

RADIOLOGIC AND ENGINEERING ASSESSMENT

FOR

DOE ID NO.: GJ-00807-MR
ADDRESS: 160 LITTLE PARK ROAD

JULY 1985

FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

ALBUQUERQUE OPERATIONS OFFICE

DEPARTMENT OF ENERGY

BY

BENDIX FIELD ENGINEERING CORPORATION
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APPROVED BY

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DATE

August 7, 1985

REA-00807:REA-KL016

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PDR WASTE
WM-54 PDR

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

The location, DOE ID No. GJ-00807-MR, is a single-family residence located at 160 Little Park Road, 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, 0 cu. yd.; interior, 20 cu. yd.

2.0 PROPERTY DESCRIPTION

2.1 General Description

Address: 160 Little Park Road, Grand Junction, Colorado

Zoning: Residential (R-2A)

Lot Size: Approximately 108,900 sf (2.50 acres)

Legal Description: Lot 43, Section 33, T1S, R1W, or the northeast 1/4 of the southeast 1/4 of the southeast 1/4 of the northwest 1/4 of Section 33, T1S, R1W, County of Mesa, State of Colorado.

Point of Reference: This property is located approximately 3 miles southwest of the State of Colorado Tailings Repository. Appendix Figure 2.1 shows the property location relative to its surroundings.

Utilities: Utility locations are shown in Appendix Figures 2.2a and 2.2b.

Electrical:	Overhead
Gas:	Underground
Telephone:	Overhead
Sewer:	Underground
Water:	Underground
Cable TV:	None

Bordering Properties:

North:	Single-family residence
South:	Scattered brush, trees, etc.
East:	Canyon
West:	Single-family residence

2.2 Existing Facilities and Structures

Primary Structure:

Type:	Single-family residence
Size:	Approximately 1,530 sf
Construction Date:	1966
Construction:	Wood-frame with masonite siding
Foundation:	Monolithic concrete floor and footing
Footing Depth:	Approximately 6" to bottom of footing from grade
Basement:	None
Crawl Space:	None
Condition:	Good

Other Structures: None

General Remarks:

Structures, utilities, landscaping, and other special features of this property are included in Appendix Figures 2.2a and 2.2b. A floor plan of the residence is shown on Appendix Figure 2.3.

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-00807-MR on March 20, 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 under a portion of the slab in 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, Memo of Understanding, team leader notes, and deconvolution graphs are included in the Appendix (Section 6.0).

3.2 Gamma Exposure-Rate Surveys

3.2.1 Exterior Findings

Background Readings: 9 to 16 uR/h
Highest Outside Gamma Reading (HOG): 16 uR/h

Exterior radium-concentration measurements are presented in Appendix Table 3.1. Grid-point survey results and ranges of the walking scans are shown in Appendix Figure 3.1. Appendix Figure 3.2 shows that no elevated readings were recorded on the exterior portion of this property.

3.2.2 Interior Findings

Background Readings: 11 to 14 uR/h
Highest Inside Gamma Reading (HIG): 40 uR/h

Interior radium-concentration measurements are presented in Appendix Table 3.2. Interior gamma exposure-rate measurements are summarized in Appendix Table 3.3. Appendix Figure 3.3 shows interior exposure rates and locations of these measurements.

3.3 Boreholes, Soil Samples, and Other Measurements

Areas which displayed elevated gamma levels were further investigated; these areas are shown in Appendix Figure 3.3. Locations of utility line and foundation investigations are presented in Figure 3.4. Data from these investigations are included in Appendix Tables 3.1 and 3.2.

3.4 Radon/Radon Daughter Concentration (RDC)

Determined by CDH: 0.009 gross working level (WL). No additional RDC measurements were taken by Bendix.

3.5 Extent of Contamination

Appendix Figure 3.5 shows the identified area and estimated depth of contamination on this property, based on assessments of all measurements taken. As noted in this figure, the area that contains identified residual radioactive materials is:

(AREA A) There is contamination under a portion of the 4-inch-thick concrete slab in the primary structure. The depth of contamination is 12 inches deep measured from the surface of the uncontaminated slab (approximately 548 sf). This area is excluded from remedial action.

4.0 RECOMMENDED REMEDIAL ACTION

4.1 Decontamination and Restoration

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

4.2 Evaluation of Recommended Remedial Action

The recommendation that no remedial action be performed on this property is made because the levels of radioactivity on this property fall below the EPA Standards (40 CFR 192) when averaged over 100 m².

The EPA Standard is as follows:

- (1) If the indoor radon daughter concentration exceeds 0.02 working level (WL), where practical or 0.03 WL in any event (the gross working level determined by CDH for this property is 0.009); and
- (2) Indoor gamma radiation exceeds 20 microroentgens per hour (uR/h) above background levels (interior background readings for this location were found to be 11 to 14 uR/h with the highest inside mean surface gamma reading of 18 uR/h).

Appendix Table 4.1 presents the area and volume calculations of contamination present on the property.

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

Appendix Figures:

Figure 2.1	Vicinity Map
Figure 2.2	Site Plan
Figure 3.1	Exterior Grid-Point Exposure Rates
Figure 3.2	Exterior Gamma Scan
Figure 3.3	Sample Locations
Figure 3.4	Interior Gamma Survey
Figure 3.5	Estimated Extent of Contamination

Official Survey Report

Memo of Understanding

Team Leader Notes

Deconvolution Graphs (Apparent Radium-226 Concentration)

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.		
5	231274	03	TC	2.4		*	Water line
		06	TC	2.5		*	Auger refusal
		09	TC	2.6		*	
		12	TC	2.6		*	DC = 0 inches
		15	TC	2.6		*	
		18	TC	2.5		*	
		21	TC	2.5		*	
		24	TC	2.4		*	
		27	TC	2.5		*	
		30	TC	2.4		*	
		33	TC	2.4		*	
		36	TC	2.1		*	
		39	TC	2.2		*	
6	236310	06	DS	<1.0		*	Horizontally under slab
7	255285	03	TC	2.2		*	
		06	TC	2.5		*	Sewer line
		09	TC	2.4		*	Auger refusal
		12	TC	2.2		*	
		15	TC	1.5		*	DC = 0 inches
		18	TC	1.4		*	
		21	TC	1.3		*	
8	281310	00	DS	<1.0		*	Gas line
		10	DS	<1.0		*	On gas line
9	282236	03	TC	2.0		*	
		06	TC	2.3		*	Septic tank
		09	TC	2.4		*	Auger refusal
		12	TC	2.3		*	
		15	TC	2.3		*	DC = 0 inches
		18	TC	2.4		*	
		21	TC	2.5		*	
		24	TC	2.6		*	
		27	TC	2.7		*	
		30	TC	2.8		*	
		33	TC	2.8		*	

Radium Concentrations at Exterior Locations

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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	310220	03	TC	1.5		*	Leach field
		06	TC	1.5		*	Auger refusal
		09	TC	1.5		*	
		12	TC	1.4		*	DC = 0 inches
		15	TC	1.3		*	
		18	TC	1.2		*	
		21	TC	1.1		*	
		24	TC	1.1		*	
		27	TC	1.3		*	
		30	TC	1.4		*	

Tool 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 = 03-20-85
 Team Leader = BJF

Radium Concentrations at Interior Locations

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Loc #	Grid Location	Depth (in.)	Meas. Type	In Situ Ra-226 (pCi/g)		Chem Ra-226 (pCi/g)	Comments
				Tot. Ct	Spectr.		
1		00	DS	5.1		*	Hall
2		00	DS	8.5		*	Living room
3		00	DS	<1.0		*	Living room
4		00-04	SS			4.2	Concrete core
		04-10	SS			34.8	Soil
		03	TC	20.6		*	
		06	TC	23.5		*	
		09	TC	15.2		*	
		12	TC	10.0		*	DC = 12 inches
		15	TC	7.1		*	Based on the
		18	TC	5.7		*	deconvolution graph
		21	TC	4.9		*	
		24	TC	4.3		*	
		27	TC	3.9		*	
		30	TC	3.6		*	

Tool 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 = 03-20-85
 Team Leader = BJF

Table 3.3

Summary of Interior Gamma Exposure Rates

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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	14	11-16	13	15	11-18	13
ROOM B	06	11-13	12	07	12-19	13
ROOM C	05	10-13	12	05	11-17	13
ROOM D	17	13-21	15	19	13-40	18
ROOM E	08	11-13	12	08	11-13	12
ROOM F	06	11-13	12	06	11-13	13
ROOM G	07	13-17	15	07	14-24	18
ROOM H	07	11-26	15	07	11-28	17

*Exposure Rates and Room Locations Shown in Appendix Figure 3.3

Table 4.1
Area and Volume Calculations
DOE ID No. GJ-00807-MR

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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>
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INTERIOR

Concrete

A	18 x 14	=	252		
	10 x 3	=	30		
	11 x 10	=	110		
	11 x 8	=	88		
	12 x 3	=	36		
	5 x 2	=	10		
*	12 x 2	=	24		
			550	x	0.3 = 165

Volume of Concrete = 165 = 165/27 = 6

Contaminated Fill

A	18 x 14	=	252		
	10 x 3	=	30		
	11 x 10	=	110		
	11 x 8	=	88		
	12 x 3	=	36		
	5 x 2	=	10		
	4 x 3	=	12		
	5 x 2	=	10		
			548	x	0.7 = 384

Volume of Contaminated Fill = 384 = 384/27 = 14

TOTAL VOLUME - INTERIOR = 20

TOTAL VOLUME - EXTERIOR = 0

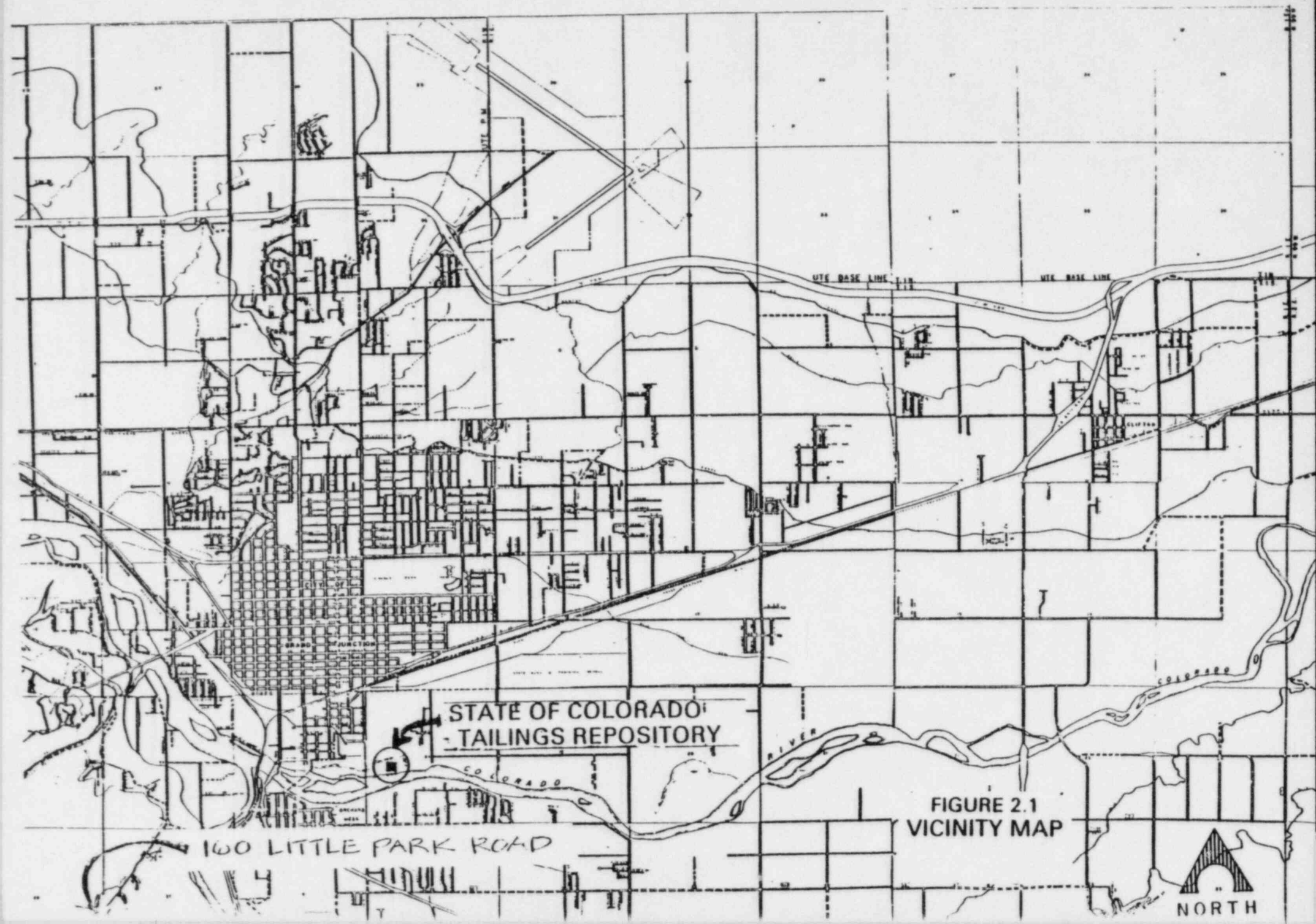
* This volume is exterior concrete that would need to be removed to gain access to the foundation.

See Appendix Figure 3.5 For Areas

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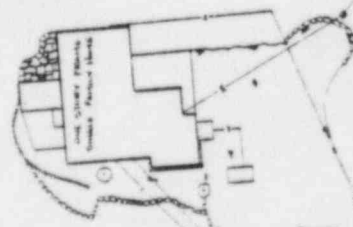


LOT 45 SECTION 33, T. 15, R. 1W, OF THE
 PLANNED IN OF THE SOUTHEAST 1/4 OF THE
 SOUTHEAST 1/4 OF THE NORTHEAST 1/4 OF SECTION 33,
 T. 15, R. 1W, HESSE COUNTY, COLORADO

PLAT = 550.0

PLAT = 550.0

PLAT = 550.0



These drawings are prepared for the use of the owner and are not to be used for any other purpose without the written consent of the engineer. The engineer assumes no responsibility for the accuracy of the data furnished by the owner or for the results of the use of these drawings.

Form No. 144

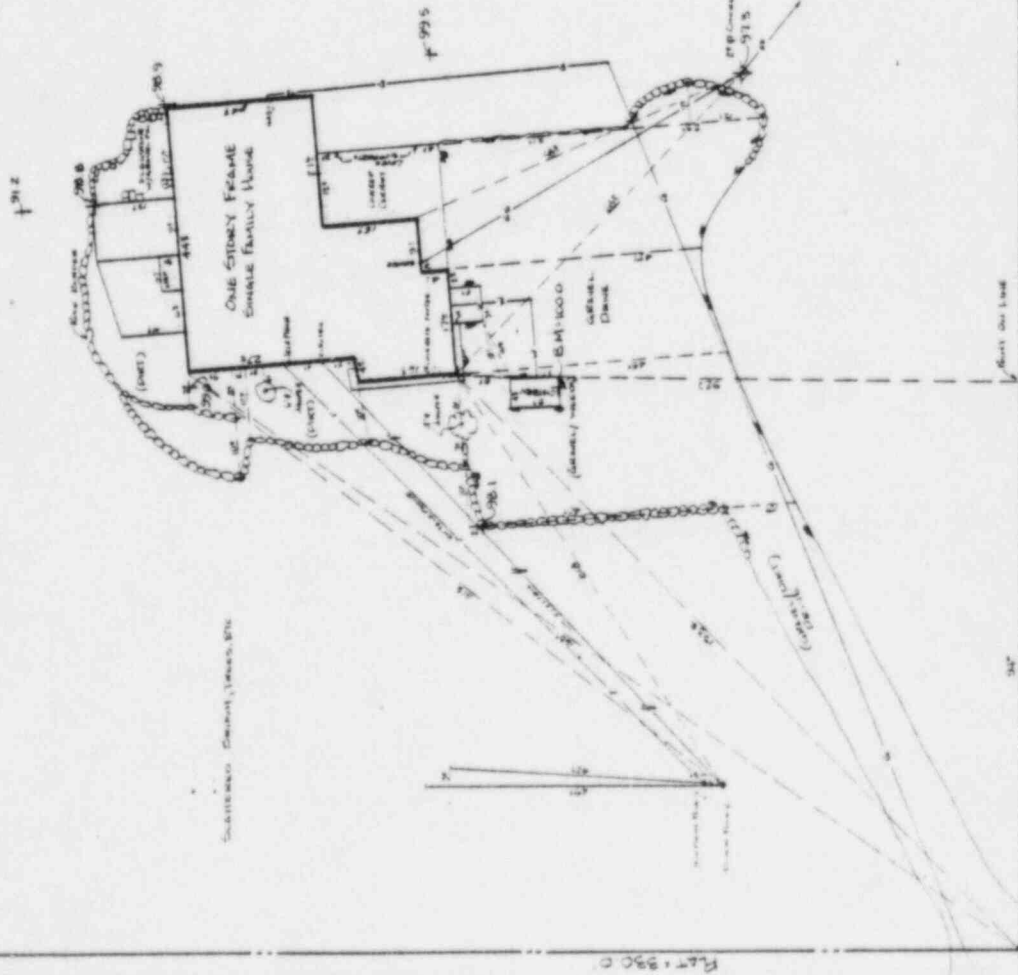
PLAT = 550.0' MEASURED = 550.0'

Scale in Feet

FIGURE 2.2a SITE PLAN

U.S. DEPARTMENT OF ENERGY	PROJECT NO.	01-000001-2
OFFICE OF ENERGY DELIVERY AND EFFICIENCY	PROJECT NAME	01-000001-2
ENERGY EFFICIENCY PROGRAM	PROJECT LOCATION	01-000001-2
ENERGY EFFICIENCY PROGRAM	PROJECT DESCRIPTION	01-000001-2
ENERGY EFFICIENCY PROGRAM	PROJECT STATUS	01-000001-2
ENERGY EFFICIENCY PROGRAM	PROJECT DATE	01-000001-2

LOT 45 SECTION 33, T.15, R.1W, ON THE
NORTHEAST 1/4 OF THE SOUTHEAST 1/4 OF THE
SOUTHEAST 1/4 OF THE NORTHWEST 1/4 OF SECTION 33,
T.15, R.1W, NECA COUNTY, COLORADO



PLAN = 330.0' (MEASURED FROM TO HALL = 330.0')



FIGURE 2.2 b SITE PLAN

This drawing, prepared by the Bureau of Land Management, is a true and correct copy of the original drawing on file in the Bureau of Land Management, Denver, Colorado. It is not to be used for any other purpose without the written consent of the Bureau of Land Management.

U.S. DEPARTMENT OF THE INTERIOR	BUREAU OF LAND MANAGEMENT	SECTION 33, T.15, R.1W
PLAT NO.	330.0	330.0
SECTION	33	33
TOWNSHIP	15 N	15 N
RANGE	1 W	1 W
COUNTY	NECA	NECA
STATE	COLORADO	COLORADO
DATE	1955	1955
DRAWN BY	J. L. BROWN	J. L. BROWN
CHECKED BY	J. L. BROWN	J. L. BROWN

