
|       |               | 39          | TC         | 3.3                    |         | *                   |                                      |
|       |               | 42          | TC         | 3.2                    |         | *                   |                                      |
|       |               | 45          | TC         | 3.2                    |         | *                   |                                      |
|       |               | 48          | TC         | 3.2                    |         | *                   |                                      |
|       |               | 51          | TC         | 3.1                    |         | *                   |                                      |
| 10    | 241263        | 00          | DS         | 8.6                    |         | *                   | On concrete                          |
|       |               | 04          | DS         | 5.5                    |         | *                   | Beneath concrete                     |

## Radium Concentrations at Exterior Locations

DOE ID #GJ-12163-RS

1410 Walnut Avenue

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. |                     |                     |
| 10    | 241263        | 10          | DS         | <1.0                   |         | *                   |                     |
| 11    | 242263        | 00          | DS         | 1.5                    |         | *                   | East of south steps |

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 = 07-09-85  
Team Leader = JD

Table 3.2

## Summary of Interior Gamma Exposure Rates

DOE ID No. GJ-12163-RS

1410 Walnut Avenue

Page 1 of 1

| Location | Number of<br>Readings<br>Taken at<br>Waist<br>Level | Range at<br>Waist<br>Level<br>(uR/h) | Mean at<br>Waist<br>Level<br>(uR/h) | Number of<br>Readings<br>Taken at<br>Surface | Range at<br>Surface<br>(uR/h) | Mean<br>Surface<br>(uR/h) |
|----------|---|--------------------------------------|-------------------------------------|--|-------------------------------|---------------------------|
| Basement | *   | *                                    | *                                   | *  | 15-17                         | *                         |
| Cellar   | *   | *                                    | *                                   | *  | 16-18                         | *                         |
| Garage   | *   | *                                    | *                                   | *  | 15-17                         | *                         |

\* Walking gamma scans were performed to confirm the absence of interior contamination.

Table 4.1  
Area and Volume Calculations  
DOE ID No. GJ-12163-RS

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| <u>AREA</u>             | <u>CALCULATIONS(ft)</u> | <u>SF</u> | <u>DEPTH(ft)</u> | <u>CF</u> | <u>CUBIC YARDS</u> |
|-------------------------|-------------------------|-----------|------------------|-----------|--------------------|
| EXTERIOR                |                         |           |                  |           |                    |
| A                       | 5 x 8                   | = 40      |                  |           |                    |
|                         | 6 x 8                   | = 48      |                  |           |                    |
|                         |                         | <hr/>     |                  |           |                    |
|                         |                         | 88        | x 1.0            | = 88      |                    |
| B                       | 4 x 10                  | = 40      |                  |           |                    |
|                         | 6 x 8                   | = 48      |                  |           |                    |
|                         |                         | <hr/>     |                  |           |                    |
|                         |                         | 88        | x 0.5            | = 44      |                    |
| C                       | 2 x 2                   | = 4       | x 0.3            | = 1       |                    |
| D                       | 2 x 3                   | = 6       | x 0.9            | = 5       |                    |
|                         |                         |           |                  | <hr/>     |                    |
| TOTAL VOLUME - EXTERIOR |                         |           |                  | = 138     | = 138/27 = 5       |

NOTE: Total square feet of exterior Areas A, B, C, and D = 186 square feet  
186 square feet = 17 square meters

See Appendix Figure 3.3 For Areas

=====

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

Where

$C_{avg}$  = Concentration average (pCi/g)

$C_c$  = Concentration of Contamination (pCi/g)

$A_c$  = Area of Concentration ( $m^2$ )

$C_b$  = Background Concentration (pCi/g)

$$C_{avg} = \frac{9.8 \times 17 + 2 (100 - 17)}{100}$$

$$C_{avg} = 3.4 < 7$$

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

NOTE: Background Radium concentration for this area is 2 pCi/g  
 $C_c$  was obtained from ORNL soil sample

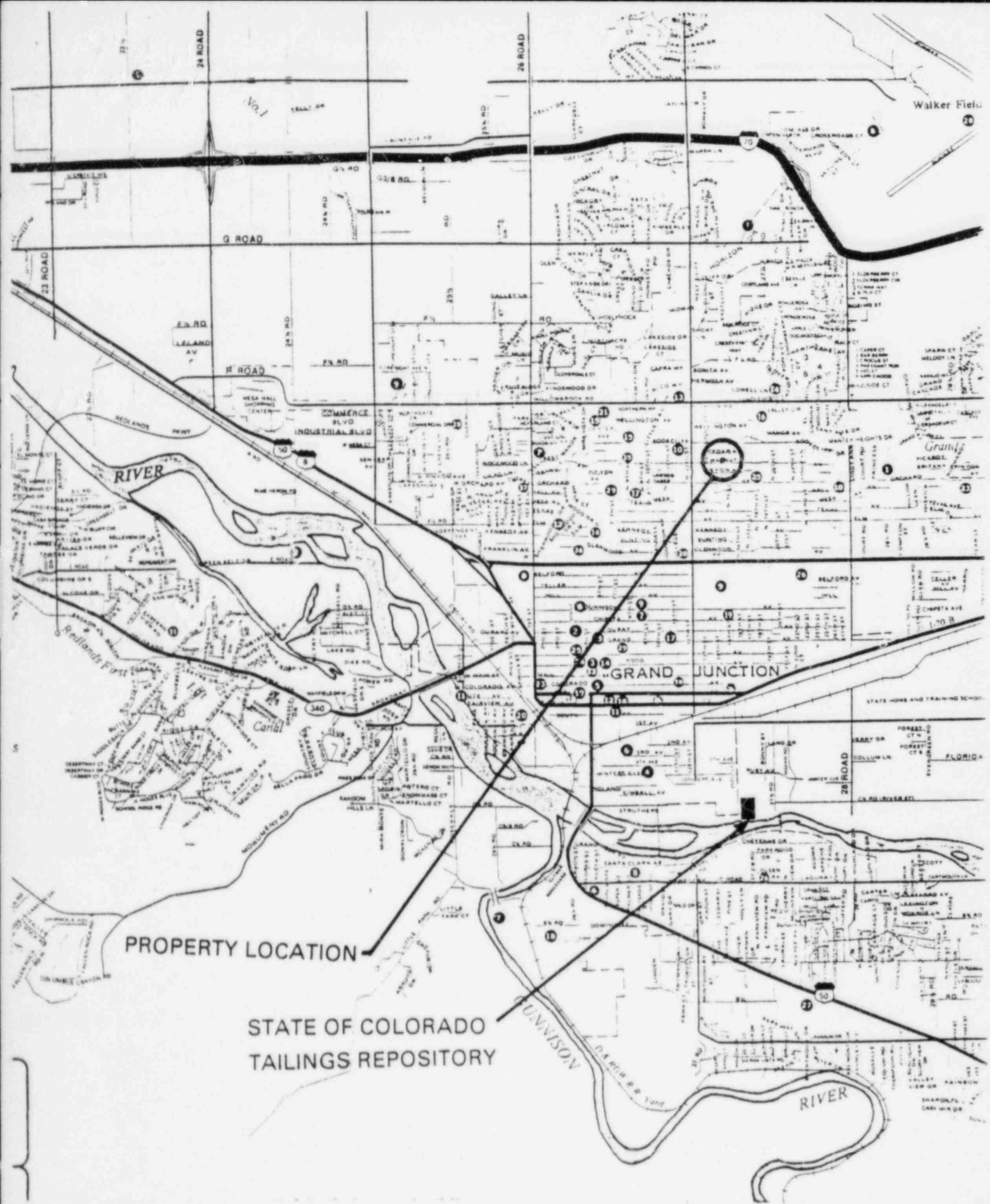


FIGURE 2.1  
VICINITY MAP



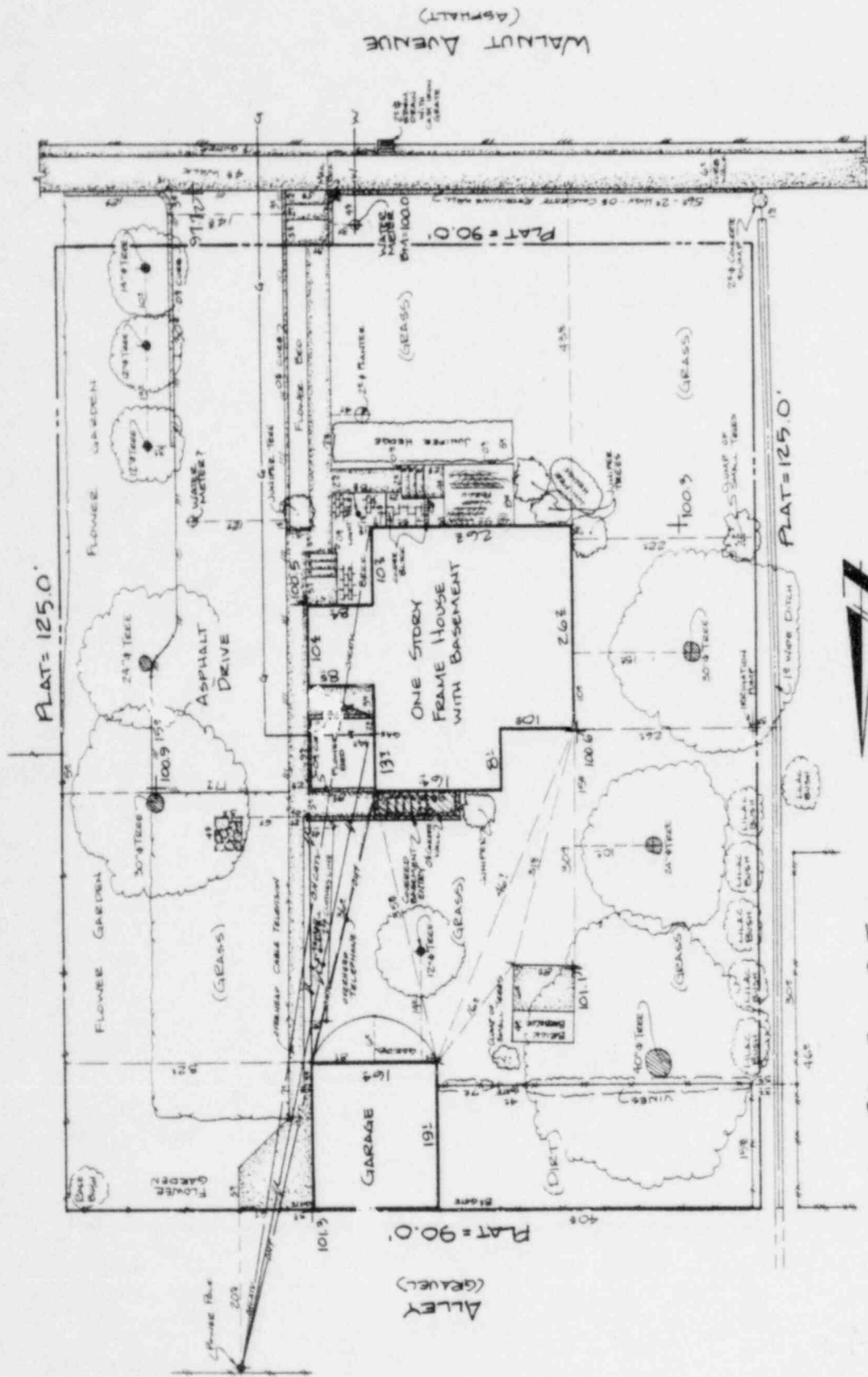
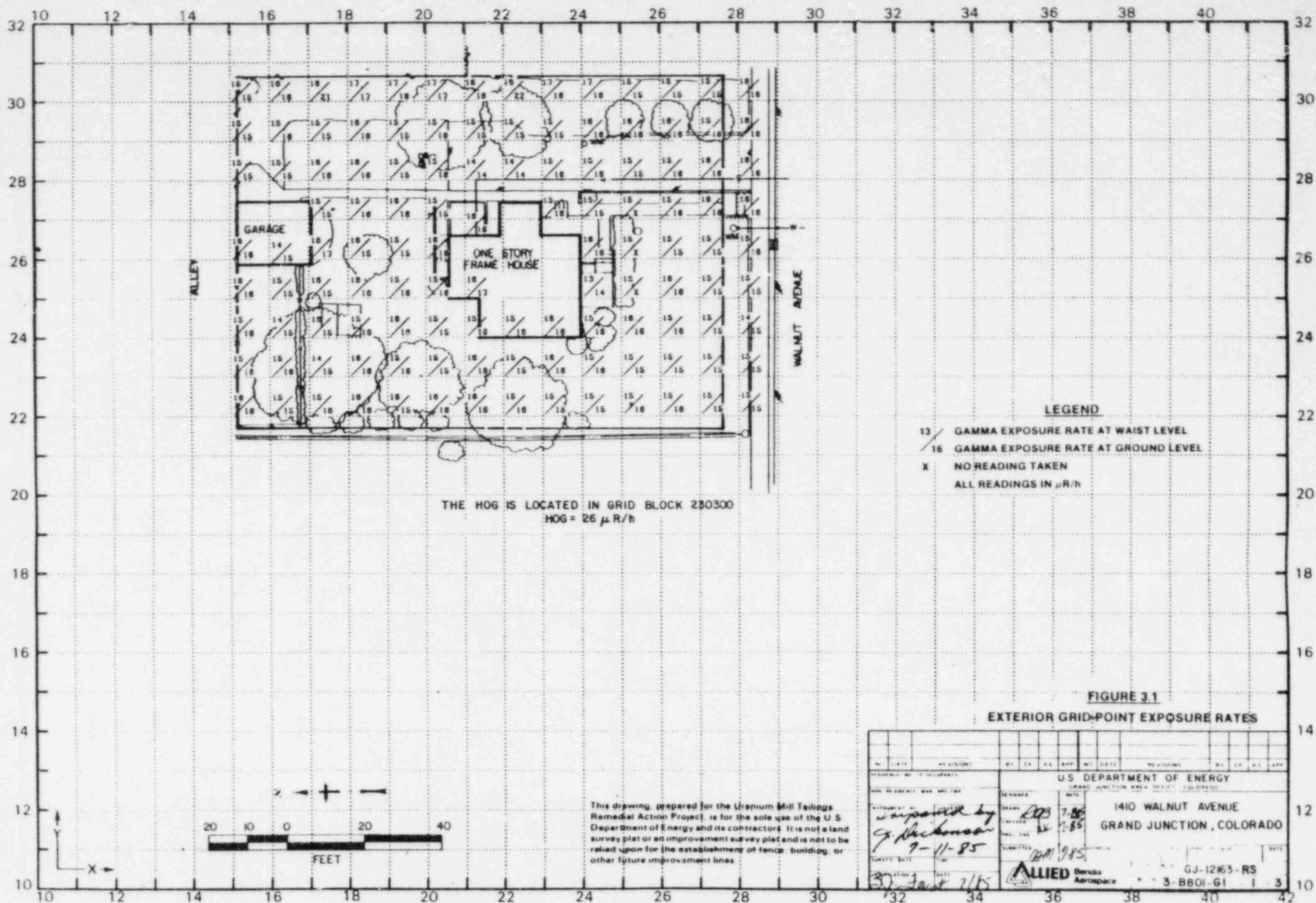


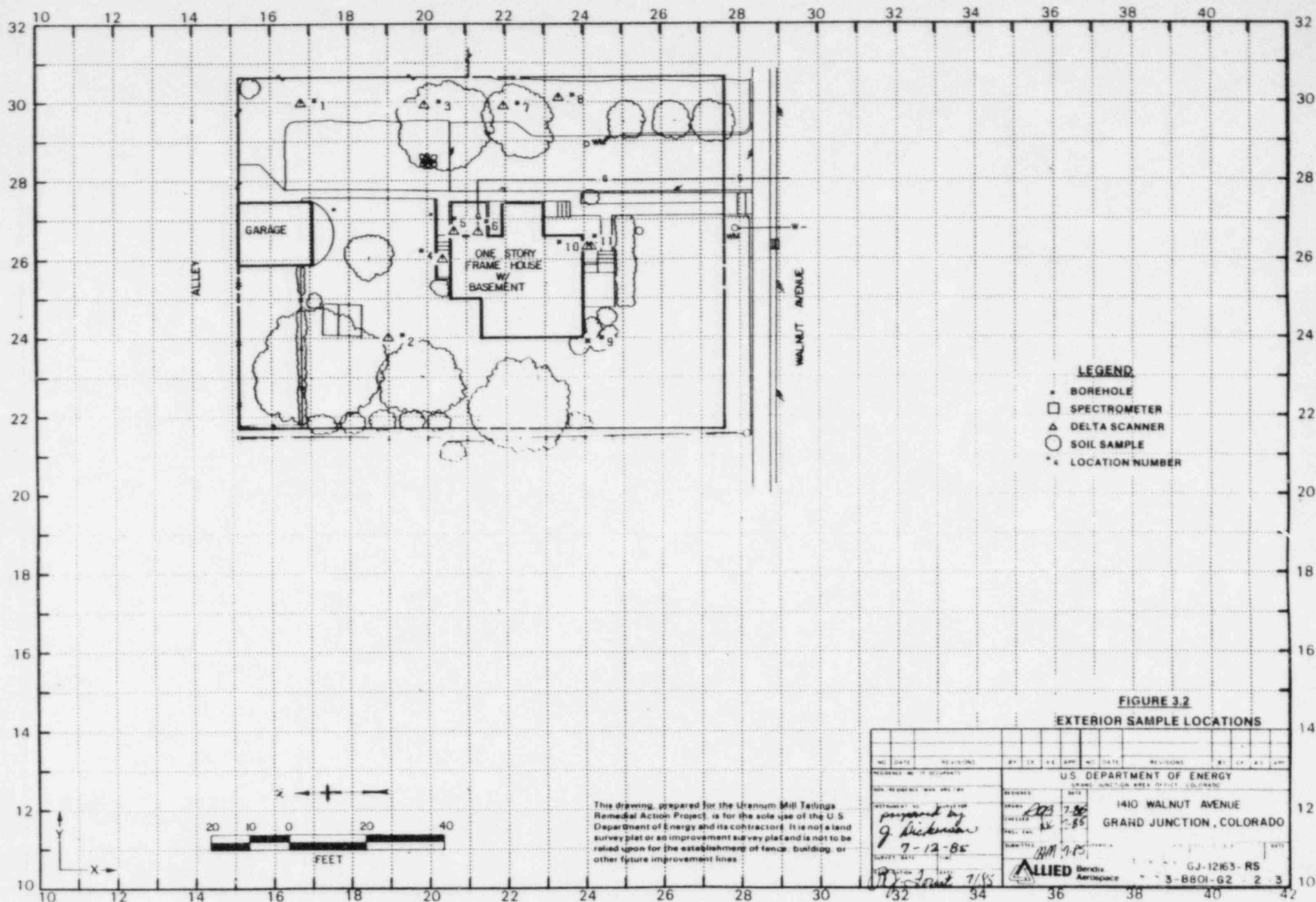
FIGURE 2.2 SITE PLAN

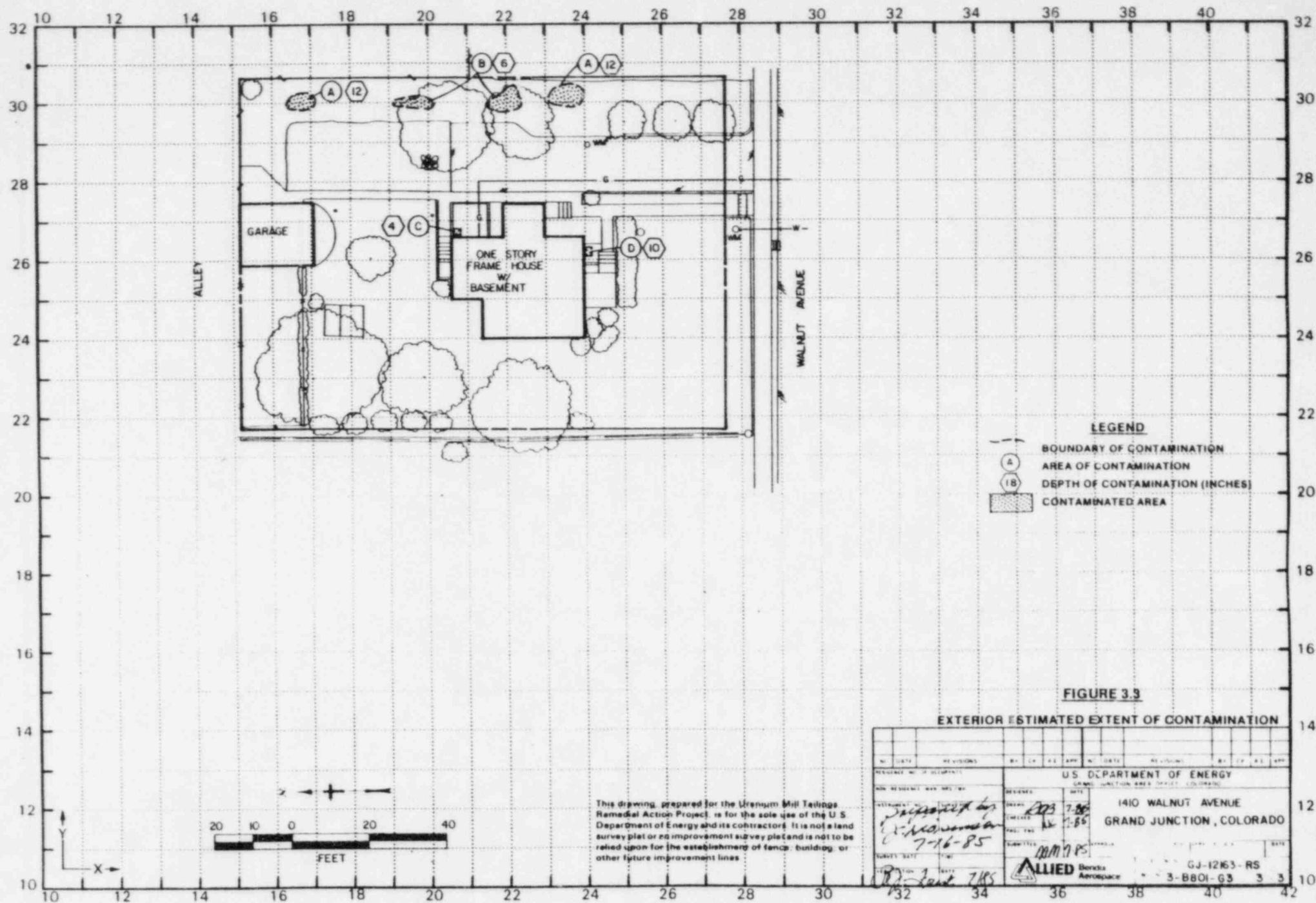
|                                  |  |
|----------------------------------|--|
| TAX SCHEDULE NO. 23A5-122-00-0B5 | DOR TO NO. GJ12163 RS                    |
| U.S. DEPARTMENT OF ENERGY        | GRAND JUNCTION PROJECT OFFICE, CO. GRADO |
| ADDRESS 1410 WALNUT AVENUE       | GRAND JUNCTION, COLORADO                 |
| SURV. WHL 122.85                 | DRAFT RSK 7.5.85                         |
| DRAWING NO. 3-C-801-F1           | SHEET 1 OF 1                             |

This drawing, prepared for the U.S. Department of Energy, 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.

THE WEST 90.0 FEET OF THE SOUTH 125.0 FEET OF THE WEST 1/2 OF LOT 20 BLOCK 6 FAIRMOUNT SUBDIVISION, SECTION 12, T.19S., R.1W., U.M., CITY OF GRAND JUNCTION, COLORADO.







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

Official Survey Report

Property Address 1410 Walnut Avenue, Grand Junction, Colorado  
Property Owner J. and G. Jones  
Address of Owner (if different from above) same  
Report Prepared By J. Dickerson

I. PRESENCE/ABSENCE OF RESIDUAL RADIOACTIVE MATERIALS

☐ No evidence of residual radioactive material on surveyed property.

☒ Residual radioactive materials found at the following locations:

☒ In open areas.

☐ Under or around exterior improvements.

☐ Under or around a typically nonoccupied structure.

☒ Under or around a typically occupied structure.

II. RESULTS OF RADIOLOGIC ASSESSMENT

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

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

cc:

G. A. Franz, III, GJ/CDH

J. Themelis, Mgr. UMTRA Proj. Off.

HIG = 17 uR/h  
HOG = 26 uR/h



ALLIED Bendix  
Aerospace

Bendix Field Engineering Corporation  
Grand Junction Operations  
Grand Junction, Colorado

Date: July 9, 1985

To: Files

From: John Dickerson

Subject: Team Leader Notes - GJ-12163-RS

Address: 1410 Walnut Avenue

Owner: J. and G. Jones

Team Members

J. Dickerson (Team Leader)  
N. Wallace  
D. Bell

S. Garcia  
S. Larsen  
H. Mattison

The owner stated that approximately three "washtubs" of tailings were brought in to condition the soil in the flower garden (estimate 1/3 cubic yard).

The water and sewer lines are situated under asphalt and concrete and could not be investigated without undue damage to the surface material. Absence of anomalous readings in the basement indicates no involvement associated with buried utilities. The gas line was investigated by delta scintillometer; no contamination was found.

The foundation of the primary structure was investigated by an auger hole (total count) at the southwest corner, and by a delta scintillometer at the cellar step base; no elevated readings were noted.

Team Leader Notes  
John Dickerson  
GJ-12163-RS  
July 9, 1985  
Page 2

Four isolated deposits of contaminated material were found in the flower bed along the east property line. Two concrete slabs (prepoured) had elevated readings. Both slabs are contaminated, and the slab at the southwest corner of the primary structure has contaminated material beneath the concrete.

Delta count instrument C-4067 malfunctioned at Location 220299. The readings previously obtained were confirmed with C-4060 at surface level.

The property was cleaned up and all team members were alpha scanned at 1430 hours.

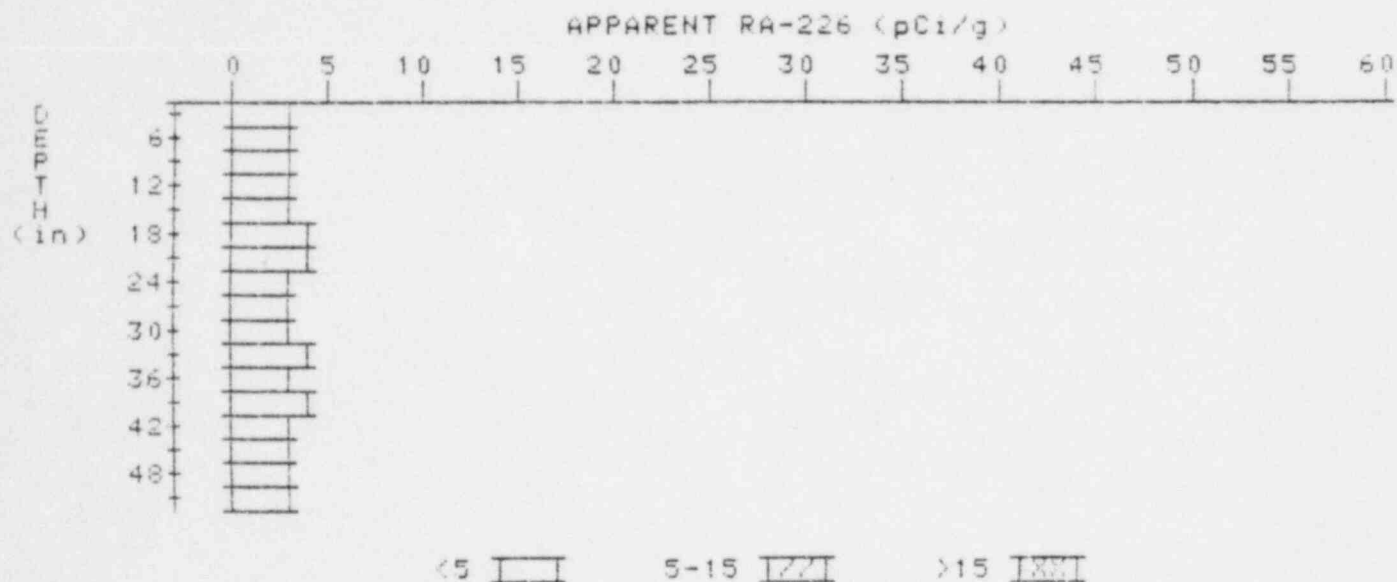
# APPARENT RADIUM-226 CONCENTRATION DECONVOLUTION GRAPH

9

PROPERTY NUMBER: GJ-12163-R3

HOLE NUMBER: 9

LOCATION: 241239



| Depth<br>(in) | Apparent<br>Radium-226<br>(pCi/g)<br>Undeconvolved | Apparent<br>Radium-226<br>(pCi/g)<br>Deconvolved |
|---------------|--|--|
| 3             | 2.9  | 2.9  |
| 6             | 3.0  | 2.8  |
| 9             | 3.2  | 3.4  |
| 12            | 3.3  | 3.3  |
| 15            | 3.4  | 3.4  |
| 18            | 3.5  | 3.7  |
| 21            | 3.5  | 3.7  |
| 24            | 3.4  | 3.4  |
| 27            | 3.3  | 3.3  |
| 30            | 3.2  | 2.7  |
| 33            | 3.4  | 4.1  |
| 36            | 3.2  | 2.7  |
| 39            | 3.3  | 3.7  |
| 42            | 3.2  | 3.0  |
| 45            | 3.2  | 3.2  |
| 48            | 3.2  | 3.4  |
| 51            | 3.1  | 3.1  |



