see ltr. w. Flory
fm. J. Pepin
2/28/85
WM-48

DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
CONTRACT NO. DE-AC04-83AL18796

Draft
Radiological and Engineering Assessment

Vicinity Property No. NIIR 032

Remedial Actions
Contractor
for the
Uranium Mill Tailings
Remedial Actions
Project

MORRISON
KNUDSEN

UMTRA-7

NRC FILE CENTER COPY

Vicinity Property No. 032

WM-48

DRAFT

THE RADIOLOGICAL AND ENGINEERING ASSESSMENT

AND FINAL DESIGN

FOR

[redacted] PROPERTY

DU-032

February 27, 1985

PREPARED FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

UNITED STATES DEPARTMENT OF ENERGY

PREPARED BY

MORRISON-KNUDSEN COMPANY, INC.

NOTE:

SUPPLEMENTAL STANDARDS

URFO-7

TABLE OF CONTENTS

1.0 Executive Summary

1.1 Introduction
1.2 Evaluation and Recommendation

2.0 Engineering Field Survey

2.1 Property Description
2.2 Existing Facilities and Structures

3.0 Radiological Survey and Assessment

3.1 Gamma Exposure Rate Survey
3.2 Borehole Survey
3.3 Radon/Radon Daughter Survey
3.4 Estimated Extent of Contamination
3.5 Supplemental Standards

4.0 Engineering Assessment

4.1 Evaluation of Options
4.2 Recommendation

5.0 Technical Specifications

6.0 Construction Drawing

DU-032-020 Excavation & Restoration Plan DU-032

FIGURES

2.1 Vicinity Map DU-032
2.2 Site Plan DU-032
2.3 Property Photos
2.4 Property Photos
3.1 Radiological Survey Data DU-032
4.1 Excavation & Restoration Plan DU-032

TABLES

2.1 Property Survey Data
3.1 Outdoor Gamma Survey
3.2 Borehole Survey
3.3 Angle Hole Survey
4.1 Costs
5.1 Index of Technical Specifications

APPENDIX

A. Survey Data Logs

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Property DU-032 is a private residence located at 460 San Juan Drive, Durango, CO.

1.2 Evaluation and Recommendation

1.2.1 Residual Radioactive Material Involvement

There are two areas of contamination located in the yard area of this property.

1.2.2 Recommended Remedial Action Option

The recommended option is to remove the contaminated material.

Due to severe time constraints, the field survey crew was unable to get a core drilled in the sidewalk or street. Unidentified contamination may, therefore, extend under the front sidewalk and San Juan Drive. It is recommended that if contamination is found during remedial action to extend under this area, the contamination be left in place in accordance with the criteria of 40 CFR 192.21(c), "Criteria for Applying Supplemental Standards."

1.2.3 Estimated Costs

The estimated cost for removal of the contaminated material and restoration of the property is $15,700.00.

1.2.4 Schedule

The estimated duration of the remedial action effort is 5 to 10 days.

2.0 ENGINEERING FIELD SURVEY

2.1 Property Description

2.1.1 Property Use and Occupancy

Property DU-032 is a private residence located at 460 San Juan Drive, Durango, Colorado and owned by Floyd T. Denton. The map in Figure 2.1 illustrates the property's vicinity location.

2.1.2 Legal Description

The legal description as recorded with the La Plata County Recorder's Office in Deed Book No. 320, Page 298 follows:

Lot Six (6) in Block One (1), Thompson's Addition to the City of Durango, together with all improvements thereon situate.

2.1.3 Bordering Properties

The lot is zoned R-1, Residential District. It is located in a residential area less than 2-1/4 miles northeast of the old Vanadium Corporation of America mill tailings site. The property is bounded on the north by a residence; on the east by a residence; on the south by San Juan Drive; and on the west by a residence.

2.2 Existing Facilities and Structures

2.2.1 Structures

The residence is a single story wood frame structure with asbestos lap siding on a concrete foundation. A two car asphalt paved driveway extends from the street to the southwest corner of the house and narrows to one car width along the west side of the house. Concrete sidewalks are located along the street just outside the south property line, from the driveway to the covered concrete front porch, and from the end of the driveway out into the rear yard.

A prefabricated metal shed on a concrete slab is located in the northwest corner of the rear yard. A narrow concrete curb borders the entire west lot line and most of the east property line. Two large sheet metal concentric circular planters are located in the rear yard, as well as a clothes line.

Front and rear yards are grassed. The rear yard is fenced on the east and west sides with a white picket fence atop the concrete curb and on the north side with a large wood plank fence. Two small shrubs have been planted near a large garden plot in the northeast corner of the rear yard.

The residence is less than 50 years old and therefore meets the requirements of Stipulation I.a. of the Programmatic Memorandum of Agreement between the DOE, the Colorado Historic Preservation Officer, and the Advisory Council on Historic Preservation.

2.2.2 Utilities

Utilities are serviced to the property as follows:

Electric power - Overhead to north side of house

Telephone - Overhead to east side of house

Water - Underground from San Juan Drive main to south side of house

Gas - Underground from utility right-of-way on north to east side of house

Sewer - Underground from San Juan Drive main to south side of house

2.2.3 Site Plan and Survey Data

See Figure 2.2 for a site plan of the property. Property survey data and photos are presented in Table 2.1 and Figure 2.3 and Figure 2.4.

Table 2.1

PROPERTY SURVEY DATA

GENERAL:

Site Location: Durango

Property Address: 460 San Juan Drive

Owner's Name: Floyd T. Denton Address: Same

Lot No.: 6 Property Type: Residence

Occupancy Group: Adults: N/A Children: N/A

Survey Completed By: R. Livengood/C. Sanders-Meena Date: 5-17-84

Property Description - Exterior:

Dwelling: Sq. Ft.: N/A

Levels: Single Story with Crawl Space

Construction Type: Wood Frame with Asbestos Lap Siding

Foundation: 32" High Concrete Perimeter Wall

Garage: None

Storage Bldg: Prefab: 6-1/2'x8' Metal on Concrete Slab in NW Corner of Backyd

Other:

Improvement to Dwellings: Additions: None Porches: Covered Conc South Side

Deck: None Patio: None

Other:

Driveway: Concrete: Paved: Two Car from Street

Gravel: Other:

Sidewalks: Concrete/Paved: As Noted on Drawing

Other:

Fences/Gates: Wood: 4' White Picket on East/West Sides Back Yard; 6' Wood Along Back (North) of Lot

Table 2.1 (cont'd)

PROPERTY SURVEY DATA

Site Location: Durango

Property Address: 460 San Juan Drive

Grounds:
- Lawn: Full Front And Back
- Trees: None
- Shrubs: As Noted on Drawing
- Garden: Plot in Northeast Corner of Back Yard
- Grading: Relatively Flat
- Other: 2 Sheet Metal Concentric Circ Planters in Back Yard

Soil Type:

Existing Survey Plot: Yes

Property Description - Interior: No Interior Contamination

Room	Floor	Walls E	Walls W	Walls N	Walls S	Ceiling	Comments

Utilities:

Heating: Gas: X Electric:

Hot Water: Other:

Air Cond: Gas: Heat Pump:

Table 2.1 (cont'd)

PROPERTY SURVEY DATA

Site Location: Durango

Property Address: 460 San Juan Drive

Electric Line Location: Overhead to North Side of House

Gas Line Location: Underground from Utility ROW on North to East Side House

Water Line Location: Underground from San Juan Drive main (See Drawing)

Sewage Line Location: Underground from San Juan Drive main (See Drawing)

Telephone Line Location: Overhead to East Side of House

Building Codes and Zoning:

Codes	Local	State	Federal
Building Work	UBC		
Plumbing			
HVAC			
Electrical			
Other			

Zoning District: City of Durango

Present Dwelling Zoning: R-1 Residence District

Setbacks: Front:

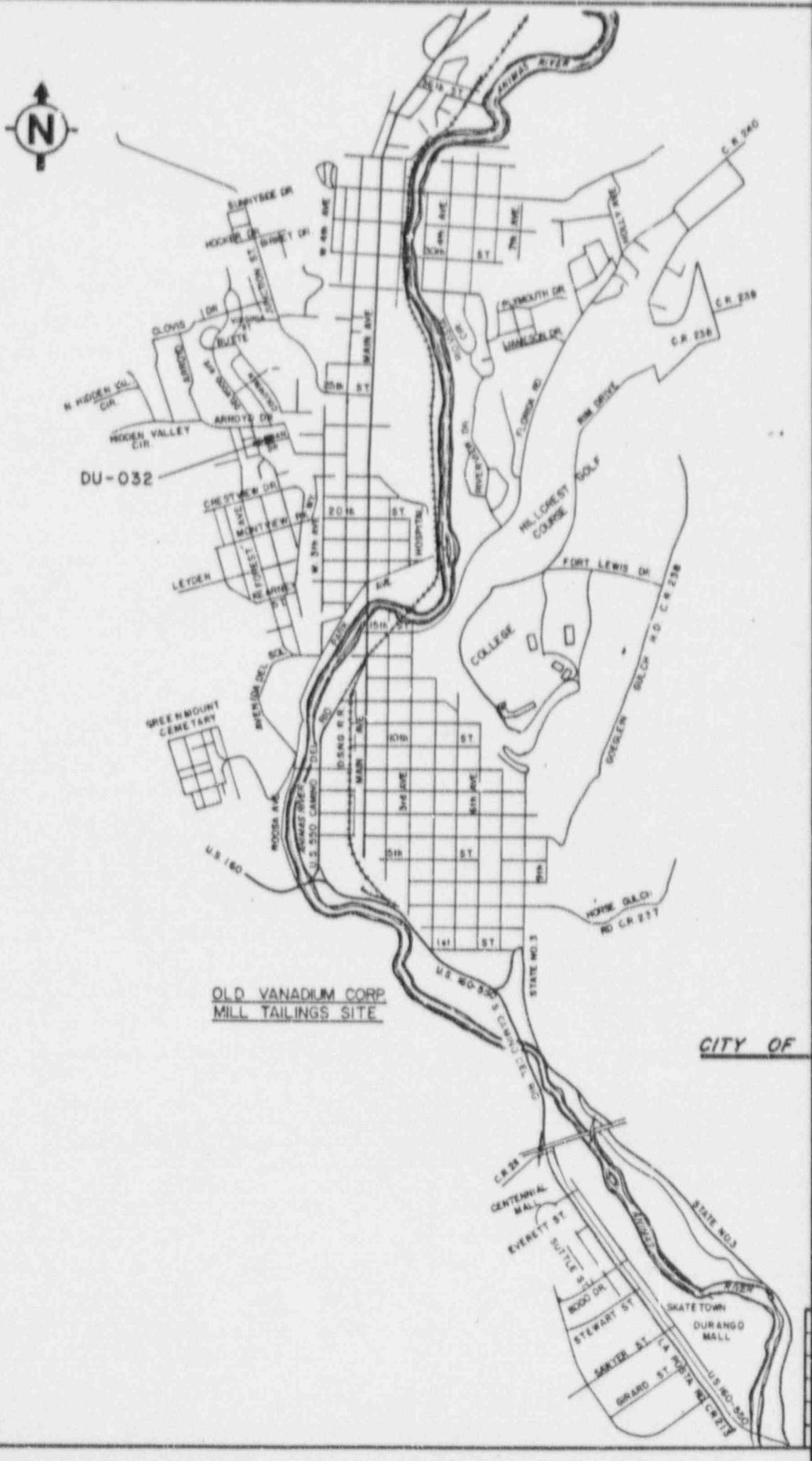
Rear:

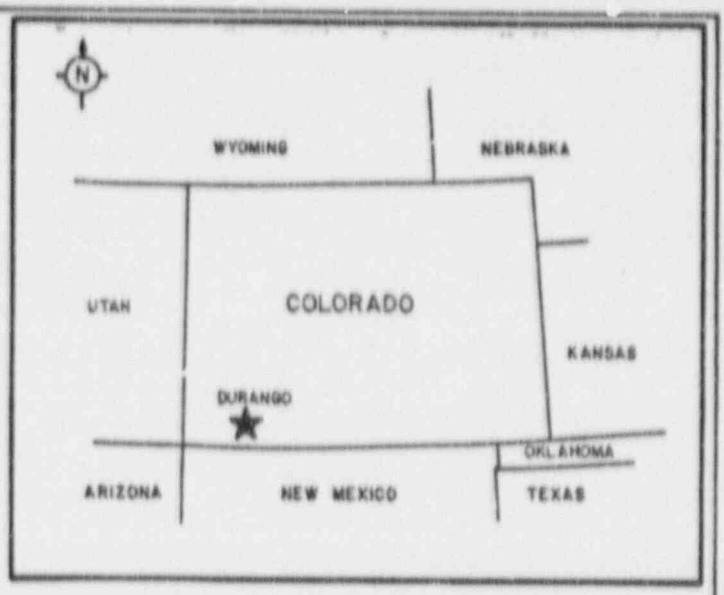
Side:

Other:

Photographs:

Roll Frame	Description	Direction
3-4	Front of House	Looking North
3-3	Rear of House	Looking South
3-2	Rear of Yard	Looking Northwest
3-1	Rear of Yard	Looking Northeast


N
DU-032
OLD VANADIUM CORP
MILL TAILINGS SITE
CITY OF
ANIMAS RIVER
MAIN AVE
HOSPITAL
HILLCREST GOLF COURSE
COLLEGE
FORT LEWIS DR
GOLF RD C.R. 238
GREENMOUNT CEMETERY
RIVERSIDE CEM.
ROOSA AVE
U.S. 550 CAMINO DEL SOL
U.S. 160
HORSE GULCH RD C.R. 237
STATE HWY 3
C.R. 240
C.R. 239
C.R. 238
PLYMOUTH DR
FLORIDA RD
RIM DRIVE
RIVERSIDE DR
SUNNYSIDE DR
HOOVER DR
GLOVIS DR
VIRGINIA ST
BUFFALO ST
N. HIDDEN VALLEY CIR.
HIDDEN VALLEY CIR
ARROYO DR
CASTLEVIEW DR
MONTVIEW DR
LEYDEN
RIVERSIDE CEM.
CENTENNIAL MALL
EVERETT ST
SUTTLE ST
MAIN
BOOD DR
STEWART ST
BAXTER ST
GIRARD ST
SKATE TOWN
DURANGO MALL
U.S. 160-550
C.R. 23



DURANGO, COLORADO

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED | DRAWN: GJW
CHECKED
REVIEWED
APPROVED

FIGURE 2.1

VICINITY MAP DU-032

DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

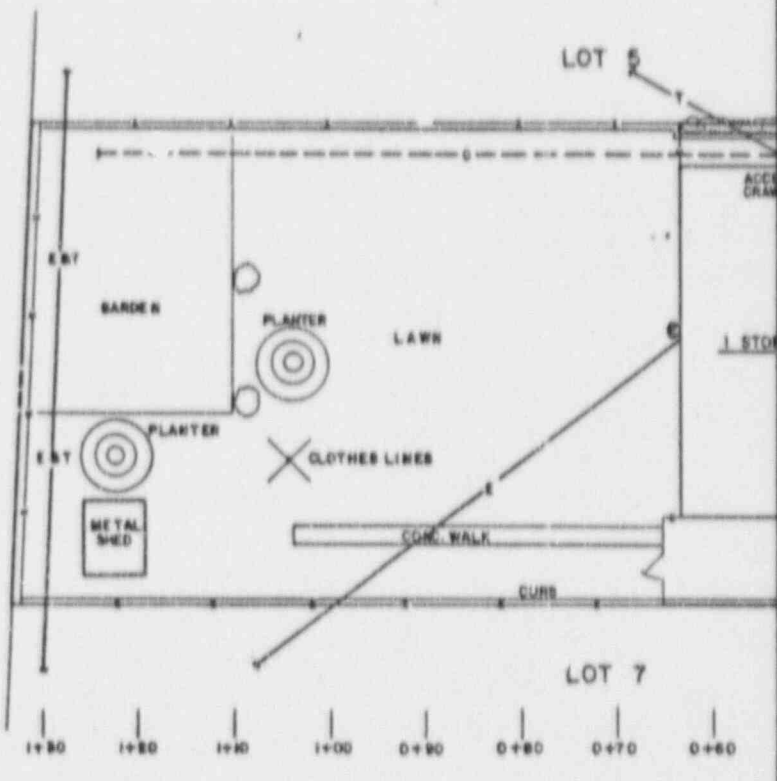
APPROVED	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
NR		NR		NR	

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-032-005 REV. A

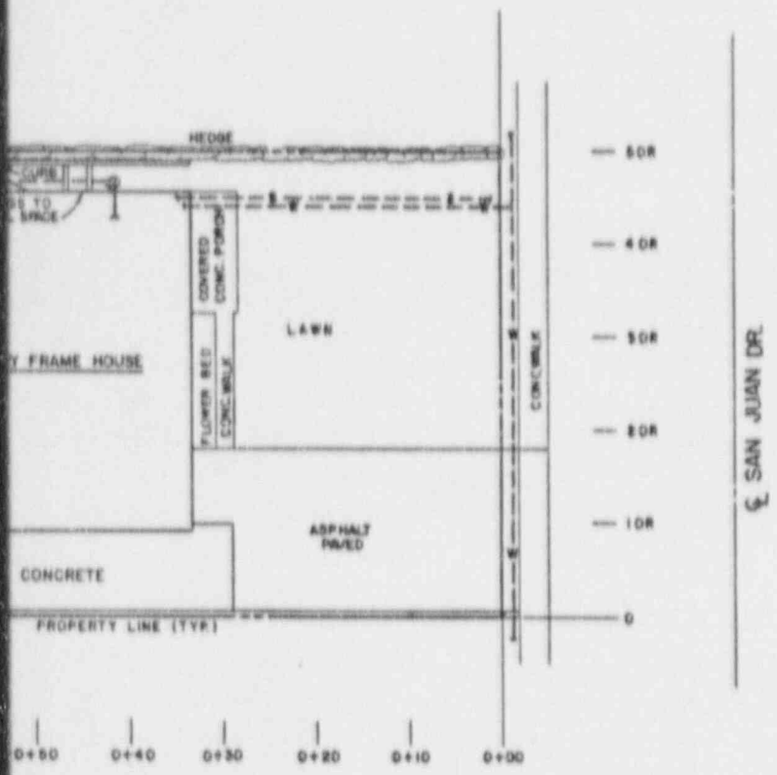
NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LOE	APPROVAL DH	PROJ ENG	APPROVAL DOE
A	12/22/93	FINAL REA SUBMITTAL	JDT	TLP	TLP	[illegible]	[illegible]	-


LOT 5
EAST
GARDEN
PLANTER
LAWN
PLANTER
EAST
CLOTHES LINES
METAL SHED
CONC. WALK
CURB
LOT 7
1+30
1+20
1+10
1+00
0+90
0+80
0+70
0+60

LEGEND

W	WATER LINE
G	GAS LINE
GM	GAS MAIN
S	SEWER LINE
SM	SEWER MAIN
STM	STORM SEWER
E	ELECTRICAL LINE
T	TELEPHONE LINE
TV	CABLE TV
	PROPERTY LINE
x x x	FENCE LINE
G, W or E	METER
G or W	VALVE
	PROPERTY PIN
	POWER POLE

NOTE: OVERHEAD SERVICE DENOTED BY SOLID LINE.
UNDERGROUND SERVICE DENOTED BY DASHED LINE.



9707090130-02

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

FIGURE 2.2
SITE PLAN DU-032
DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

DESIGNED	DRAWN	CHECKED	REVIEWED	RECOMMENDED	APPROVED	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
	GJW				NR		NR		NR	

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. DU-032-010 REV A

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LOE	APPROVAL DOE	PROJ. ENG	APPROVAL DOE
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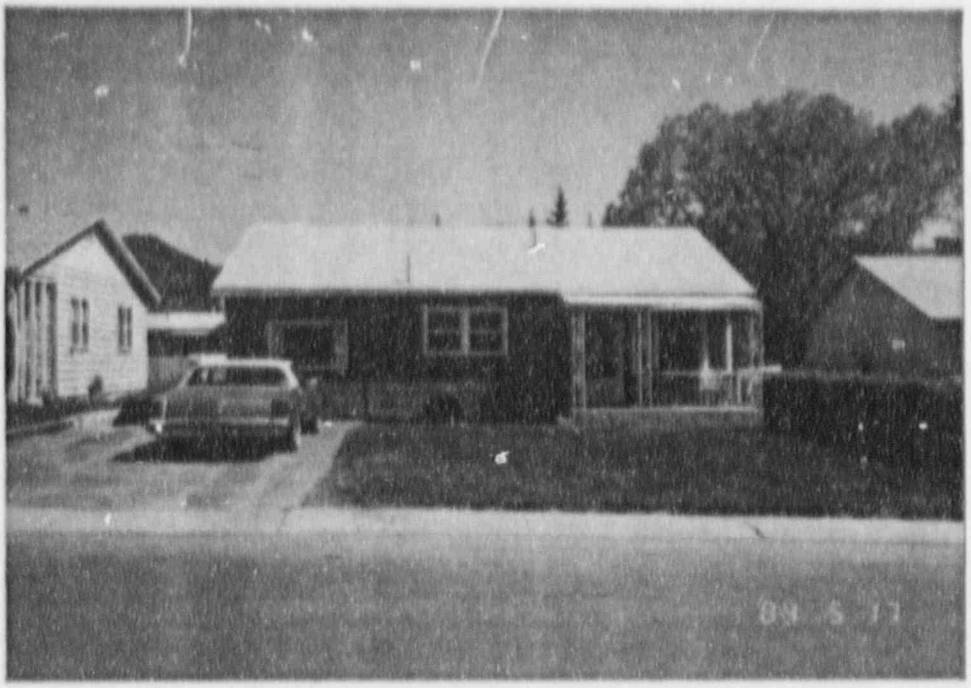
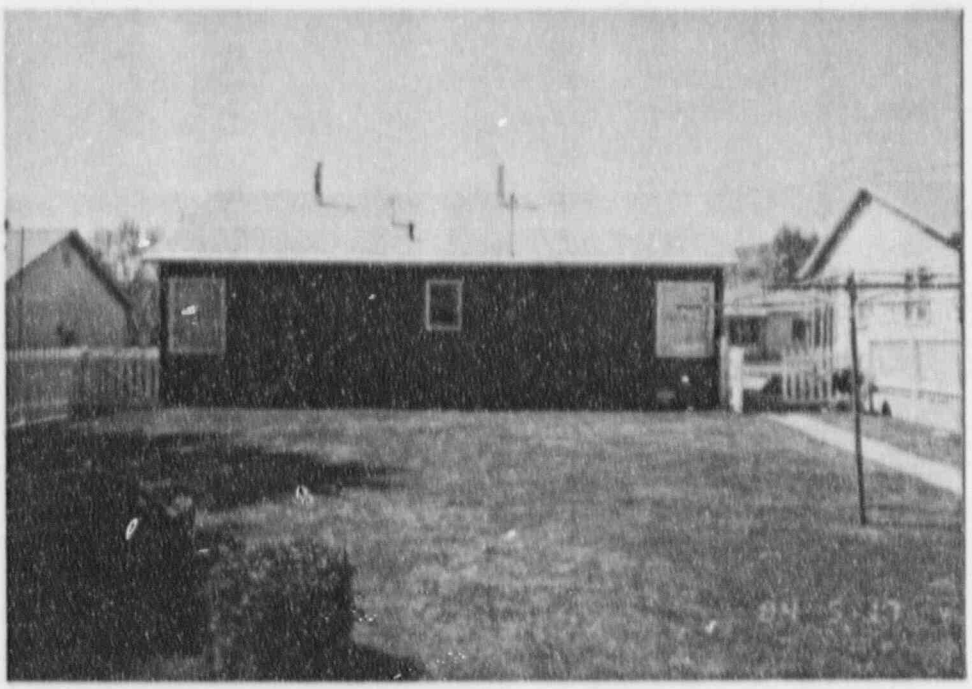


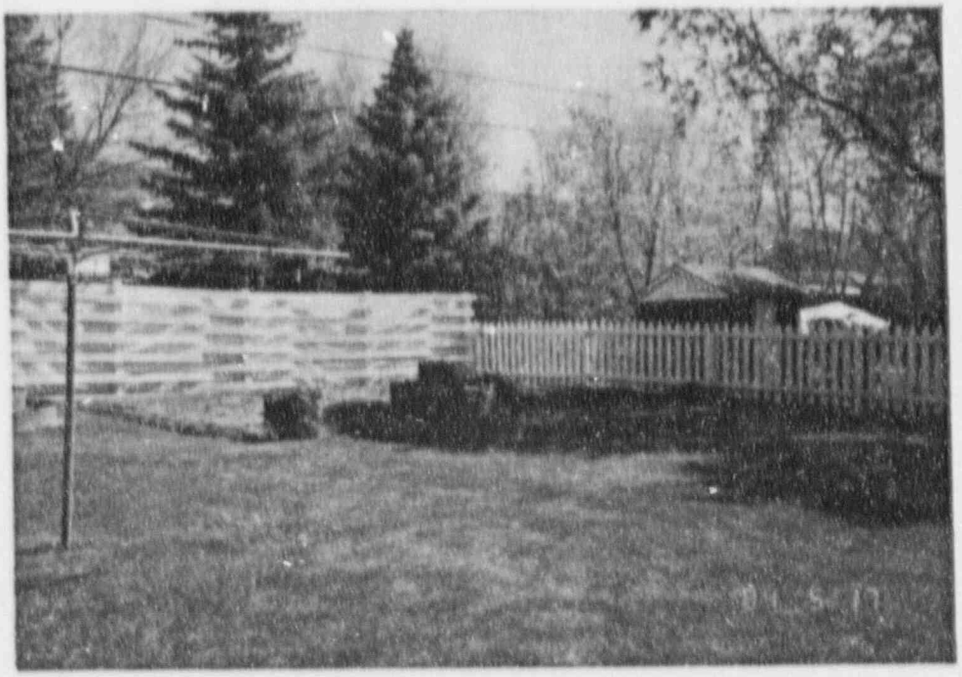
Front of House Looking North



Rear of House Looking South

Figure 2.3 Property Photos

Rear of Yard Looking Northwest



Rear of Yard Looking Northeast

Figure 2.4 Property Photos

3.0 RADIOLOGICAL SURVEY AND ASSESSMENT

3.1 Gamma Exposure Rate Survey

3.1.1 Survey Method

The outdoor contaminated areas identified in the inclusion survey (Results of the Radiological Survey at Property DU-032, ORNL, May 1983) were surveyed in accordance with the RAC UMTRA Procedure 019. The survey was made on a 10' x 10' grid. A surface scan was made of the entire gridded yard with a gamma scintillometer to identify the boundary of the contamination. Gamma readings were made within one foot of the house on all sides of the structure.

An indoor gamma survey was not conducted inside the building since the inclusion survey reported that no contamination is present in or under the structure.

3.1.2 Survey Results

Surface gamma readings on the property range from 15 to 66 micro R/hr (Table 3.1). This may be compared with the background for the Durango site of 14 micro R/hr. Table 3.1 lists surface gamma readings greater than 16 micro R/hr.

3.2 Borehole Survey

3.2.1 Survey Method

A gasoline-powered hand auger was used to drill 4-inch diameter holes in and around the regions identified as contaminated during the gamma survey. The holes were surveyed in compliance with the RAC UMTRA Procedure 018. Holes were also angled under the footings of the structure inside the crawl space.

3.2.2 Survey Results

Contamination was found in 11 of the 16 outdoor holes augered. The location and depth of the contamination is described in Table 3.2 and is shown in Figure 3.1.

3.3 Radon/Radon Daughter Survey

No radon/radon daughter surveys were performed inside the buildings at the property, since the inclusion survey reported that no contamination is present in or under the structures. The inclusion survey reported a single radon daughter concentration measurement of 0.01 WL inside the house.

3.4 Estimated Extent of Contamination

Two areas of contamination were identified in the survey.

Area A has an estimated depth of contamination of 18 inches, but could be 24 inches in some locations. Contamination above guidelines could exist underneath the paved driveway, but this has not been determined. When Area A has been excavated, the walls of the driveway should be checked; if contamination is present, the driveway also should be added to Area A.

Area B is in the rear of the property and has an estimated depth of contamination of 18 inches.

3.5 Supplemental Standards

Due to severe time constraints, the field survey crew was unable to get a core drilled in the sidewalk or street. Unidentified contamination may, therefore, extend under the front sidewalk and San Juan Drive. It is recommended that if contamination is found during remedial action to extend under this area, the contamination be left in place in accordance with the criteria of 40 CFR 192.21(c), "Criteria for Applying Supplemental Standards."

Table 3.1
OUTDOOR GAMMA SURVEY
Property DU-032

POINT	uR/hr
0+00,20R	22
0+00,30R	24
0+00,40R	33
0+00,50R	19
0+10,20R	33
0+10,30R	26
0+10,40R	25
0+10,50R	20
0+20,00R	18
0+20,20R	30
0+20,30R	28
0+20,40R	28
0+20,50R	21
0+40,08R	24
0+70,00R	21
0+70,10R	17
0+70,50R	17
0+80,00R	23

Table 3.1 - Cont'd.
OUTDOOR GAMMA SURVEY
Property DU-032

POINT	uR/hr
0+80,50R	18
0+90,00R	28
1+00,00R	29
1+00,50R	18
1+10,00R	28
1+10,10R	16
1+10,20R	16
1+10,30R	24
1+10,50R	17
1+20,00R	27
1+20,10R	19
1+20,20R	19
1+20,30R	20
1+20,40R	20
1+20,50R	18
1+30,00R	66
1+30,10R	22
1+30,20R	19
1+30,30R	20

Table 3.1 - Cont'd.
OUTDOOR GAMMA SURVEY
Property DU-032

POINT	uR/hr
1+30,40R	19
1+30,50R	17
0+33,20R	26
0+33,30R	20

Table 3.2
BOREHOLE SURVEY
Property DU-032

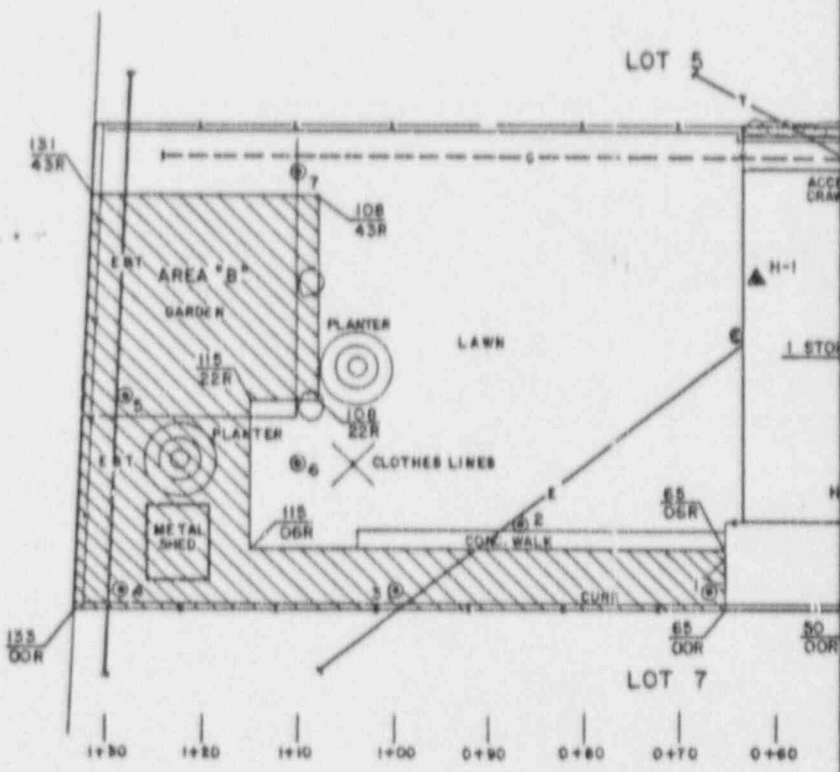
HOLE	LOCATION	CONTAMINATION DEPTH
1	0+67,02R	None
2	0+87,09R	None
3	1+00,02R	0-12"
4	1+29,02R	0-18"
5	1+28,22R	0-6"*
6	1+10,15R	None
7	1+10,45R	None
8	0+00,20R	0-18"
9	0+00,40R	0-24"
10	0+20,20R	0-18"
11	0+20,40R	0-18"
12	0+26,40R	0-18"
13	0+26,20R	0-18"
14	0+36,6R	0-18"
15	0+44,6R	0-18"
16	0+31,9R	0-18"

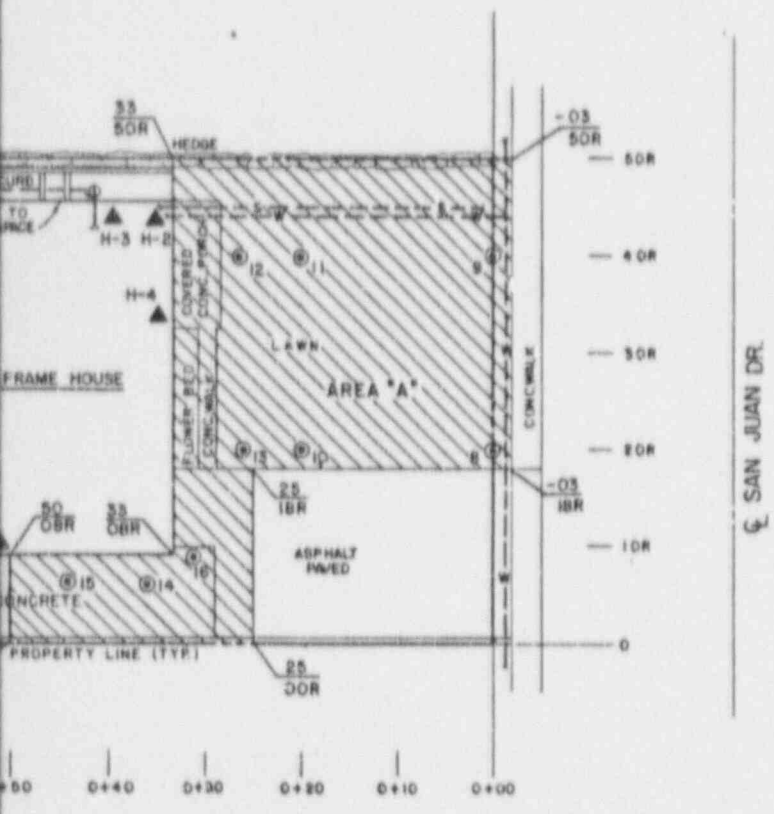
*Low-level contamination present.

Table 3.3
ANGLE HOLE SURVEY
Property DU-032

HOLE	LOCATION (All at Crawl Space)	CONTAMINATION DEPTH
H-1	North Wall	None
H-2	Southeast Corner by Water and Sewer Line	None
H-3	Under Sewer Line	None
H-4	South Wall	None
H-5	West Wall	None

Note: Could not dig deeper - rocky soil.


LOT 5
131
43R
108
43R
AREA "B"
GARDEN
PLANTER
LAWN
115
22R
108
22R
PLANTER
CLOTHES LINES
115
06R
65
06R
CONC. WALK
METAL SHED
125
06R
65
06R
LOT 7
1+30
1+20
1+10
1+00
0+90
0+80
0+70
0+60



LEGEND

⊕B AUGER HOLE DESIGNATION

▲H-5 ANGLE HOLE DESIGNATION

ESTIMATED DEPTH OF CONTAMINATION

18"

9707090130-03

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED | DRAWN: D.W
CHECKED
REVIEWED
RECOMMENDED

FIGURE 3.1

RADIOLOGICAL SURVEY DATA DU-032

DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

APPROVED	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
NR		NR		NR	

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-032-015 REV. A

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LOE	APPROVAL DH	PROJ. ENG	APPROVAL DOE
0	9/20/90	FINAL REA SUBMITTAL						

ENGINEERING ASSESSMENT

Engineering options were formulated and evaluated based on the radiological and engineering assessment for this property. Factors forming the basis of the evaluation were: the extent and location of the contamination, construction costs, and required demolition and constructibility for the various options. Results of the evaluation are detailed below.

4.1 Evaluation of Options

4.1.1 Options

Two options were evaluated for property DU-032:

1. No action should be taken.

2. Complete decontamination of the property including retrieval of the contaminated material and restoration of the property. See Figure 4.1 Excavation and Restoration Plan for scope of work.

Option 2 includes the following:

- Remove, salvage, and replace porch railing and shore roof.
- Demolish, remove, and replace concrete porch, sidewalk, shed slab and concrete area of driveway.
- Demolish and remove asphalt driveway and replace with concrete.
- Remove and replace shrubs and planter.
- Remove and replace fence.
- Excavate contaminated materials in areas as shown in Figure 4.1.
- Backfill excavated areas with common fill. In lawn area, top with topsoil and sod. In concrete area, top with structural fill.

4.1.2 Costs

Estimated costs for the activities associated with Option 2 are detailed in Table 4.1. Costs include labor, insurance, material, equipment, supplies, overhead, profit, and contingency. All costs are listed in 1985 dollars. It is anticipated that the time required for the subcontractor to complete the work will be 5 to 10 days.

4.2 Recommendation

The limited cost and amount of remedial action work p[illegible]ed evaluating any more than these two options. The results of the radiological assessment concluded that contamination levels on the property exceeded EPA guidelines. Therefore, based on these guidelines, it is recommended that Option 2, decontamination of the property, be pursued. The total estimated cost for Option 2 is $15,700.00.

Table 4.1
OPTION 2 COSTS

Activity	Unit Price	Quantity	Estimated Cost
Remove Porch Railing and Shore Roof	LS		170.00
Remove Concrete Porch, Sidewalk, Driveway Slab and Shed Slab	3.00	330 sf	990.00
Remove Asphalt Driveway	.20	598 sf	119.60
Relocate and Replace Metal Shed	LS		300.00
Remove and Salvage Fence	2.75	45 lf	123.75
Excavation (Machine)	8.30	208 cy	1,726.40
Common Backfill	7.20	150 cy	1,080.00
Structural Fill	26.40	17 cy	448.80
Topsoil	26.40	41 cy	1,082.40
Sod	3.00	186 sy	558.00
Construct Concrete Porch, Sidewalk, Shed Slab, and Driveway	3.50	928 sf	3,248.00
Replace Planter	LS		105.00
Replace Fence	8.20	45 lf	369.00
Replace Shrubs	50.00	12 ea	600.00
Subtotal			$10,920.95
5% Subcontractor's Contingency			564.05
20% Overhead and Profit			2,184.19
Subtotal			$13,651.19
15% Contingency			2,047.68
Total (Rounded)			$15,700.00

5.0 TECHNICAL SPECIFICATIONS

Technical specifications applicable to this property are indexed in Table 5.1 . Specifications previously approved by the Department of Energy (DOE) are noted in the table. Also listed are specifications not previously submitted to the DOE which require approval. The text for these additional specifications follow the table.

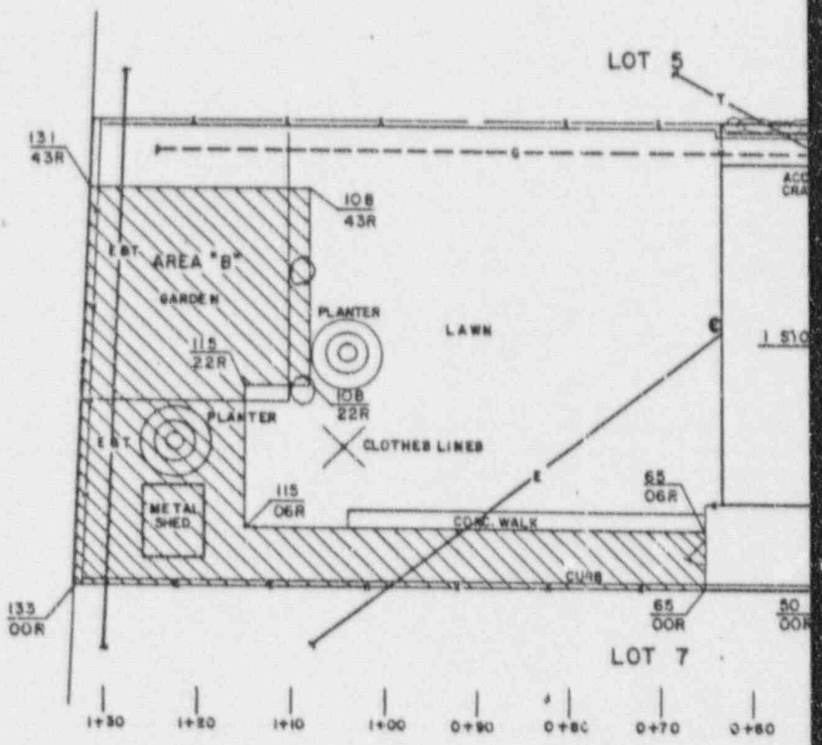
Table 5.1
INDEX OF TECHNICAL SPECIFICATIONS

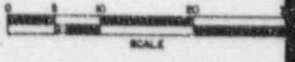
Description		Specifications Previously Approved	Specifications Requiring DOE Approval
Division 2 - Site Work			
SECTION 02050	DEMOLITION	X	
SECTION 02110	CLEARING AND GRUBBING	X	
SECTION 02130	CONTAMINATED MATERIAL REMOVAL	X	
SECTION 02200	EXCAVATION AND BACKFILL	X	
SECTION 02480	LANDSCAPING	X	
SECTION 03300	CAST-IN-PLACE CONCRETE	X	

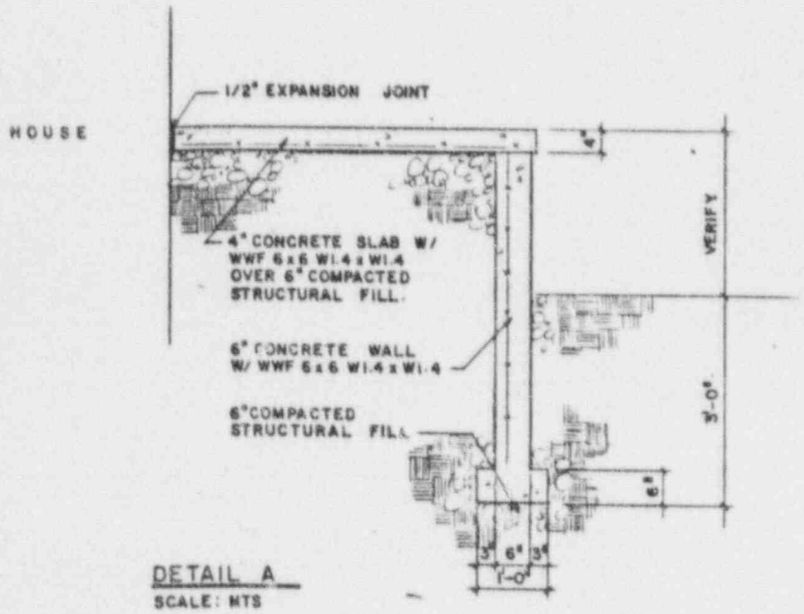
6.0 CONSTRUCTION DRAWINGS

Listed below is an index of the construction drawings required for remedial action on this property. Copies of the drawings follow this section.

Drawing Number	Drawing Title
DU-032-020	Excavation & Restoration Plan DU-032

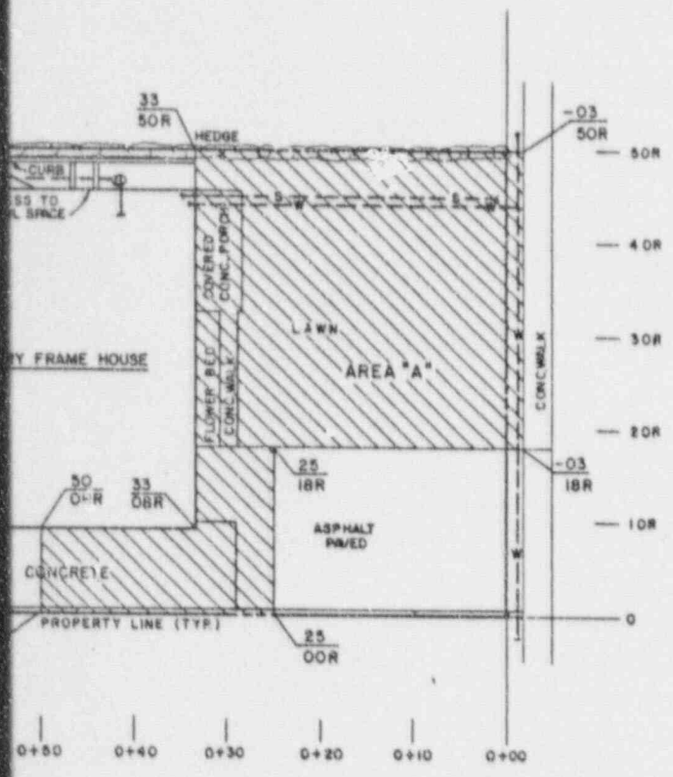






DETAIL A

SCALE: NTS



LEGEND

W	WATER LINE
G	GAS LINE
GM	GAS MAIN
S	SEWER LINE
SM	SEWER MAIN
STM	STORM SEWER
E	ELECTRICAL LINE
T	TELEPHONE LINE
TV	CABLE TV
	PROPERTY LINE
X X X	FENCE LINE
G, W or E	METER
G or W	VALVE
	PROPERTY PIN
	POWER POLE

NOTE: OVERHEAD SERVICE DENOTED BY SOLID LINE. UNDERGROUND SERVICE DENOTED BY DASHED LINE.

NOTES:

1. THE LATEST REVISION OF THE FOLLOWING TECHNICAL SPECIFICATIONS APPLY TO THE REMEDIAL ACTION WORK REQUIRED FOR PROPERTY NO. DU-032.
   - SECTION 02050 DEMOLITION
   - SEC. [illegible] 02110 CLEARING AND GRUBBING
   - SECTION 02130 CONTAMINATED MATERIAL REMOVAL
   - SECTION 02200 EXCAVATION AND BACKFILL
   - SECTION 02480 LANDSCAPING
   - SECTION 03300 CAST-IN-PLACE CONCRETE
2. UTILITY LOCATIONS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS SHALL BE DETERMINED BY THE SUBCONTRACTOR PRIOR TO START OF CONSTRUCTION.
3. THE EXCAVATION LIMITS AND DEPTHS ARE BASED ON A LIMITED NUMBER OF BORINGS TAKEN DURING THE RADIOLOGICAL SURVEYS OF THIS PROPERTY. ADDITIONAL RADIOLOGICAL SURVEYS PERFORMED DURING REMEDIAL ACTION MAY REQUIRE MORE OR LESS EXCAVATION TO BE TAKEN FROM THE DESIGNATED AREAS. ALL CHANGES TO THE LIMITS AND DEPTHS OF EXCAVATION AS SHOWN ON THE DESIGN DRAWINGS SHALL BE AS DIRECTED BY THE CONTRACTOR'S REPRESENTATIVE.

SCOPE OF WORK:

AREA "A"

- REMOVE AND SALVAGE PORCH RAILING AND POSTS. SHORE ROOF AS NECESSARY.
- DEMOLISH AND REMOVE CONCRETE PORCH AND SIDEWALK. SAWCUT ASPHALT AND CONCRETE IN DRIVEWAY AREA WITHIN THE LIMITS OF CONTAMINATION AND REMOVE.
- REMOVE HEDGE, NOTING SIZE AND TYPE.
- EXCAVATE AREA "A" TO A DEPTH OF 18 INCHES. CONTRACTOR'S REPRESENTATIVE TO RESURVEY. IF FURTHER EXCAVATION EXISTS, EXCAVATE AS REQUIRED BY CONTRACTOR'S REPRESENTATIVE.
- BACKFILL EXCAVATED AREA WITH COMMON FILL. TOP WITH 6 INCHES OF STRUCTURAL FILL IN CONCRETE AREAS. TOP WITH 6 INCHES OF TOPSOIL IN LAWN AREA AND SOD.
- CONSTRUCT NEW CONCRETE PORCH AS PER DETAIL A TO SAME DIMENSIONS AND ELEVATION OF THAT REMOVED, AND REPLACE RAILING AND POSTS.
- CONSTRUCT NEW 4 INCH THICK SIDEWALK AND DRIVE TO SAME DIMENSIONS AND ELEVATION OF THAT REMOVED.
- REPLACE HEDGE WITH SAME TYPE AND SIZE AS THAT REMOVED AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.

AREA "B"

- RELOCATE METAL SHED AND DEMOLISH AND REMOVE CONCRETE SLAB.
- REMOVE PLANTER NOTING SIZE AND LOCATION.
- REMOVE AND SALVAGE FENCE AND REPLACE WHEN EXCAVATION HAS BEEN COMPLETED.
- EXCAVATE AREA "B" TO A DEPTH OF 18 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL. TOP WITH 6 INCHES OF TOPSOIL IN LAWN AND 12 INCHES IN GARDEN AREA, AND SOD LAWN AREA. TOP WITH 6 INCHES OF STRUCTURAL FILL IN CONCRETE AREA.
- CONSTRUCT NEW 4 INCH THICK CONCRETE SLAB TO SAME DIMENSIONS AND ELEVATION OF THAT REMOVED AND RESTORE METAL SHED.
- REPLACE PLANTER WITH SAME TYPE AND SIZE IN ORIGINAL LOCATION.
- REPLACE SHRUBS WITH SAME TYPE AND SIZE AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.

9707090130-04

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

FIGURE 4.1

EXCAVATION & RESTORATION PLAN DU-032

DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

DESIGNED	DRAWN	CHECKED	REVIEWED	RECOMMENDED
[illegible]	GWH	[illegible]	[illegible]	[illegible]

APPROVED	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
NR		NR		NR	

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-032-020 REV A

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LDE	APPROVAL DH	PROJ ENG	APPROVAL DOE
A	5/22/96	FINAL REA SUBMITTAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-

APPENDIX A

SURVEY DATA LOGS

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

LOGGING CREW: E. COUCH
L. BENALLY, JR
E. SCHULTZ

SHEET 1 OF 5 PAGE 1

DATE: JUNE 25, 1984

PROPERTY ID: DU-032

INSTRUMENT ID NO.: _____

BACKGROUND CALCULATION:

#1 _____ + #2 _____ + #3 _____ = _____ ÷ 3 = 11,500 COUNTS/.1MIN

AREA:		AREA:		AREA:		AREA:	
POINT ID	READING COUNTS/.1MIN	POINT ID	READING COUNTS/.1MIN	POINT ID	READING COUNTS/.1MIN	POINT ID	READING COUNTS/.1MIN
0+00+00R	14450 / 14390	0+40+00R	14710 / 15470	0+90+00R	56080 / 31080	0+130+00R	156410 / 40120
0+00+10R	14180 / 14560	0+40+08R	43088 / 26270	0+90+10R	15670 / 17710	0+130+10R	37770 / 27750
0+00+20R	37660 / 32620	0+40+46R	14300 / 11290	0+90+20R	14016 / 15330	0+130+20R	27450 / 23510
0+00+30R	43076 / 38266	0+40+50R	15670 / 13340	0+90+30R	14420 / 14540	0+130+30R	31920 / 23910
0+00+46R	70830 / 47710	0+50+00R	13700 / 13630	0+90+46R	14576 / 14200	0+130+46R	26496 / 23460
0+00+50R	27560 / 32970	0+50+08R	14320 / 12940	0+90+50R	15540 / 14310	0+130+50R	22230 / 19470
0+10+00R	15890 / 14100	0+50+46R	15850 / 11740	0+100+00R	57440 / 34320	0+33+20R	49026 / 24980 *
0+10+10R	11730 / 13090	0+50+50R	14600 / 13910	0+100+10R	17210 / 20160	0+33+30R	30160 / 22160 *
0+10+20R	70580 / 42040	0+60+00R	14150 / 13680	0+100+20R	14870 / 15830		
0+10+30R	48230 / 46730	0+60+08R	14166 / 30800	0+100+30R	14016 / 14210		
0+16+46R	41660 / 45580	0+60+46R	15580 / 11790	0+100+40R	14096 / 14360		
0+16+50R	29790 / 35770	0+60+50R	13690 / 13440	0+100+50R	25510 / 15560		
0+20+00R	23800 / 14420	0+70+00R	34160 / 14470	0+110+00R	55950 / 37630		
0+20+10R	17020 / 11770	0+70+10R	19130 / 16680	0+110+10R	17210 / 22140		
0+20+20R	63890 / 44000	0+70+20R	14270 / 14450	0+110+20R	15250 / 17140		
0+20+30R	58470 / 49570	0+70+30R	13930 / 14280	0+110+30R	43240 / 22560		
0+20+46R	54160 / 48520	0+70+46R	14260 / 13400	0+110+46R	15190 / 17200		
0+20+50R	32750 / 38740	0+70+50R	19030 / 14440	0+110+50R	19880 / 16920		
0+30+00R	18220 / 15850	0+80+00R	41500 / 26240	0+120+00R	54320 / 32270		
0+30+10R	17370 / 19510	0+80+10R	15470 / 17060	0+120+10R	27700 / 26620		
0+30+20R	15870 / 24780	0+80+20R	14580 / 14740	0+120+20R	26580 / 24770		
0+30+30R	17070 / 30020	0+80+30R	13870 / 14340	0+120+30R	28970 / 23760		
0+30+46R	16510 / 24780	0+80+46R	13960 / 14400	0+120+46R	29730 / 25180		
0+30+50R	18980 / 18790	0+80+50R	24220 / 15140	0+120+50R	25670 / 19360		

REMARKS: ALL READINGS ARE IN COUNTS PER MINUTE (CPM)
TOP- ARE CONTACT MEASUREMENTT
BOTTOM- READINGS TAKEN 1 METER ABOVE GROUND LEVEL
* Rose and Flower garden - No Bore Holes Drilled

VP-04A

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: E. Gauch
L. Benally, Jr
E. Schultz

INSTRUMENT ID NO.

SHEET 2 OF 5 PAGE 2

DATE: June 25, 1992

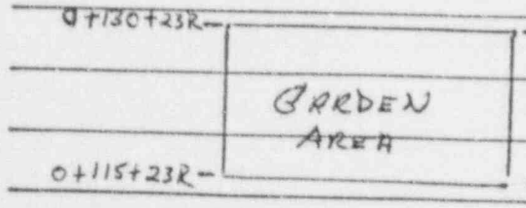
PROPERTY ID: DH-032

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC., IN THE REMARKS SECTION.

(1) HOLE ID: 0+69+02R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(2) HOLE ID: 0+82+09R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(3) HOLE ID: 01+00+02R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(4) HOLE ID: 01+29+02R TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	29560	0"	16620	0"	53510	0"	46840
6"	32010	6"	21100	6"	65920	6"	100990
12"	26850	12"	21640	12"	50010	12"	86200
18"	24440	18"	21370	18"	32310	18"	42150
24"	21840	24"	21000	24"	28640	24"	30070
30"	20570	30"	21880	30"	26460	30"	27250
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"		96"		96"		96"	

REMARKS: Back Ground Measurement 23,000 CPM
All measurements are in Counts Per Minute (CPM)



No Bore Holes Drilled in garden even though most readings indicate area is contaminated.

VP-04B

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: E. Couch
L. Benally, Jr.
E. Schultz

INSTRUMENT ID NO.

SHEET 3 OF 5 PAGE 3

DATE: June 25, 1984

PROPERTY ID: DU-032

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC. IN THE REMARKS SECTION.

(5) HOLE ID: 0+128+22R TIME DRILLED: TIME LOGGED: SOIL TYPE: (*)		(6) HOLE ID: 0+110+15R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(7) HOLE ID: 0+110+45R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(8) HOLE ID: 0+00+20R TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	30260	0"	14430	0"	16160	0"	45480
6"	37490	6"	16450	6"	19830	6"	63470
12"	32980	12"	20050	12"	22230	12"	74900
18/15"	24460	18"	22450	18"	21150	18"	41890
24"		24"	22520	24/25"	20490	24"	30950
30"		30/28"	21090	30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"		96"		96"		96"	

REMARKS: Back Ground Measurement 23,000 CPM.
All measurements are in Counts Per Minute (CPM)
(*) We drilled until large rock and gravel bed prevented further drilling

VP-046

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: E. Gach, L. Benally, Jr., E. Schultz

INSTRUMENT ID NO.

SHEET 4 OF 5 PAGE 4

DATE: June 25, 1984

PROPERTY ID: DU-032

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC., IN THE REMARKS SECTION.

(9)
HOLE ID: 0100+40R
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	82350
6"	120550
12"	104900
18"	48890
24"	37450
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(10)
HOLE ID: 0120+20R
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	56240
6"	91260
12"	72460
18"	37420
24"/21"	31430
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(11)
HOLE ID: 0120+40R
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	63170
6"	93740
12"	81480
18"	37590
24"	32630
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(12)
HOLE ID: 0126+40R
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	55010
6"	84960
12"	70850
18"	36150
24"	27750
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

REMARKS: Back Ground Measurement 23,000 CPM
All measurements are in Counts Per Minute (CPM)

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: E. Couch
L. BENNEY, JR.
E. Schultz

INSTRUMENT ID NO.

SHEET 5 OF 5 PAGE 5

DATE: June 25, 1984

PROPERTY ID: DM-037

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC., IN THE REMARKS SECTION.

(13) HOLE ID: DF2672R TIME DRILLED: TIME LOGGED: SOIL TYPE:		(14) HOLE ID: DF3676R TIME DRILLED: TIME LOGGED: (*) SOIL TYPE:		(15) HOLE ID: DF4476R TIME DRILLED: TIME LOGGED: (*) SOIL TYPE:		(16) HOLE ID: DF3178R TIME DRILLED: TIME LOGGED: (*) SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	49550	0"	37870	0"	55300	0"	55430
6"	82730	6"	86870	6"	124720	6"	143100
12"	71790	12"	61470	12"	106330	12"	68940
18"	35840	18"	29160	18"	38580	18"	32590
24"	26650	24"	24220	24"	29440	24"	25200
30"	23240	30" 26"	23880	30"	26980	30"	23270
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"		96"		96"		96"	

REMARKS: Back Ground Measurements 23,000 CPM
All measurements are in Counts Per Minute (CPM)
(*) CORE -- CONCRETE

VP-04B

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch
Edward Schultz
Julius Butrilla

INSTRUMENT ID NO. LUD 2220 #1398 4/4/10 #16538

SHEET 1 OF 2 PAGE 1

DATE: October 16, 1984

PROPERTY ID: DU-032

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC., IN THE REMARKS SECTION.

HOLE ID: N WALL TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: H2O+ SEWER LINE ~~TIME DRILLED:~~ ~~TIME LOGGED:~~ S.E. ~~SOIL TYPE:~~ CORNER		HOLE ID: SEWER TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: S. WALL TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	16270	SURFACE	17720	SURFACE	16520	SURFACE	17270
0"	17340	0"	16570	0"	17630	0"	19080
6"	19210	6"	19610	6"	19960	~~6~~ 5"	21320
H ~~12~~ 4"	19570	12"	21200	H ~~12~~ 6	21670	H ~~12~~ 3"	19840
18"		18"	20010	H ~~18~~ 10	22320	18"	
24"		~~24~~ 21	20790	H ~~24~~ 12	22520	24"	
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"		96"		96"		96"	

REMARKS: H = horizontal, H # number equals the holes was angled and # of inches under spread footing, background is 23000 cpm, all counts in CPM (In crawl space)

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch, Edward Schultz, Julius Betrilly

SHEET 2 OF 2 PAGE 3

DATE: October 16, 1984

PROPERTY ID: DU-032

INSTRUMENT ID NO. WO220 #3982 w/[illegible] #1652X

AREA: Durango, Colorado

NOTES: 1. ALL HOLES ARE 4"DIA. UNLESS OTHERWISE NOTED.
2. RECORD UNUSUAL CONDITIONS, SUCH AS THE PRESENCE OF WATER IN BOREHOLES AND DEPTH, CASING TYPE AND THICKNESS IF USED, CONCRETE CORES AND THICKNESS, OBSTRUCTIONS, UTILITIES, ETC., IN THE REMARKS SECTION.

HOLE ID: W. WALL		HOLE ID:		HOLE ID:		HOLE ID:	
TIME DRILLED:		TIME DRILLED:		TIME DRILLED:		TIME DRILLED:	
TIME LOGGED:		TIME LOGGED:		TIME LOGGED:		TIME LOGGED:	
SOIL TYPE:		SOIL TYPE:		SOIL TYPE:		SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	17100	SURFACE		SURFACE		SURFACE	
0"	18170	0"		0"		0"	
~~6~~ 2"	19170	6"		6"		6"	
12"		12"		12"		12"	
18"		18"		18"		18"	
24"		24"		24"		24"	
30"		30"		30"		30"	
36"		36"		36"		36"	
42"		42"		42"		42"	
48"		48"		48"		48"	
54"		54"		54"		54"	
60"		60"		60"		60"	
66"		66"		66"		66"	
72"		72"		72"		72"	
78"		78"		78"		78"	
84"		84"		84"		84"	
90"		90"		90"		90"	
96"		96"		96"		96"	

REMARKS: Shallow shovel holes are due to rocky ground in crawl space, background is 23000 cpm, all counts in CPM.

MORRISON-KNUDSEN COMPANY, INC.

UMTRA PROJECT OFFICE
P.O. BOX 9136
ALBUQUERQUE, NEW MEXICO 87119