

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

Draft Radiological and Engineering Assessment

Vicinity Property No. DUR 027

Remedial Actions
Contractor
for the
Uranium Mill Tailings
Remedial Actions
Project



MORRISON
KNUDSEN

Vicinity Property No. DUR 027

8507090339 850208
PDR WASTE
WM-48 PDR

DRAFT

THE RADIOLOGICAL AND ENGINEERING ASSESSMENT

AND FINAL DESIGN

FOR

DURANGO PROPERTY

DU-027

February 6, 1985

PREPARED FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

UNITED STATES DEPARTMENT OF ENERGY

PREPARED BY

MORRISON-KNUDSEN COMPANY, INC.

NOTE:

SUPPLEMENTAL STANDARDS

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Property DU-027 is a private residence located at 50 Rio Vista Circle, Durango, CO.

1.2 Evaluation and Recommendation

1.2.1 Residual Radioactive Material Involvement

The front yard and two small areas in the back yard are contaminated. There is no interior contamination.

1.2.2 Recommended Remedial Action Option

The recommended option is to remove the contaminated material except that under the public sidewalk. This material will be left 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 \$15,250.00.

1.2.4 Schedule

The estimated duration of the remedial action effort is 5 to 8 days.

2.0 ENGINEERING FIELD SURVEY

2.1 Property Description

2.1.1 Property Use and Occupancy

Property DU-027 is a private residence located at 50 Rio Vista Circle, Durango, Colorado and owned by Ray and Julia Haney. 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. 449, Page 586 follows:

Lot Eleven (11), in Block Two (2) RIVERVIEW PARK SECOND RESUBDIVISION to the City of Durango, La Plata County, Colorado, according to the official plat of said Resubdivision filed for record in the office of the Clerk and Recorder of La Plata County, Colorado. Together with all improvements thereon situate.

2.1.3 Bordering Properties

The lot is zoned R-1, single family residence. It is located in a residential area less than 3-1/2 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 a residence; and on the west by Rio Vista Circle.

2.2 Existing Facilities and Structures

2.2.1 Structures

The residence is a single story wood frame structure on a concrete foundation. A concrete driveway extends from the previous garage, now a room addition, on the south side of the house to the street. A concrete sidewalk extends along the street outside the west property line, from the driveway to the front porch and from the back patio into the rear yard. A wrought iron decorative fence borders the front porch. In the rear yard there is a detached metal storage shed along the south fence, and a series of stone terraces.

Front, rear and side yards are landscaped. Evergreen and deciduous shrubs border the front of the house and an evergreen hedge runs along the south side of the driveway. The rear yard is fenced. There is a metal gate on the south side and a section of 6 foot high cedar fencing from the gate to the metal shed. Beyond the shed, the fence is 3 foot high horizontal wood plank. The lot slopes upward steeply to the east from the stone terraces to the back fence line.

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 the east side of the house from a utility pole near the east property line.

Telephone - Overhead to the east side of the house from utility pole near east property line.

Water - Underground from Rio Vista Circle.

Gas - Underground from rear (east) of lot.

Sewer - Underground from Rio Vista Circle.

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, Figures 2.3 and 2.4.

Table 2.1

PROPERTY SURVEY DATA

GENERAL:

Site Location: Durango

Property Address: 50 Rio Vista Circle

Owner's Name: Ray and Julia Haney Address: Same

Lot No.: 11 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; Brick Exterior Original House; Wood
Siding on Two Additions; Sandstone on West Side of Converted Garage

Foundation: Paved concrete

Garage: Converted to Additional Room

Storage Bldg: Prefab: 6-1/2'x10' Metal in Back Yard
Other: Wood Root Cellar and Wood Box

Improvement Additions: (1) 20'x24' Wood Frame on NE Corner of Original House
(2) 12'x9-1/2' Wood Frame on SE Corner of Orig. House

to Dwellings: Porches: Covd Conc on West Side Patio: Uncovd Conc on East Side
Other: Roof Extension on SE Side of House for Wood Storage

Driveway: Concrete: Street to Converted Garage Addition
Gravel: _____ Other: _____

Sidewalks: Concrete/Paved: As Noted on Drawing
Other: _____

Fences/Gates: Wood: 6' Cedar and 3' Wood on South Side Backyd; 6' Wood on E Side
Chain Link: 4' High on North Side Back Yard

Radiological and Engineering Assessment: Property DU-027

Table 2.1 (cont'd)

PROPERTY SURVEY DATA

Site Location: Durango

Property Address: 50 Rio Vista Circle

Grounds: Lawn: Full Frt and Bk; Frt Lawn Partially Dist for Sewr Repr

Trees: As Noted on Drawing

Shrubs: As Noted on Drawing

Garden: In Terraced Area; Along East Side of House

Grading: 20% Slope Beginning Approx. 20' from Back of House

Other: _____

Soil Type: _____

Existing Survey Plot: Yes

Property Description - Interior: No Interior Contamination

Walls

Room	Floor	E	W	N	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: 50 Rio Vista Circle

Electric Line Location: Overhead from East Utility Pole to East Side of House

Gas Line Location: Underground from Rear (East) of Lot

Water Line Location: Underground from Rio Vista Circle Main (See Drawing)

Sewage Line Location: Underground from Rio Vista Circle Main (See Drawing)

Telephone Line Location: Overhead from East Utility Pole to East Side of House

Building Codes and Zoning:

<u>Codes</u>	<u>Local</u>	<u>State</u>	<u>Federal</u>
<u>Building Work</u>	<u>UBC</u>		
<u>Plumbing</u>			
<u>HVAC</u>			
<u>Electrical</u>			
<u>Other</u>			

Zoning District: City of Durango

Present Dwelling Zoning: R-1 Residence District

Setbacks: Front: _____

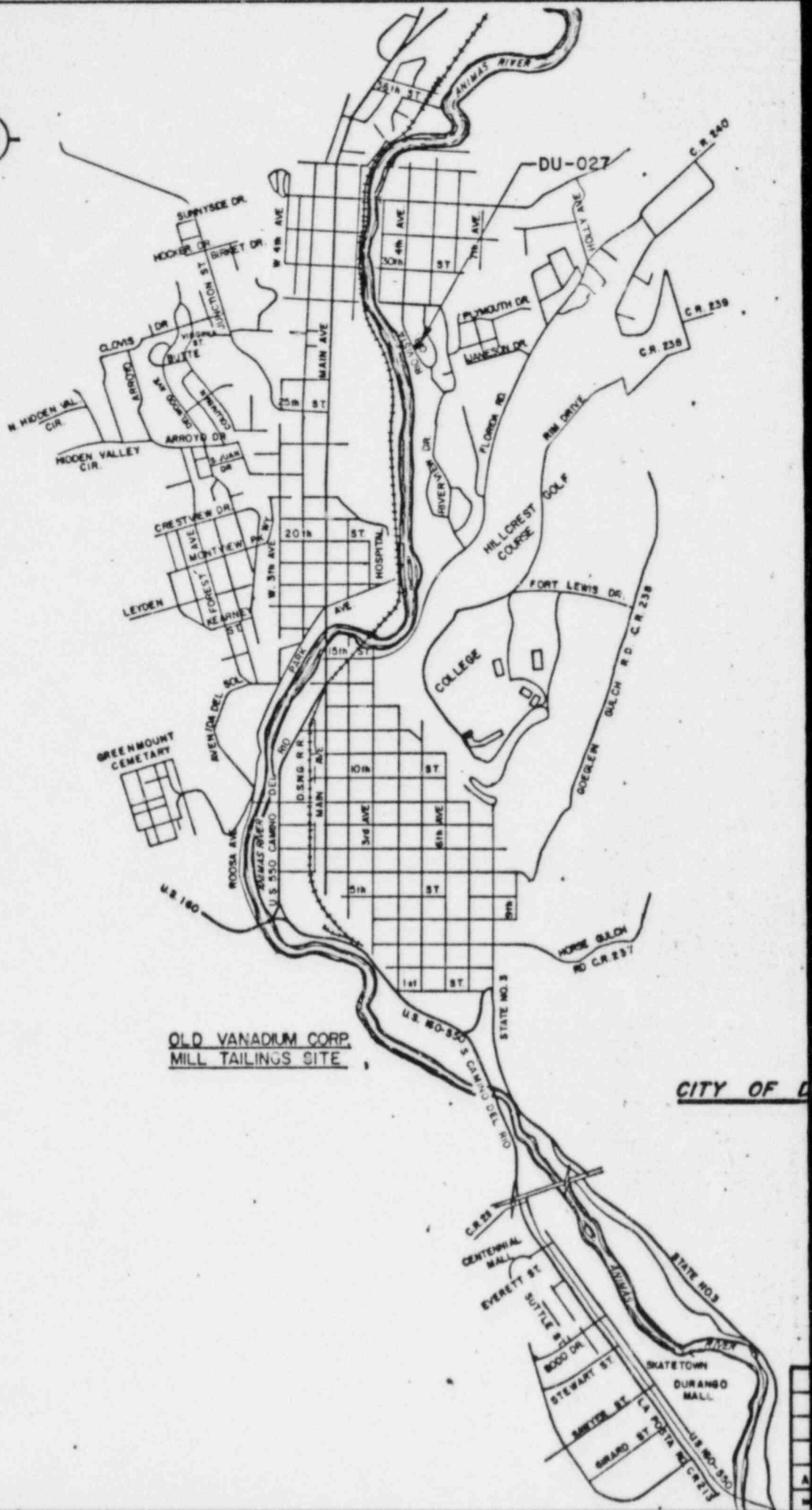
Rear: _____

Side: _____

Other: _____

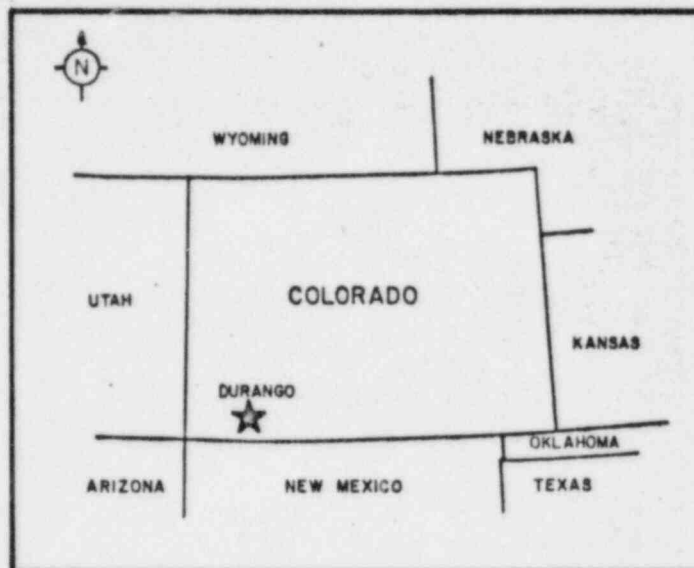
Photographs:

<u>Roll Frame</u>	<u>Description</u>	<u>Direction</u>
<u>2-34</u>	<u>Front of House</u>	<u>Looking Southeast</u>
<u>2-33</u>	<u>Front of House</u>	<u>Looking East</u>
<u>2-30</u>	<u>Rear of House</u>	<u>Looking West</u>
<u>2-31</u>	<u>Rear of House</u>	<u>Looking Southwest</u>



OLD VANADIUM CORP.
MILL TAILINGS SITE

CITY OF D



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REVIEWED BY	<i>[Signature]</i>
APPROVED BY	<i>[Signature]</i>

FIGURE 2.1
VICINITY MAP DU-027

DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

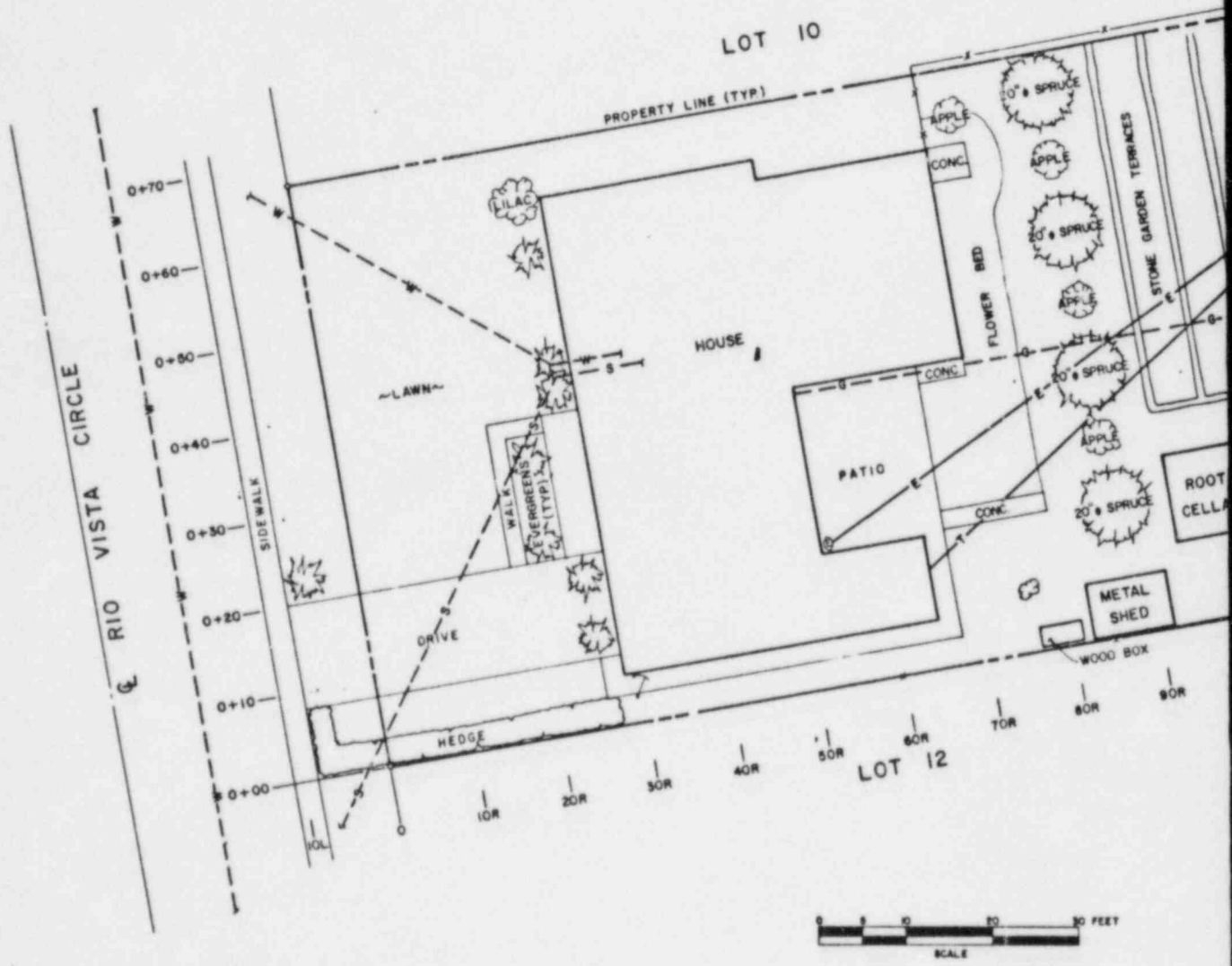
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PROJECT NO.			DE-AC04-83AL18796					
DRAWING NO.			DU-027-005					



MORRISON
KNUDSEN

DATE	REVISIONS	MA	UP	UP	IN	RED	-
		ST	ST	LOC	ON	ENG	SCS

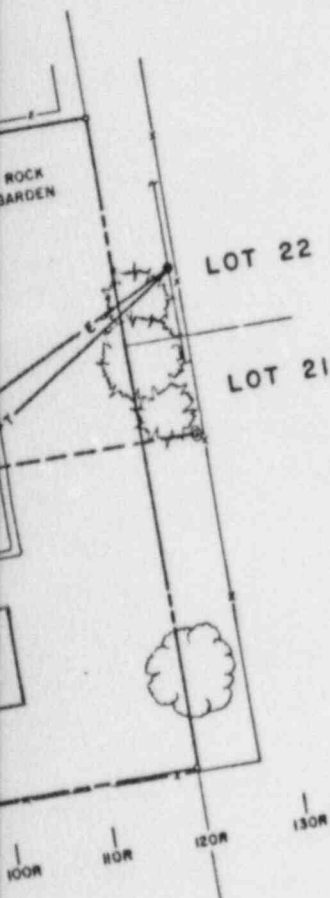
FINAL REA SUBMITTAL



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 P.I.N
●	POWER POLE
[Hatched Area]	REMEDIAL ACTION AREA

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



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RECOMMENDED	MA
APPROVED	MA

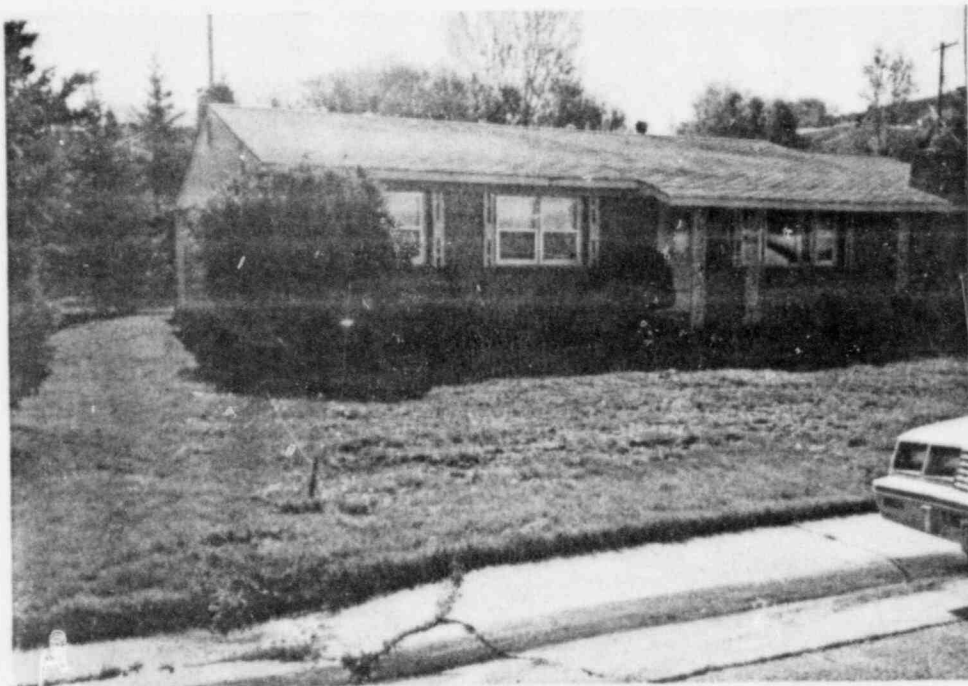
FIGURE 2.2 SITE PLAN DU-027

DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

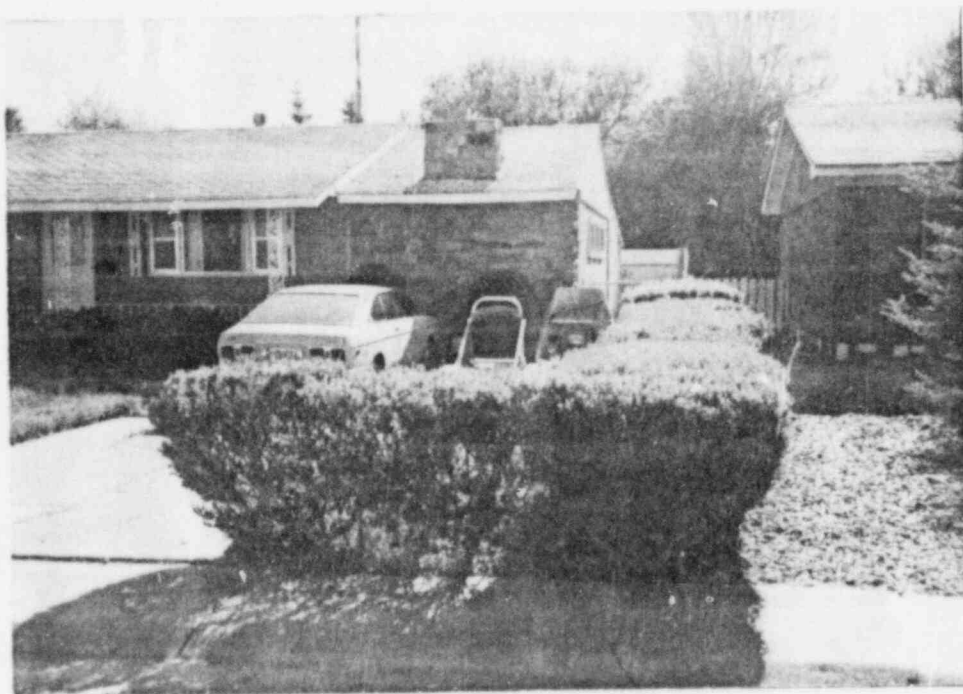
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NR		NR		NR	
PROJECT NO.					
DE-AC04-83AL18796					
DRAWING NO. DU-027-010					
REV. A					



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DATE	BY	BY	BY	BY	BY	BY

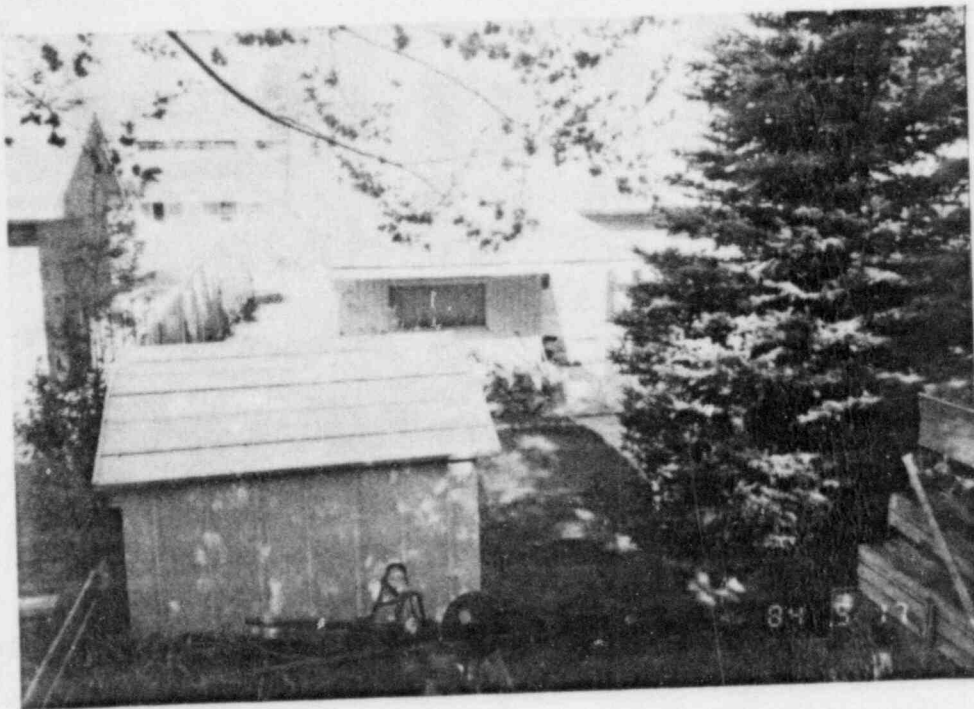


Front of House Looking Southeast

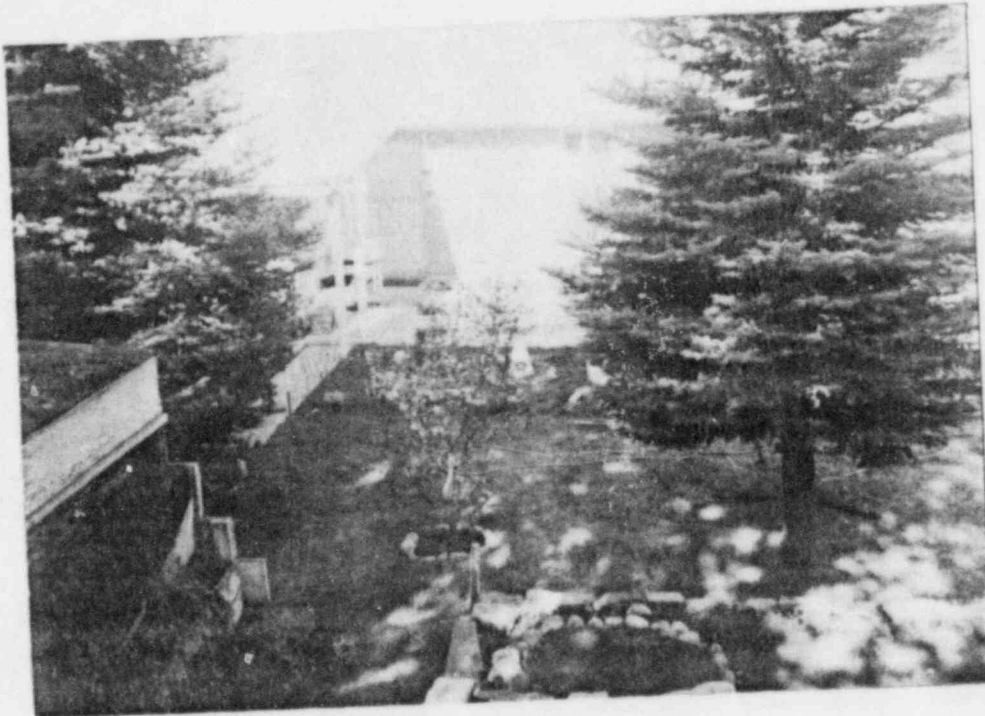


Front of House Looking East

Figure 2.3 Property Photos



Rear of House Looking West



Rear of House Looking Southwest

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 Vicinity Property DU-027, ORNL, April 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.

A surface gamma survey was conducted at selected points in the crawl space under the house. This survey was conducted in accordance with RAC Procedure 019.

An indoor gamma survey was not conducted inside the house, since the inclusion survey and the crawl space survey indicated that no contamination is present in or under the house.

3.1.2 Survey Results

Surface gamma readings on the property range from 14 to 230 micro R/hr. This may be compared with the background for the Durango site of 14 micro R/hr. Table 3.1 lists surface gamma readings at all points greater than 16 micro R/hr. The patio area showed no readings above normal background readings. Gamma readings in the crawl space were 16 to 17 micro R/hr except at the west wall of the house, where readings up to 19 micro R/hr were observed. These slightly elevated readings are attributed to "shine" from the outside tailings found in the front yard.

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 dug in the crawl space and angled under the footings of the house. These holes were surveyed as closely as possible to the procedures of RAC Procedure 018. Two of these holes were placed adjacent to the water and sewer lines, and one was next to the gas line.

3.2.2 Survey Results

Contamination was found in 9 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.

No contamination was found in any of the 8 crawl space holes. The location and activity of these holes are described in Table 3.3, and the locations are shown in Figure 3.1.

3.3 Radon/Radon Daughter Survey

No radon/radon daughter surveys were performed inside the house at the property, since the inclusion survey attributed all elevated measurements to the presence of outdoor contamination.

3.4 Estimated Extent of Contamination

Areas A, B, and C, shown on Figure 3.1, are contaminated to an approximate depth of 24 inches. (Pockets of contamination may extend to 36 inches). Portions of the northeast corner of the front yard may not require excavation as deep. This will be handled per Note 3 on Construction Drawing DU-027-020.

3.5 Supplemental Standards

Supplemental Standards apply to the contamination under the sidewalk (Figure 3.1) per 40 CFR 192.21(c), "Criteria for Applying Supplemental Standards," and, therefore, no excavation is required in this area.

Table 3.1
OUTDOOR SURFACE GAMMA READINGS
Property DU-027

POINT	MICRO R/hr
0+00,10L	46
0+10,10L	69
0+20,10L	57
0+30,10L	60
0+40,10L	62
0+50,10L	47
0+60,10L	61
0+67.5,10L	38
0+00,00R	38
0+10,00R	31
0+20,00R	21
0+30,00R	17
0+40,00R	17
0+50,00R	17
0+60,00R	17
0+67.5,00R	20
0+00,10R	18
0+10,10R	50
0+20,10R	28
0+30,10R	18
0+40,10R	24

Table 3.1 - Cont'd.
OUTDOOR SURFACE GAMMA READINGS
Property DU-027

POINT	MICRO R/hr
0+50,10R	24
0+60,10R	25
0+00,20R	17
0+10,20R	36
0+20,20R	36
0+30,20R	28
0+40,20R	40
0+50,20R	25
0+60,20R	24
0+67.5,20R	17
0+00,30R	22
0+20,28R	18
0+30,28R	17
0+40,28R	230
0+50,28R	67
0+60,28R	48
0+67.5,30R	17
0+03,30R	42
0+03,40R	56
0+03,50R	38

Table 3.1 - Cont'd.
OUTDOOR SURFACE GAMMA READINGS
Property DU-027

POINT	MICRO R/hr
0+03,60R	17
0+03,90R	17
0+10,90R	17
0+03,100R	63
0+18,77R	45

Table 3.2
BOREHOLE SURVEY
Property DU-027

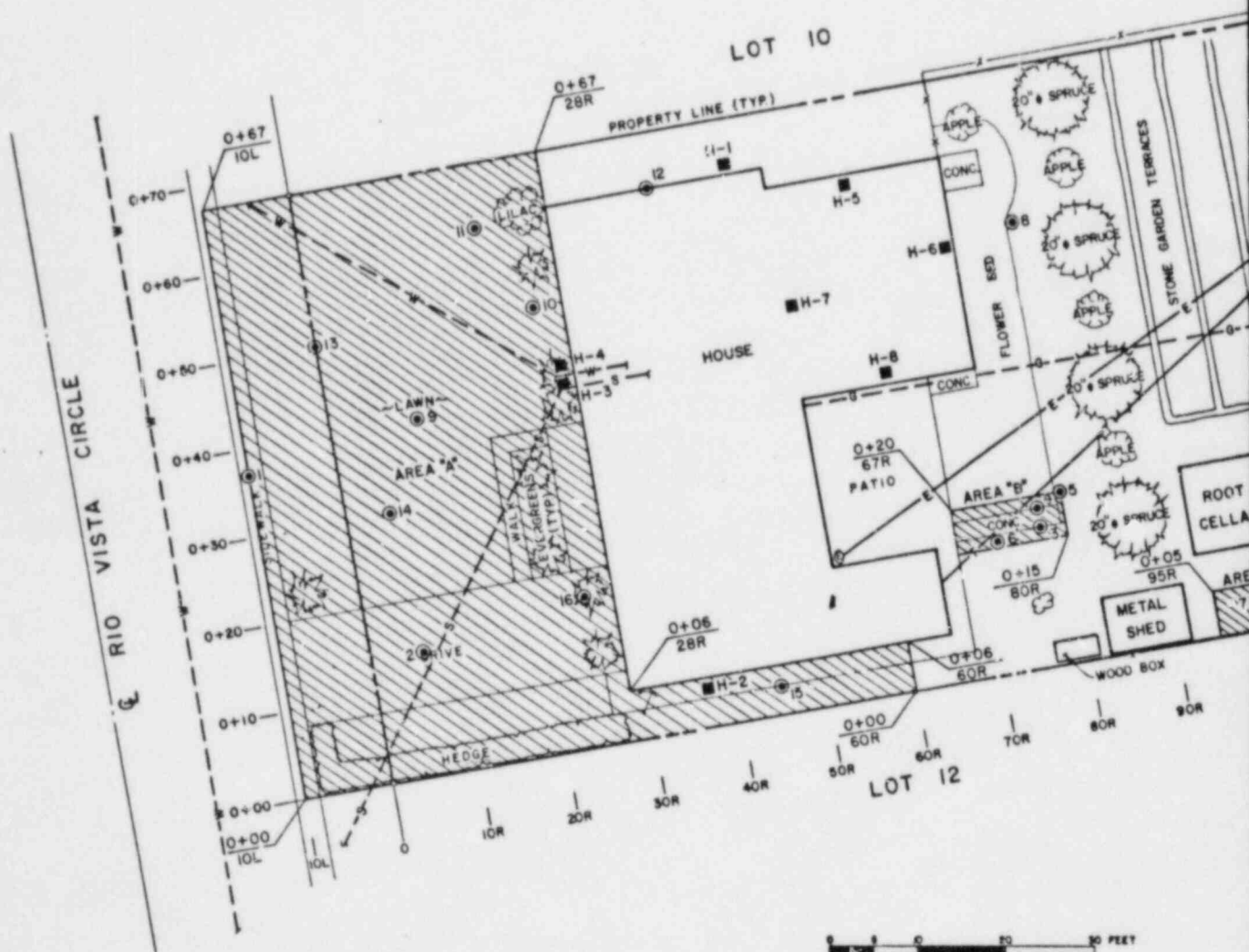
HOLE	LOCATION	CONTAMINATION DEPTH
1	0+37,10L	0-18"+
2	0+14,06R	0-30"+
3	0+16,77R	0-24"
4	0+18,77R	0-24"
5	0+20,80R	None
6	0+15,72R	None
7	0+03,100R	0-18"+
8	0+50,80R	None
9	0+40,10R	0-12"
10	0+50,25R	0-24"
11	0+60,20R	0-6"*
12	0+60,40R	None
13	0+50,00R	None
14	0+30,05R	None
15	0+03,45R	0-24"
16	0+17,25R	0-6"+

NOTE: All holes were drilled as deep as possible, until rocks prevented further penetration.

*Low-level contamination present.

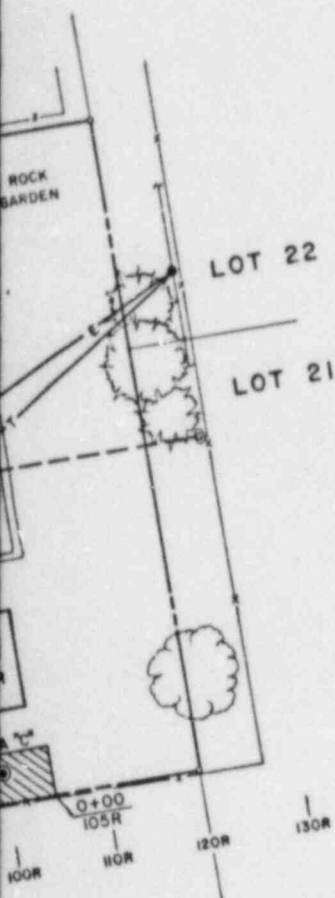
Table 3.3
ANGLED HOLE SURVEY
Property DU-027

HOLE	LOCATION	CONTAMINATION DEPTH
H-1	North wall	None
H-2	South wall	None
H-3	West wall, 6" north of water line	None
H-4	West wall at water line	None
H-5	Addition, north wall	None
H-6	Addition, east wall	None
H-7	Addition, west wall	None
H-8	Addition, south wall	None



④ 4 AUGER HOLE DESIGNATION
■ H-4 AUGER HOLE DESIGNATION (ANGLED)


A rectangular cross-section with diagonal hatching. A dimension line to the right indicates a width of 24".



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DESIGNED	MA	FIGURE 3.1 RADIOLOGICAL SURVEY DATA DU-027 DURANGO, COLORADO URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT								
CHECKED										
REVIEWED										
RECOMMENDED										
APPROVED	NR	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE				
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		DE-ACO4-83AL18796								
		DRAWING NO. DU-027-015 REV A								

4.0 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-027:

1. No action should be taken.
2. Complete decontamination of the property including retrieval of the contaminated material and restoration of the property.

Option 2 includes the following:

- o Excavate contaminated material in areas as shown in Figure 4.1.
- o Backfill excavated areas with common fill. Top with topsoil in lawn area and sod. Top with structural fill in concrete areas.
- o Area "A" is to be excavated except for the 2 foot wide portion of the sidewalk along Rio Vista Circle.
- o Remove and replace hedge and shrubs
- o Remove, salvage and replace ornamental iron railings and shore porch roof as necessary.
- o Demolish, remove and replace concrete driveway, sidewalks and front porch.

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 8 days.

4.2 Recommendation

The limited cost and amount of remedial action work precluded 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 \$15,250.00.

Table 4.1
OPTION 2 COSTS

<u>Activity</u>	<u>Unit Price</u>	<u>Quantity</u>	<u>Estimated Cost</u>
Excavation (Machine)	8.30	201 cy	1,668.00
Excavation (Hand)	59.05	9 cy	531.00
Remove Porch Handrail and Shore Porch	220.00	1 ls	220.00
Demolish Driveway & Sidewalk	3.00	615 sf	1,845.00
Clean Backfill	7.20	153 cy	1,102.00
New Concrete (Driveway, Walks & Porch)	3.50	615 sf	2,153.00
Topsoil	26.40	42 cy	1,108.00
Sod	3.00	250 sy	750.00
Landscaping (Hedge, Bushes, Shrubs)	50.00	20 ea	1,000.00
Replace Porch Handrail	220.00	1 ls	220.00

Subtotal	\$10,597.00
5% Contractor Contingency	530.00
20% Overhead & Profit	<u>2,119.00</u>
Subtotal	\$13,246.00
15% Engineer Contingency	<u>1,987.00</u>
Total (Rounded)	\$15,250.00

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.

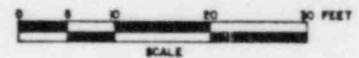
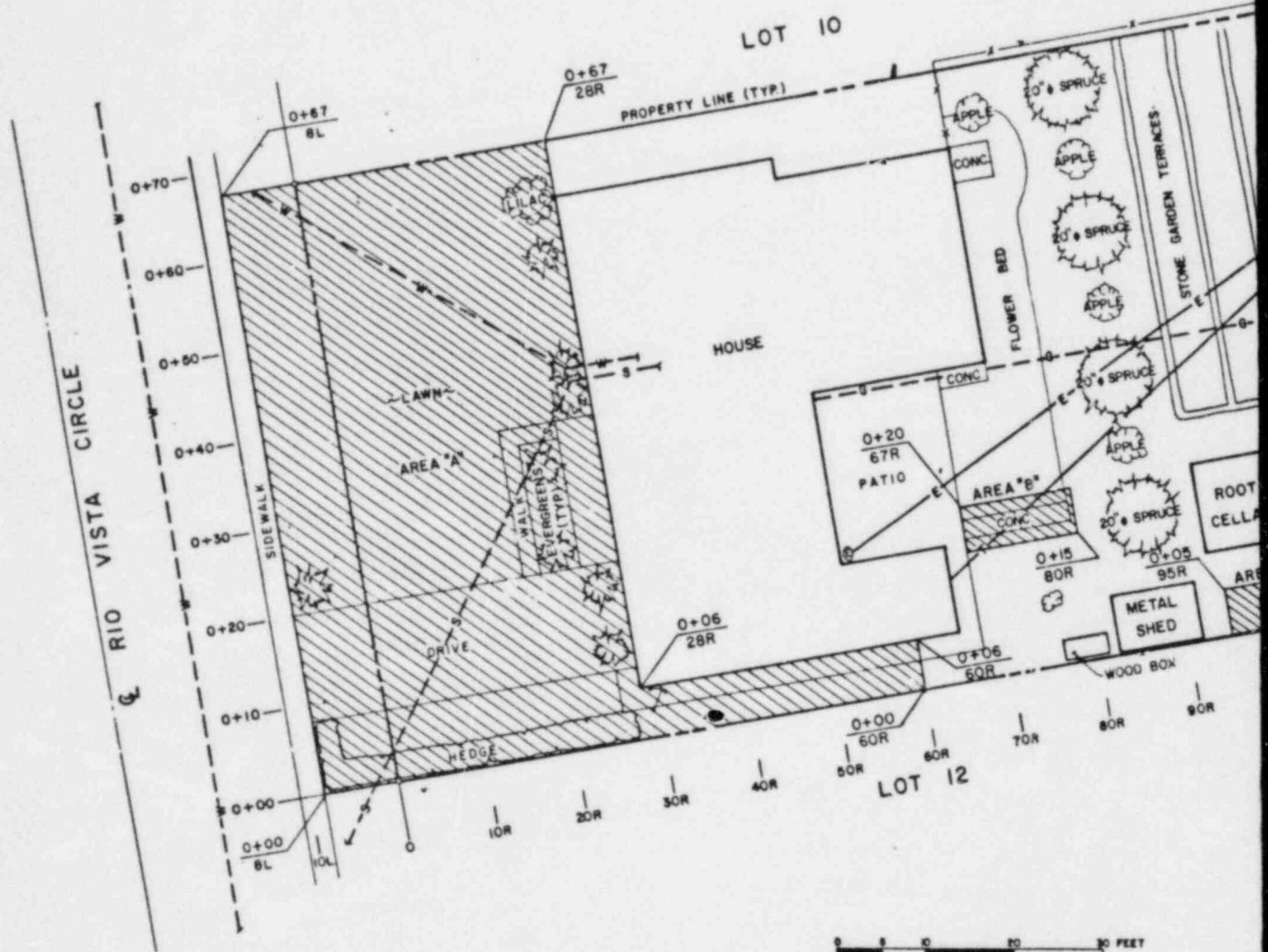
Table 5.1
INDEX OF TECHNICAL SPECIFICATIONS

Description		Specifications Previously Approved	Specifications Requiring DOE Approval
SECTION 02050	DEMOLITION	X	
SECTION 02110	CLEARING AND GRUBBING	X	
SECTION 02130	CONTAMINATED MATERIAL REMOVAL	X	
SECTION 02150	UNDERPINNING	X	
SECTION 02200	EXCAVATION AND BACKFILL	X	
SECTION 02480	LANDSCAPING	X	
SECTION 02700	UNDERGROUND PIPING	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.

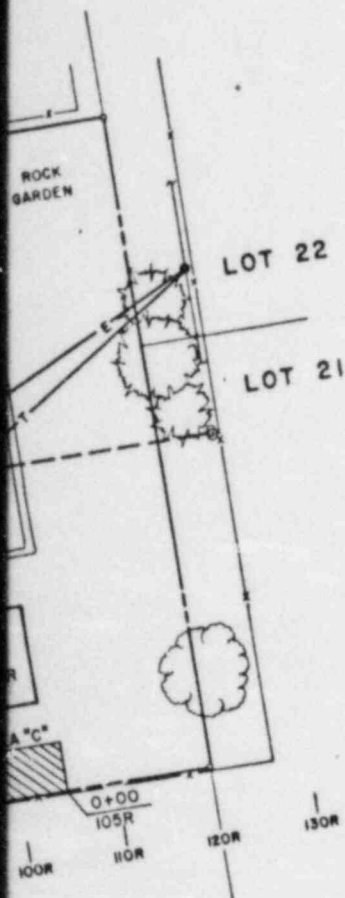
<u>Drawing Number</u>	<u>Drawing Title</u>
DU-027-020	Excavation & Restoration Plan DU-027



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
⊙ U, W or E	METER
⊗ G or W	VALVE
●	PROPERTY PIN
⦿	POWER POLE
	REMEDIAL ACTION AREA

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



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NOTES:

1. THE LATEST REVISION OF THE FOLLOWING TECHNICAL SPECIFICATIONS APPLY TO THE REMEDIAL ACTION WORK REQUIRED FOR PROPERTY NO. DU-027.

SECTION 02050
DEMOLITION

SECTION 02110
CLEARING AND GRUBBING

SECTION 02130
CONTAMINATED MATERIAL REMOVAL

SECTION 02150
UNDERPINNING

SECTION 02200
EXCAVATION AND BACKFILL

SECTION 02480
LANDSCAPING

SECTION 02700
UNDERGROUND PIPING

SECTION 03100
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 CONTRACTORS REPRESENTATIVE.

SCOPE OF WORK

AREA "A"

- REMOVE AND SALVAGE ORNAMENTAL IRON RAILING AND POSTS. SUPPORT EXISTING PORCH ROOF AS REQUIRED.
- INVENTORY TYPE AND SIZE OF SHRUBS IN THE AREA AND REMOVE AS REQUIRED. REPLACE WITH NEW SHRUBS IN ORIGINAL LOCATION WITH SAME TYPE AND SIZE AS THOSE REMOVED.
- DEMOLISH AND REMOVE CONCRETE DRIVEWAY, SIDEWALK AND PORCH. EXCAVATE AREA "A" TO A DEPTH OF 24 INCHES. BACKFILL ENTIRE AREA WITH 18 INCHES OF COMMON FILL. IN DRIVEWAY, SIDEWALK AND PORCH AREA TOP WITH 6 INCHES OF STRUCTURAL FILL. IN LAWN AREA TOP WITH 6 INCHES OF TOPSOIL AND SOD.
- CONSTRUCT NEW 4 INCH THICK CONCRETE PORCH, SIDEWALK AND DRIVEWAY TO THE SAME SIZE, ELEVATION, AND LOCATION OF THOSE REMOVED. REINFORCE DRIVEWAY WITH W4F 6 x 6 W14 x W14.
- REPLACE ORNAMENTAL IRON RAILING AND POSTS IN ORIGINAL LOCATION.

AREA "B"

- REMOVE AND SALVAGE SUPPORT POST AND SHORE ROOF AS REQUIRED.
- DEMOLISH AND REMOVE CONCRETE SIDEWALK AND EXCAVATE AREA "B" TO A DEPTH OF 24 INCHES.
- BACKFILL EXCAVATED AREA WITH 18 INCHES OF COMMON FILL AND TOP WITH 6 INCHES OF TOPSOIL AND SOD AREA AS REQUIRED.
- INVENTORY AND REMOVE PLANTS AS REQUIRED FOR EXCAVATION AND REPLACE PLANTS IN ORIGINAL LOCATION WHEN CONSTRUCTION IS COMPLETED.
- CONSTRUCT NEW 4 INCH THICK CONCRETE SIDEWALK TO SAME SIZE, ELEVATION AND LOCATION OF THAT REMOVED.

AREA "C"

- EXCAVATE AREA "C" TO A DEPTH OF 24 INCHES.
- BACKFILL WITH 18 INCHES COMMON FILL AND 6 INCHES TOP OF SOIL AND SOD.

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

FIGURE 4.1

EXCAVATION & RESTORATION PLAN DU-027

DURANGO, COLORADO

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

DESIGNED	DRAWN
2027	MA
CHECKED	
REVIEWED	
APPROVED	
NR	

DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
	NR		NR	

PROJECT NO.

DE-AC04-83AL18796

DRAWING NO. DU-027-020



1/25/95	FINAL REA SUBMITTAL	MA	TP	TP	MA	UCD	-
DATE	REVISIONS	DRAWN	CHECKED	APPROVAL	DATE	PROJ	APPROVAL
		BY	BY	LOC	ON	END	DOE

APPENDIX A
SURVEY DATA LOGS

OUTDOOR GAMMA SCREENING SURVEY DATA SHEET

LOGGING CREW: ERNEST COURCH
LEVON BENALLY, JR

SHEET 1 OF 6 PAGE 1

DATE: JUNE 6, 1984

PROPERTY ID: DU-027

INSTRUMENT ID NO.: Ludlum 2220 # 31972 1/4410

BACKGROUND CALCULATION:

#1 _____ + #2 _____ + #3 _____ = _____ + 3 = 11,523 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
0100+10L	108880 15770	0100+20R	22240 24170	0103+30R	95320 49170	0110+100R	15380 15660
0110+10L	161510 13760	0110+20R	81150 48510	0103+40R	131490 66020	0120+101R	14530 14720
0120+10L	135760 76640	0120+20R	51000 52500	0103+50R	87350 45920	0130+101R	13970 13340
0130+10L	141050 76130	0130+20R	54560 54560	0103+60R	22220 24650	0140+100R	14000 14100
0140+10L	147620 75470	0140+20R	90110 73150	0103+70R	18540 20170	0150+100R	14090 13450
0150+10L	110890 62600	0150+20R	48430 66770	0110+70R	14950 17883	0160+100R	15060 14230
0160+10L	142710 63930	0160+20R	44880 50130	0120+70R	15880 17590	0161.5H00R	13830 13170
0167.5H00L	86910 53660	0167.5H20R	20060 25780	0130+70R	15450 14610	0103+110R	14260 14830
0100+00R	87660 47610	0100+30R	38200 47720	0110+80R	16530 16960	0110+110R	14420 14590
0110+00R	64590 59320	0110+78R	17140 24310	0120+80R	16410 20300	0120+110R	13590 13530
0120+00R	34230 42800	0120+28R	22290 28190	0130+80R	15660 15350	0130+110R	13280 13700
0130+00R	19800 25310	0130+28R	20770 33330	0140+80R	14930 14740	0140+110R	13600 13830
0140+00R	21120 26110	0140+28R	41490 107140	0150+80R	15610 14070	0150+110R	13060 12950
0150+00R	20530 25900	0150+28R	158180 160120	0160+80R	14220 15320	0160+110R	13860 13680
0160+00R	21420 25810	0160+28R	111520 67360	0161.5H80R	14350 13600	0167.5H10R	12750 12690
0167.5H00R	30310 26480	0167.5H30R	19450 22410	015+90R	19520 18630	0103+120R	14270 13460
0100+10R	22890 27260	0160+140R	18640 19940	0110+90R	20960 20530	0110+120R	15060 14300
0110+10R	116920 64840	0167.5H40R	17070 18640	0120+90R	17150 15870	0120+120R	13890 12500
0120+10R	56300 49830	0160+50R	18300 15420	0130+90R	15660 14790	0130+120R	13310 12520
0130+10R	23470 26130	0167.5H50R	16130 15300	0140+90R	14570 14820	0140+120R	13380 12670
0140+10R	43070 36640	0167.5H60R	16430 12740	0150+90R	15630 13910	0150+120R	14330 12590
0150+10R	43960 37840	0167.5H70R	14470 15040	0160+90R	15050 15030	0160+120R	14380 12930
0160+10R	41700 33430	0167.5H80R	15450 12520	0167.5H90R	14880 14380	0167.5H100R	13960 13550
0167.5H10R	13250 21850	0167.5H90R	13210 12520	0103+100R	150510 34720		

REMARKS: ALL READINGS ARE COUNTS PER MINUTE (CPM)

TOP- ARE CONTACT MEASUREMENTS

BOTTOM- ARE 1 METER ABOVE GROUND LEVEL.

OUTDOOR GAMMA SCREENING SURVEY DATA SHEET

LOGGING CREW: E. Couch
L. BENALLY, JR
E. SCHULTZ & J. INNIS

SHEET 2 OF 6 PAGE 2
DATE: 6-20-84
PROPERTY ID: DU-027

INSTRUMENT ID NO.: _____

BACKGROUND CALCULATION:

$$\#1 \text{ } \underline{\hspace{2cm}} + \#2 \text{ } \underline{\hspace{2cm}} + \#3 \text{ } \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \div 3 = \underline{11500} \text{ COUNTS/.1MIN}$$
[illegible]

REMARKS: All Readings are in cpm
(Top) are contact readings
Bottom are 1 meter readings

BOREHOLE LOG

LOGGING CREW: Benally
Touch
Turnis
 INSTRUMENT ID NO. Ludlum #

SHEET 3 OF 6 PAGE 3
 DATE: 6-20-84
 PROPERTY ID: DU-027
 AREA: Durango, Co.

- 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		②		③		④	
HOLE ID: <u>0+37+10L</u>		HOLE ID: <u>0+14+6R</u>		HOLE ID: <u>0+16+77R</u>		HOLE ID: <u>0+18+77R</u>	
TIME DRILLED: _____		TIME DRILLED: <u>Drive</u>		TIME DRILLED: _____		TIME DRILLED: _____	
TIME LOGGED: <u>Sidewalk</u>		TIME LOGGED: <u>way</u>		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	<u>169830</u>	SURFACE	<u>123240</u>	SURFACE	<u>61870</u>	SURFACE	<u>78180</u>
0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>	0"	<u>198</u>
6"	<u>569830</u>	6"	<u>354650</u>	6"	<u>150750</u>	6"	<u>198210</u>
12"	<u>366560</u>	12"	<u>377490</u>	12"	<u>139230</u>	12"	<u>189790</u>
18"	<u>111730</u>	18"	<u>187490</u>	18"	<u>51340</u>	18"	<u>64620</u>
24"		24"	<u>135870</u>	24"	<u>30630</u>	24"	<u>33560</u>
30"		30"	<u>160880</u>	30"	<u>26900</u>	28" 29"	<u>28280</u>
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: All readings in cpm
Background bore hole 23,000 cpm
Holes drilled to rock

BOREHOLE LOG

LOGGING CREW: Bernally
Pouch
Travis
 INSTRUMENT ID NO. Ludlum #

SHEET 4 OF 6 PAGE 4
 DATE: 6-20-84
 PROPERTY ID: DU-027
 AREA: Durango, Co.

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		⑥		⑦		⑧	
HOLE ID: <u>0+20+80R</u>		HOLE ID: <u>0+15+72R</u>		HOLE ID: <u>0+3+100R</u>		HOLE ID: <u>0+50+80R</u>	
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	<u>17580</u>	SURFACE	<u>17730</u>	SURFACE	<u>127610</u>	SURFACE	<u>15920</u>
0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>
6"	<u>20410</u>	6"	<u>21820</u>	6"	<u>249410</u>	6"	<u>19550</u>
12"	<u>22270</u>	12"	<u>22330</u>	12"	<u>235370</u>	12"	<u>22370</u>
18"	<u>21810</u>	18"	<u>21030</u>	18"	<u>177760</u>	18"	<u>22790</u>
24"	<u>22580</u>	24"	<u>21920</u>	24"		24"	<u>22210</u>
30"	<u>22010</u>	30"		30"		30"	<u>21860</u>
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: ALL READINGS IN cpm
BACKGROUND bore hole 23000 cpm
Holes drilled to rock

BOREHOLE LOG

LOGGING CREW: BENALLY
CAUCH
INNIS
 INSTRUMENT ID NO. LUDLUM #

SHEET 5 OF 6 PAGE 5
 DATE: 6-20-84
 PROPERTY ID: Du-27
 AREA: Durango, Co.

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)		(10)		(11)		(12)	
HOLE ID: <u>0+40+10R</u>		HOLE ID: <u>0+50+25R</u>		HOLE ID: <u>0+60+20R</u>		HOLE ID: <u>0+60+40R</u>	
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	<u>41290</u>	SURFACE	<u>195050</u>	SURFACE	<u>35480</u>	SURFACE	<u>20310</u>
0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>
6"	<u>52110</u>	6"	<u>316170</u>	6"	<u>37030</u>	6"	<u>23570</u>
12"	<u>40560</u>	12"	<u>221290</u>	12"	<u>29030</u>	12"	<u>21790</u>
18"	<u>28470</u>	18"	<u>65300</u>	18"	<u>24460</u>	18"	<u>23090</u>
24"	<u>24460</u>	24"	<u>36580</u>	24"	<u>24660</u>	24"	<u>21910</u>
30"		<u>30" 24"</u>	<u>33440</u>	30"	<u>25640</u>	<u>28" 28"</u>	<u>2200</u>
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: ALL READINGS IN CPM
BACKGROUND BORE HOLE AVE. 33000 cpm
ALL HOLES DRILLED TO ROCK

BOREHOLE LOG

LOGGING CREW: BENALLY
CONCH
INNIS
 INSTRUMENT ID NO. LUDLUM #

SHEET 6 OF 6 PAGE 6
 DATE: 6-20-84
 PROPERTY ID: DU-27
 AREA: DURANGO, CO

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)		(14)		(15)			
HOLE ID: <u>0+50+00R</u>		HOLE ID: <u>0+30+5R</u>		HOLE ID: <u>0+03+45R</u>		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	<u>21920</u>	SURFACE	<u>19460</u>	SURFACE	<u>118750</u>	SURFACE	
0"	<u>—</u>	0"	<u>—</u>	0"	<u>—</u>	0"	
6"	<u>25060</u>	6"	<u>20750</u>	6"	<u>230600</u>	6"	
12"	<u>33630</u>	12"	<u>23360</u>	12"	<u>145730</u>	12"	
18"		18"	<u>23360</u>	18"	<u>57970</u>	18"	
24"		24"	<u>22600</u>	24"	<u>36910</u>	24"	
30"		30"	<u>21850</u>	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: ALL READINGS IN cpm
BACKGROUND BORE HOLE AVE. 23000 cpm
ALL HOLES DRILLED TO ROCK

INTERIOR SURVEY DATA LOG/HOT SPOT *Supplemental Information*

SURVEY CREW Ernest Couch
Edmund Schultky
Julius Bitzilly

SHEET 1 OF 4 PAGE 1
 DATE October 16, 1984
 PROPERTY ID # DU-027
 PROJECT _____

GAMMA SCINTLLATOR HOT SPOT DATA

2220 INSTRUMENT ID # #31972 #16527 B #1528 93 #31988 #4410 #16529 ^{uR/h} CONVERSION CURVE # _____ (ATTACHED)

- NOTES: 1) RECORD SPOT ID LOCATIONS ON INTERIOR SURVEY SKETCH AND ATTACH COPY.
 2) INCLUDE DISCUSSION OF ANOMALIES, SUGGESTIONS, OBSERVATIONS, MATERIAL SAMPLES INFORMATION, SOURCES OF NATURAL RADIOACTIVITY, ETC., IN COMMENTS.

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION: <u>House</u>		
<u>NE</u>	<u>19260</u>	<u>17</u>
<u>N</u>	<u>20440</u>	<u>18</u>
<u>NW</u>	<u>21060</u>	<u>18</u>
<u>W</u>	<u>22100</u>	<u>19</u>
<u>C</u>	<u>19280</u>	<u>17</u>
LOCATION: <u>Addition</u>		
<u>NW</u>	<u>18370</u>	<u>17</u>
<u>SW</u>	<u>18250</u>	<u>17</u>
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION: <u>House</u>		
<u>E</u>	<u>16430</u>	<u>16</u>
<u>SE</u>	<u>18820</u>	<u>17</u>
<u>S</u>	<u>18390</u>	<u>17</u>
<u>SW</u>	<u>20680</u>	<u>18</u>
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION: <u>Addition</u>		
<u>NE</u>	<u>17910</u>	<u>17</u>
<u>E</u>	<u>17350</u>	<u>17</u>
<u>SE</u>	<u>18480</u>	<u>17</u>
<u>S</u>	<u>17330</u>	<u>17</u>
<u>C</u>	<u>17190</u>	<u>17</u>
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		
LOCATION: _____		

COMMENTS: Contact readings only under crawl space.
Background is 11500 cpm, all counts in CPM.

BOREHOLE LOG

Supplemental Information

LOGGING CREW: Ernest Couch
Edmund Schults
Julius Betsilly
 INSTRUMENT ID NO. 1002270 #31987 #4410 #16528

SHEET 2 OF 4 PAGE 2
 DATE: October 16, 1984
 PROPERTY ID: DU-027
 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: <u>N. WALL</u> TIME DRILLED: _____ TIME LOGGED: _____ SOIL TYPE: _____		HOLE ID: <u>S. WALL</u> TIME DRILLED: _____ TIME LOGGED: _____ SOIL TYPE: _____		HOLE ID: <u>W. WALL</u> TIME DRILLED: _____ TIME LOGGED: _____ SOIL TYPE: _____		HOLE ID: <u>WATER LINE</u> TIME DRILLED: _____ TIME LOGGED: _____ SOIL TYPE: _____	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE	<u>20440</u>	SURFACE	<u>18390</u>	SURFACE	<u>20290</u>	SURFACE	<u>32100</u>
0"	<u>20900</u>	0"	<u>19630</u>	0"	<u>20650</u>	0"	<u>21800</u>
6"	<u>20650</u>	<u>H 8 4"</u>	<u>20400</u>	6"	<u>21290</u>	<u>8 5</u>	<u>22040</u>
<u>H 12 4"</u>	<u>21670</u>	12"		<u>H 12 3</u>	<u>22450</u>	<u>H 12 6</u>	<u>24710</u>
18"		18"		<u>H 18 4</u>	<u>23470</u>	<u>H 18 12</u>	<u>28040</u>
24"		24"		<u>H 24 6</u>	<u>22770</u>	<u>H 24 13</u>	<u>28330</u>
30"		30"		30"		30"	
36"		36"		36"	<u>6' From</u>	36"	
42"		42"		42"	<u>H₂O LINE</u>	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: Crawl space, H & number equals the
hole was angled and # of inches under spread
footing. Background is 23000 cpm, all counts
in CPM.

BOREHOLE LOG

Supplemental Information

LOGGING CREW: Ernest Canch
Edward Schulty
Julius Buttrill

SHEET 3 OF 4 PAGE 3

DATE: October 16, 1984

PROPERTY ID: DV -0212-027

INSTRUMENT ID NO WD2220 #31982 4440 #6528

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: <u>N. WALL</u>	HOLE ID: <u>E. WALL</u>	HOLE ID: <u>W. WALL</u>	HOLE ID: <u>S. WALL</u>
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	16280	SURFACE	17350	SURFACE	18880	SURFACE	17330
0"	17480	0"	18590	0"		0"	17960
6"	19310	4" 4"	19780	6"	COULD	4" 6"	19560
H 12" 6"	20400	12"		12"	NOT	H 12" 12"	20090
18"		18"		18"	DIG	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: N, W, E & S wall readings in crawl
space, in new addition. H & number equals
the hole was angled and # of inches under
spread footing. Shallow holes are due to
rocky ground. Background is 23000 cpm, all
counts in CPM.

BOREHOLE LOG
Supplemental Information

LOGGING CREW:

*Ernest Couch
Edward Schultz
Julius Butzky*

SHEET

4

OF

4

PAGE

4

DATE:

October 16, 1984

PROPERTY ID:

DU-027

INSTRUMENT ID NO.

140-220 #39824/4410 F10528

AREA:

Durango, Colorado

NOTES: 1. ALL HOLES ARE 4" DIA. UNLESS OTHERWISE NOTED.

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HOLE ID: <i>0+17+25R</i>	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	<i>77900</i>	SURFACE		SURFACE		SURFACE	
<i>0" 2"</i>	<i>90480</i>	0"		0"		0"	
6"		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:

*Hole cut in driveway with a tree growing
from hole, background is 23000 cpm, all
counts in C.P.M.*



MORRISON-KNUDSEN COMPANY, INC.

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