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

Draft
Radiological and Engineering Assessment

Vicinity Property No. DUR 029

Remedial Actions
Contractor
for the
Uranium Mill Tailings
Remedial Actions
Project

MORRISON
KNUDSEN

DRAFT

THE RADIOLOGICAL AND ENGINEERING ASSESSMENT AND FINAL DESIGN FOR DURANGO PROPERTY DU-029

April 1, 1985

PREPARED FOR

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT OFFICE

UNITED STATES DEPARTMENT OF ENERGY

PREPARED BY

MORRISON-KNUDSEN COMPANY, INC.

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Property DU-029 is a private residence located at 58 Rio Vista Circle, Durango, CO.

1.2 Evaluation and Recommendation

1.2.1 Residual Radioactive Material Involvement

Three areas of contamination are identified in the yard areas of this property.

1.2.2 Recommended Remedial Action Option

The recommended option is to remove the contaminated material.

1.2.3 Estimated Costs

The estimated cost for removal of the contaminated material and restoration of the property is $24,100.00.

1.2.4 Schedule

The estimated duration of the remedial action effort is 25 to 30 days.

2.0 ENGINEERING FIELD SURVEY

2.1 Property Description

2.1.1 Property Use and Occupancy

Property DU-029 is a private residence located at 58 Rio Vista Circle, Durango, Colorado and owned by John and Cynthia Fugate. 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 on Microfilm No. 474274 follows:

Lot 13, Block 2, Riverview Park Second Resubdivision in the City of Durango.

2.1.3 Bordering Properties

The lot is zoned R-1. 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, brick veneered, wood frame structure on a concrete foundation. An attached single car wood frame garage is located on the south side of the house. A concrete driveway extends from the garage to the street. A wood frame storage room has been added onto the back of the garage. Concrete sidewalks extend along the street outside the west property line and from the back door stoop into the rear year. The front porch and rear patio are both covered.

Except for a small graveled area on the north side of the house, both front and rear yards are grassed. A concrete retaining wall extends the width of the rear yard, with hedges above and below it. The rear yard is fenced on the north and south sides with chain link fencing. Numerous trees and shrubs are scattered over the front and rear yards. The lot slopes upward steeply from the retaining wall to the east property 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 State 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 from utility pole to east side of house.

Telephone - Overhead from utility pole to east side of house.

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 and Figures 2.3 and 2.4.

Table 2.1

PROPERTY SURVEY DATA

GENERAL:

Site Location: Durango

Property Address: 58 Rio Vista Circle

Owner's Name: John and Cynthia Fugate Address: Same

Lot No.: 13 Property Type: Residential

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

Survey Completed By: R. Livengood/C. Sanders-Meena Date: 5-16-84

Property Description - Exterior:

Dwelling: Sq. Ft.: 1485

Levels: Single Story with Crawl Space

Construction Type: Brick Veneered Wood Frame

Foundation: 38" High Concrete Perimeter Wall with Two Concrete Center Support Piers

Garage: Single Car Attached Brick Veneered Wood Frame on South Side of House

Storage Bldg: Prefab: None

Improvement to Dwellings: Additions: 12'x11-1/2'Wood Frame Porches: Covered Concrete on on East Side Garage West Side of House

Patio: Covered Concrete on East Side of House

Other: May have contamination under patio and addition.

Driveway: Concrete: From Street to Garage

Gravel: Other:

Sidewalks: Concrete/Paved: As Noted on Drawings

Other:

Fences/Gates: Wood: Other:

Chain Link: 4' High on North and South Sides of Back yard to Retaining Wall

Table 2.1 (cont'd)

PROPERTY SURVEY DATA

Site Location: Durango

Property Address: 58 Rio Vista Circle

Grounds:
- Lawn: Full Front and Back Yards, Gravel on North Side House
- Trees: As Noted on Drawing
- Shrubs: As Noted on Drawing
- Garden: Unplanted Plot on North side of Lot in Back Yard
- Grading: 20% Above Retaining Wall
- Other:

Soil Type: Topsoil in Lawned Areas

Existing Survey Plot: Yes

Property Description - Interior:

Room	Floor	Walls E	W	N	S	Ceiling	Comments
Storage Shed	Concrete	Unfinished Stud Walls				Tin Roof	

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: 58 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

Sewage Line Location: Underground from Rio Vista Circle

Telephone Line Location: Overhead from East Utility Pole 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:

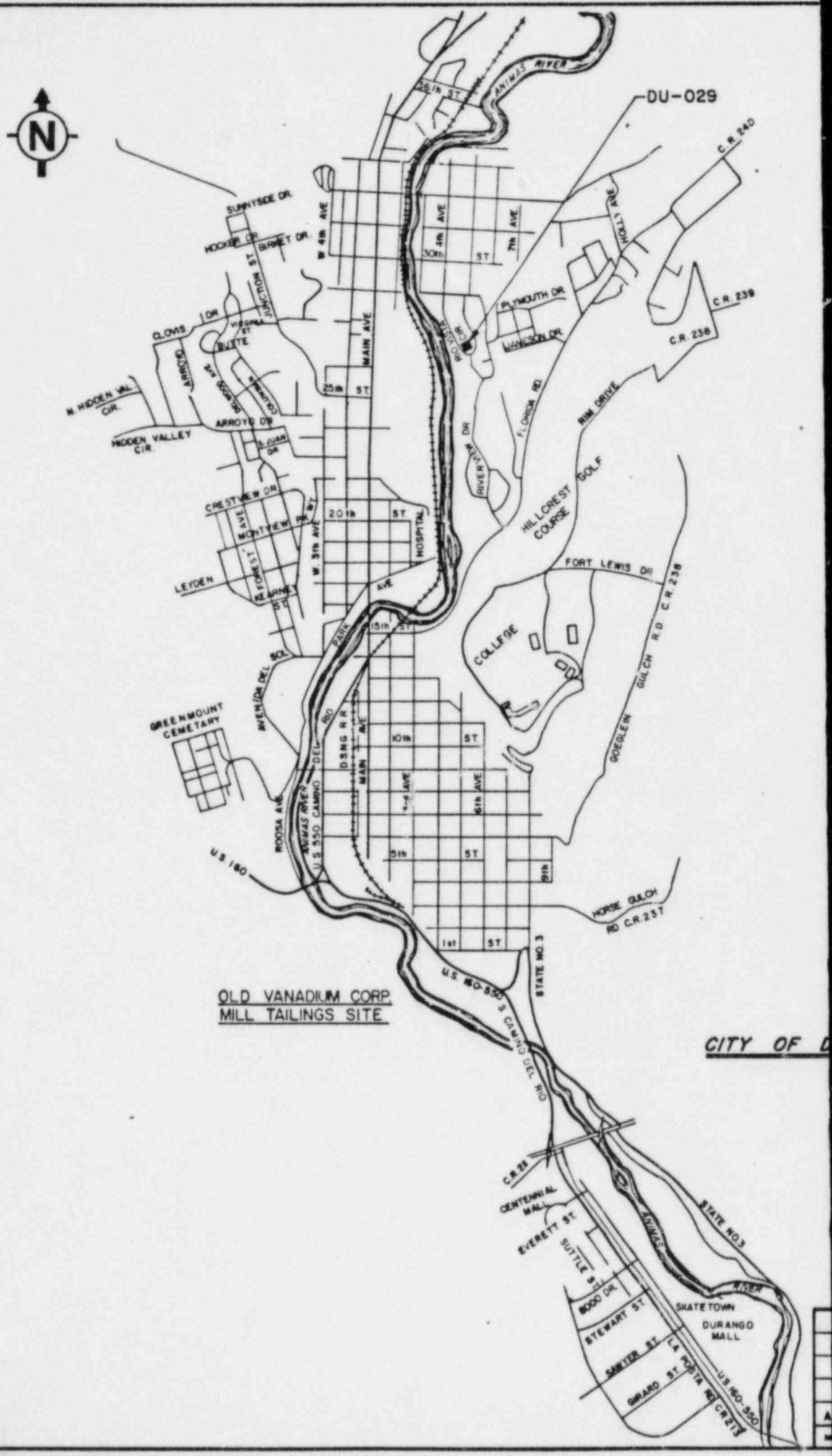
Rear:

Side:

Other:

Photographs:

Roll Frame	Description	Direction
2-26	Front of House	Looking Northeast
2-27	Front of House	Looking Southeast
2-24	Rear of House	Looking Northwest
2-25	Rear of House	Looking Southwest


DU-029
N
ANIMAS RIVER
SUNNYSIDE DR.
HOOKER DR.
GARNET DR.
JUNCTION ST.
GLOVIS DR.
BUTTE
ARROYO DR.
N. HIDDEN VAL. CIR.
HIDDEN VALLEY CIR.
S. JUAN DR.
CRESTVIEW DR.
MONTEVIEW DR.
LEYDEN
FOREST ST.
MAIN AVE
HOSPITAL
RIVERVIEW DR.
FLORIDA RD.
RIM DRIVE
HILLCREST GOLF COURSE
FORT LEWIS DR.
COLLEGE
GOEGLEIN GULCH RD C.R. 238
C.R. 240
C.R. 239
C.R. 238
PLYMOUTH DR.
HANCOCK DR.
MOUNTAIN AVE
GREENMOUNT CEMETARY
AVENIDA DEL SOL
ROOSA AVE
ANIMAS RIVER
U.S. 550 CAMINO DEL RIO
D.S.N.G. R.R.
U.S. 160
HORSE GULCH RD C.R. 237
STATE HWY 3
OLD VANADIUM CORP.
MILL TAILINGS SITE
CITY OF D
C.R. 228
CENTENNIAL MALL
EVERETT ST.
SUTTLE ST.
BOOD DR.
STEWART ST.
SKATETOWN
DURANGO MALL
SAWYER ST.
LA PORTA RD
GIRARD ST.
U.S. 160-550

URANGO, COLORADO

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED	DRAWN
CHECKED	
REVIEWED	
RECOMMENDED	

FIGURE 2.1

VICINITY MAP DU-029

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-029-005 REV. A

NO.	DATE	REVISIONS	DRAWN BY	CHKD BY	APPRVL. DOE	APPRVL. MK	PROJ ENG	APPRVL. DOE
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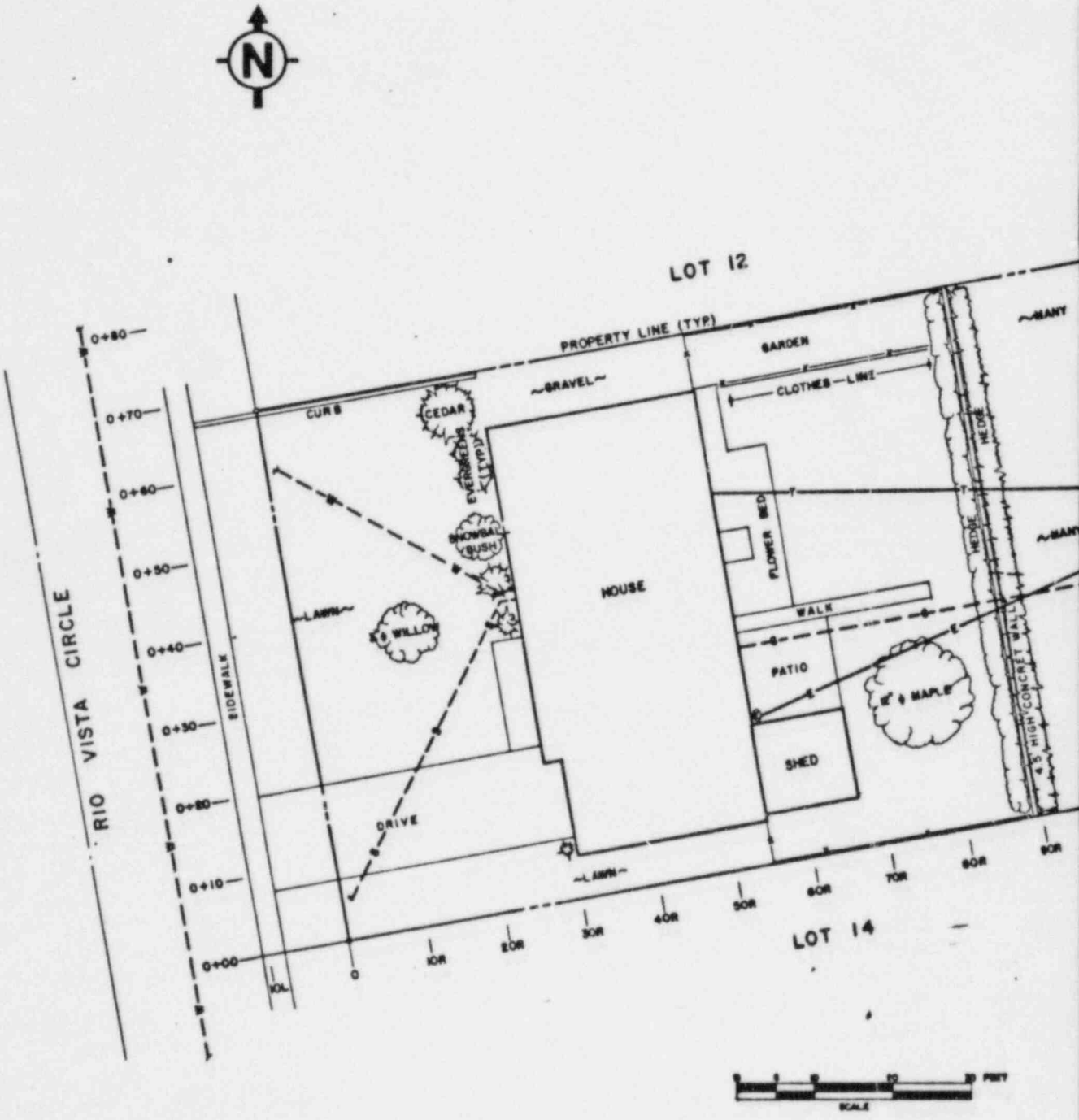
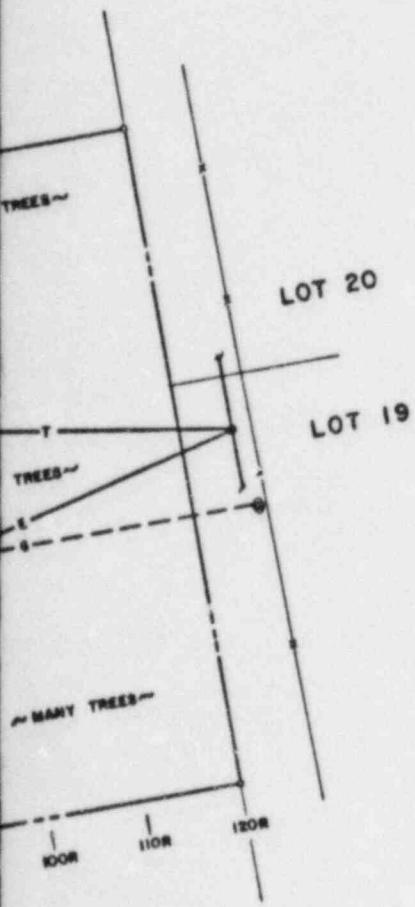

N
LOT 12
PROPERTY LINE (TYP)
GARDEN
~GRAVEL~
CLOTHES-LINE
CURB
CEDAR
EVERGREENS (TYP)
SNOWBALL BUSH
HOUSE
FLOWER BED
HEDGE
WALK
~LAWN~
WILLOW
PATIO
12" ø MAPLE
SHED
DRIVE
4.5' HIGH CONCRETE WALL
SIDEWALK
RIO VISTA CIRCLE
0+80
0+70
0+60
0+50
0+40
0+30
0+20
0+10
0+00
10L
0
10R
20R
30R
40R
50R
60R
70R
80R
90R
LOT 14
SCALE

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) G, W or E	METER
(X) G or W	VALVE
	PROPERTY PIN
	POWER POLE

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



U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

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

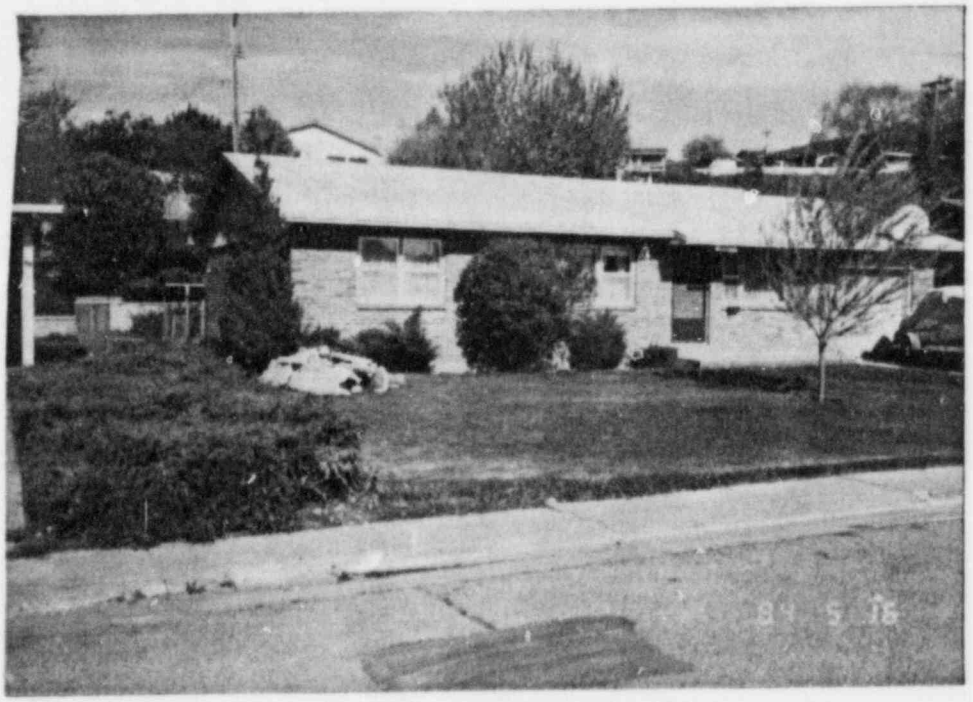
FIGURE 2.2
SITE PLAN DU-029
DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

MCGRIGSON KNUDSEN

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. DU-029-010 REV. A

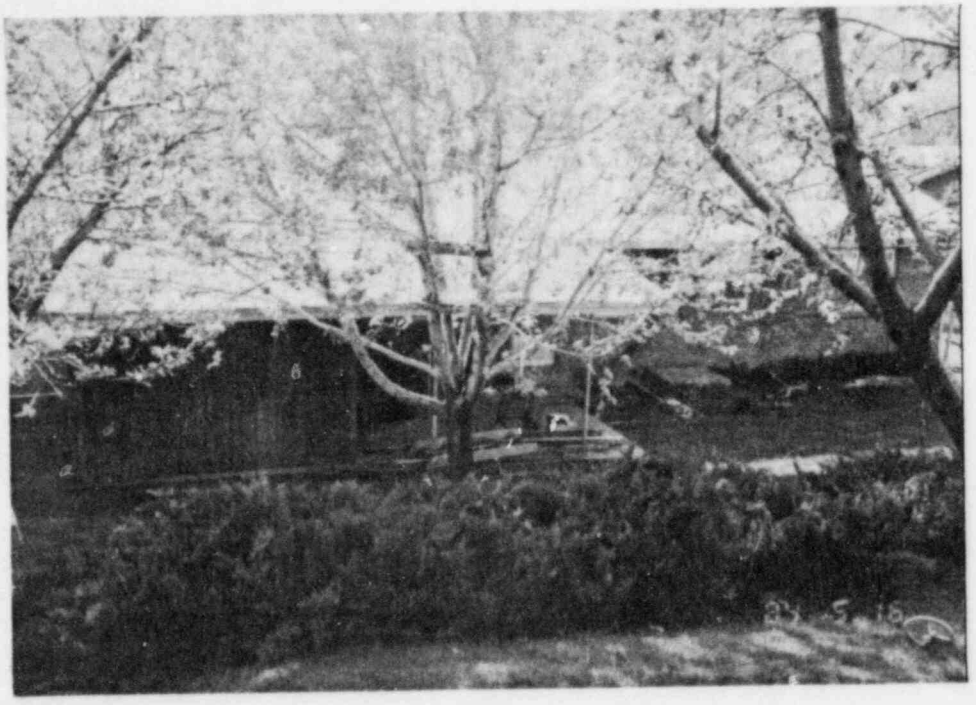
DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LDE	APPROVAL DH	PROJ ENG	APPROVAL DOE
3/22/90	FINAL REA SUBMITTAL	UDS	HW	W			—

Front of House Looking Northeast



Front of House Looking Southeast

Figure 2.3 Property Photos



Rear of House Looking Northwest

Rear of House Looking Southeast

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-029, 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 formal indoor gamma survey was not conducted inside the house, since the inclusion survey reported no evidence of contamination in or under the house. However, three measurements were taken as spot checks to confirm the results of the inclusion survey. Gamma measurements were made at 5 locations inside the garage.

3.1.2 Survey Results

Outdoor surface gamma readings on the property range from 14 to 72 micro R/hr. This may be compared with the background for the Durango site of 14 micro R/hr. Table 3.1 lists readings at all points where the readings are greater than 16 micro R/hr.

The maximum gamma reading inside the house was 20 micro R/hr. Gamma measurements in the garage range from 16 to 19 micro R/hr. The maximum level can be attributed to "shine" from tailings located just outside the garage. The other readings are within the normal variation of background in the Durango area.

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.

Several shovel holes were dug in outdoor areas of the property where the rocky soil prevented augering. These holes were surveyed as nearly as possible in compliance with RAC Procedure 018.

Holes were dug in the crawl space under the house to determine if contamination could be under the home or the footings. These holes were dug down 6 inches and then augered under the footings as far as possible. These holes were surveyed in accordance with RAC Procedure 018.

3.2.2 Survey Results

Contamination was found in 14 of the 17 outdoor holes augered. The location and depth of the contamination is described in Table 3.2 and is shown in Figure 3.1. Boreholes augered by ORNL in the inclusion survey are also shown in Figure 3.1.

Contamination was found in 2 of the 6 shovel holes. The location and depth of these holes are described in Table 3.3 and are shown in Figure 3.1.

None of the 5 crawl space angle holes showed contamination. This demonstrates that contamination does not extend beneath the house on this property. The hole locations are described in Table 3.3 and are shown in Figure 3.1.

3.3 Radon/Radon Daughter Survey

The inclusion survey indicated a radon daughter concentration inside the house of 0.007WL. This is well below the EPA standard of 0.02WL, and no further measurements were made during the present survey.

3.4 Estimated Extent of Contamination

One major area of contamination was identified in the survey and two smaller areas were also identified. The major area will be divided into two contiguous areas for convenience in this assessment.

Area A consists of the entire front yard of the property and along both sides of the house as far as the back wall of the house. The house and the area under the house are not included in Area A. The west boundary of Area A is undefined; contamination is known to extend into the street. The estimated depth of contamination in Area A is 24 inches, except that along the north side of the house, the estimated depth is 30 inches.

Area B is in the back yard of the property and includes the back sidewalk, the patio, and the shed. The estimated depth of contamination is 18 inches.

Area C has a depth of contamination that is known to be greater than 6 inches, and is estimated to be about 18 inches.

Area D has a depth of contamination that is known to be greater than 6 inches and is estimated to be about 18 inches.

Table 3.1
OUTDOOR SURFACE GAMMA SURVEY
Property DU-029

POINT	MICRO R/hr
0+00,10L	42
0+10,10L	72
0+20,10L	53
0+30,10L	52
0+40,10L	57
0+50,10L	50
0+60,10L	52
0+67.5,10L	61
0+00,00R	23
0+10,00R	28
0+20,00R	25
0+67.5,00R	17
0+00,10R	19
0+10,10R	25
0+20,10R	22
0+30,10R	18
0+40,10R	18
0+50,10R	26
0+60,10R	18
0+00,20R	19
0+10,20R	33

Table 3.1 - Cont'd.
OUTDOOR SURFACE GAMMA SURVEY
Property DU-029

POINT	MICRO R/hr
0+20,20R	19
0+30,20R	33
0+40,20R	26
0+50,20R	33
0+60,20R	27
0+67.5,20R	17
0+00,30R	26
0+20,28R	17
0+30,28R	17
0+40,28R	28
0+50,28R	34
0+60,28R	31
0+67.5,30R	23
0+00,40R	31
0+05,40R	62
0+60,40R	41
0+67.5,40R	20
0+00,50R	31
0+05,50R	57
0+60,50R	21

Table 3.1 - Cont'd.
OUTDOOR SURFACE GAMMA SURVEY
Property DU-029

POINT	MICRO R/hr
0+67.5,50R	18
0+00,60R	29
0+05,60R	33
0+30,60R	17
0+0,70R	18
0+10,70R	17
0+20,70R	18
0+30,70R	27
0+30,80R	17
0+40,80R	17
0+20,110R	18
0+40,50R	18
0+30,40R	20

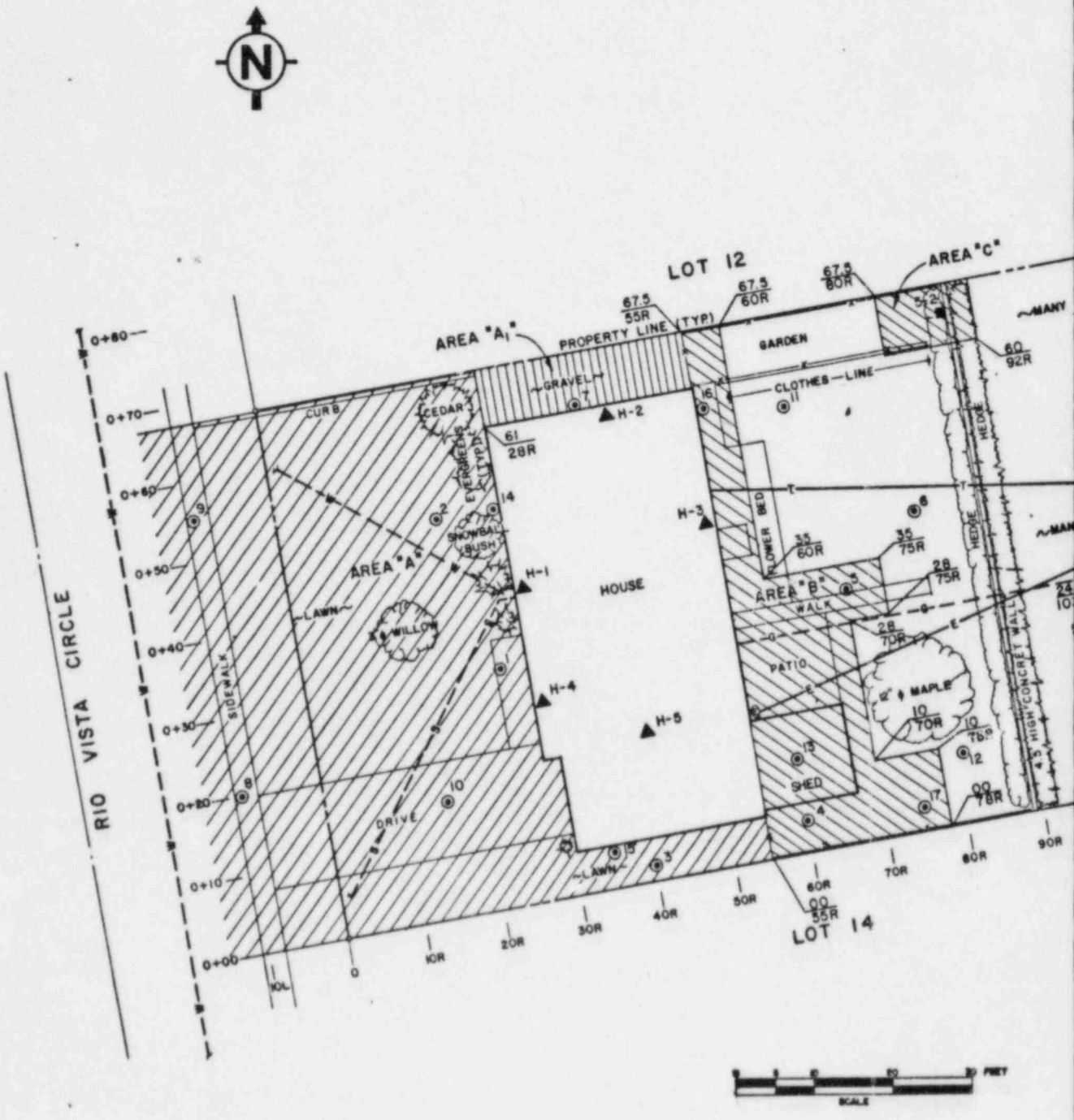
Table 3.2
BOREHOLE SURVEY
Property DU-029

HOLE	LOCATION	CONTAMINATION DEPTH
1	0+30,24R	0-24"
2	0+50,20R	0-18"
3	0+02,40R	0-24"+
4	0+04,60R	0-18"
5	0+32,70R	0-18"
6	0+40,80R	None
7	0+60,40R	0-30"
8	0+20,10L	0-24"
9	0+55,10L	0-24"+
10	0+15,15R	0-24"+
11	0+56,66R	None
12	0+09,81R	None
13	0+12,60R Center of Shed	0-18"
14	0+50,28R	0-24"
15	0+06,35R	0-21"+
16	0+58,55R	0-12"*
17	0+03,75R	0-12"*

*Low-level contamination present.
+Extent of contamination not reached.

Table 3.3
SHOVEL HOLE AND CRAWL SPACE ANGLE HOLE SURVEY
Property DU-029

HOLE	LOCATION	CONTAMINATION DEPTH
5-1	0+10,110R	None
5-2	0+64,88R	0-8"+
5-3	0+20,110R	0-8"+
5-4	0+20,100R	None
5-5	0+25,110R	None
5-6	0+20,115R	None
H-1	West Wall, Water Pipe	None
H-2	North Wall	None
H-3	East Wall	None
H-4	West Wall	None
H-5	South Wall	None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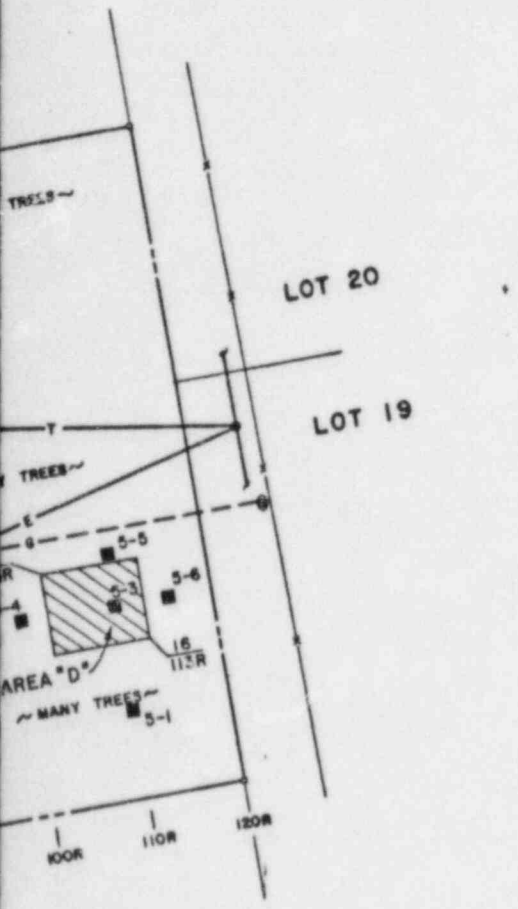
LOT 12
AREA "C"
AREA "A1"
PROPERTY LINE (TYP)
67.5/55R
67.5/60R
67.5/60R
GARDEN
MANY
60/92R
GRAVEL
CLOTHES LINE
CURB
CEDAR
EVERGREENS (TYP)
61/28R
H-2
HEDGE
FLOWER BED
H-3
35/60R
35/75R
AREA "A"
SNOWBALL BUSH
H-1
HOUSE
AREA "B"
WALK
28/75R
28/70R
LAWN
WILLOW
PATIO
12" MAPLE
10/70R
10/75R
H-4
H-5
4' HIGH CONCRETE WALL
SHED
00/78R
SIDEWALK
DRIVE
LAWN
60R/00/55R
LOT 14
RIO VISTA CIRCLE
0+80
0+70
0+60
0+50
0+40
0+30
0+20
0+10
0+00
10OL
0
10R
20R
30R
40R
50R
60R
70R
80R
90R
FEET
SCALE



LEGEND

8 ◉ AUGER HOLE DESIGNATION

H-3 ▲ ANGLE HOLE DESIGNATION

5-2 ■ SHOVEL HOLE DESIGNATION

ESTIMATED DEPTH OF CONTAMINATION

18"

24"

30"

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED REL	DRAWN RR
CHECKED	
REVIEWED	
RECOMMENDED	

FIGURE 3.1

RADIOLOGICAL SURVEY DATA DU-029

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-029-015 REV. A

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LOE	APPROVAL DH	PROJ. ENG	APPROVAL DOE
1	5/22/85	FINAL REA SUBMITTAL						

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-029:

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 would include the following:

- Remove patio cover and storage shed
- Demolish and remove concrete driveway, porch, sidewalk, and patio
- Remove and salvage fence and clothes line pole
- Remove and replace trees and shrubs
- Excavate contaminated materials within the limits and depths indicated in Figure 4.1.
- Backfill excavated areas with common fill and top with:
  1. Topsoil in lawn and garden areas and sod lawn areas.
  2. Structural fill in concrete areas.
  3. Gravel in graveled area.
- Construct new 4 inch thick concrete in areas removed
- Construct new storage shed and patio roof as per Figure 4.2
- Replace fence and clothes line pole.
- Replace trees and shrubs removed.

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 25 to 30 days.

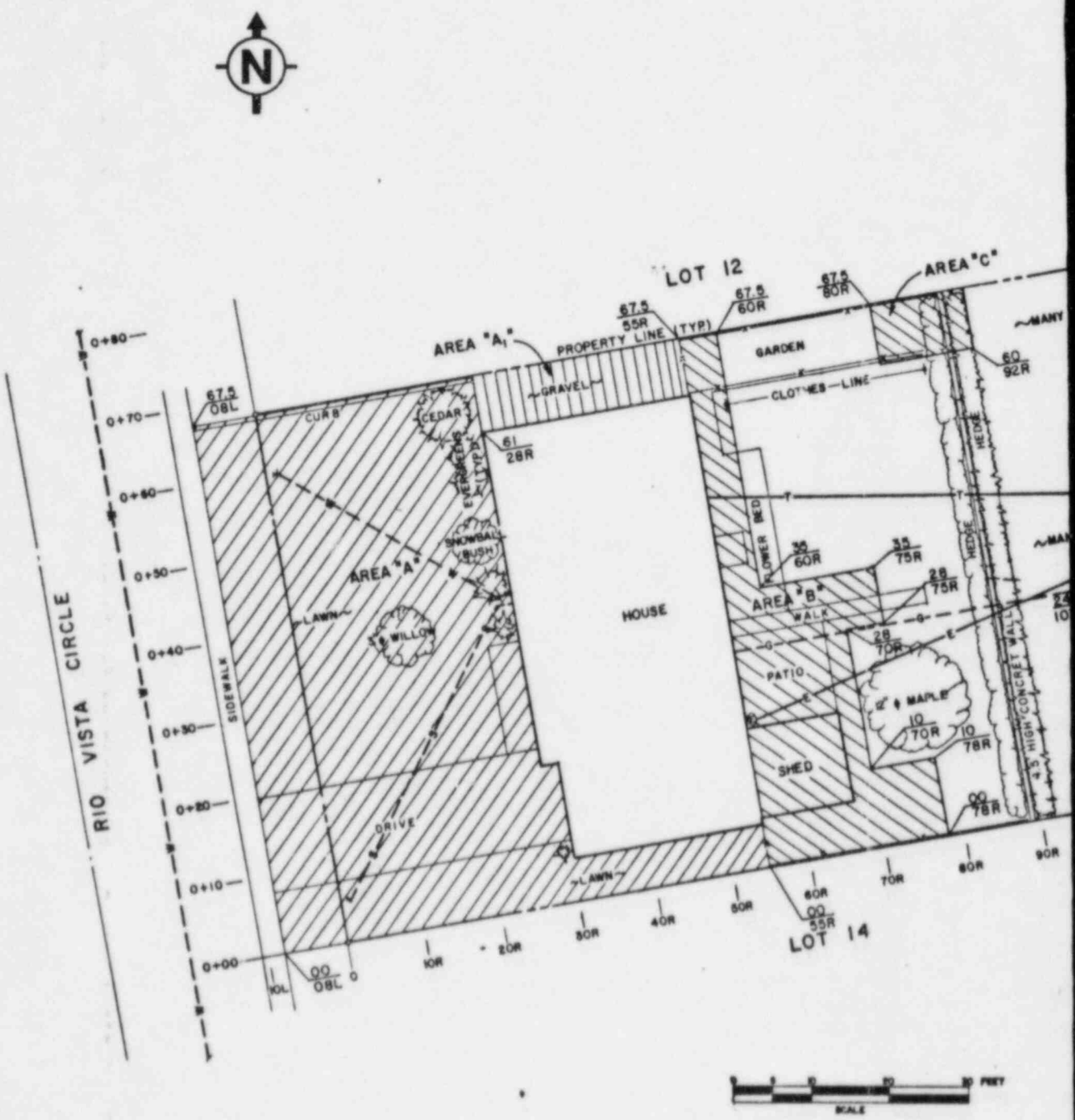
4.2 Recommendation

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 $24,100.00.

Table 4.1
OPTION 2 COSTS

Activity	Unit Price	Quantity	Estimated Cost
Remove Shed	3.50	144 sf	504.00
Remove Patio Cover	.55	325 sf	178.75
Remove Fence	2.90	27 lf	78.30
Remove Trees	100.00	3 ea	300.00
Remove Clothes Line Pole	45.00	1 ea	45.00
Demolish and Remove Concrete	3.15	836 sf	2,633.00
Excavation (Machine)	8.30	264 cy	2,191.20
Excavation (Hand)	59.05	4 cy	236.20
Common Backfill (Machine)	7.20	190 cy	1,368.00
Common Backfill (Hand)	23.40	3 sy	70.20
Structural Fill	26.40	15 cy	396.00
Topsoil	26.40	56 cy	1,478.40
Filter Fabric	1.00	21 sy	21.00
Gravel	26.40	4 cy	105.60
Sod	3.00	275 sy	825.00
Concrete	3.50	836 sf	2,926.00
Construct New Shed	8.55	144 sf	1,231.20
Construct New Patio Cover	2.00	325 sf	650.00
Replace Clothes Line Pole	90.00	1 ea	90.00
Replace Fence	5.00	27 lf	135.00
Replace Tree	200.00	3 ea	600.00
Replace Shrubs	50.00	12 ea	600.00

Subtotal	16,663.25
5% Subcontractor's Contingency	833.16
20% Overhead and Profit	3,499.28
Subtotal	20,995.69
15% Contingency	3,149.35
Total (Rounded)	24,100.00


N
LOT 12
AREA "C"
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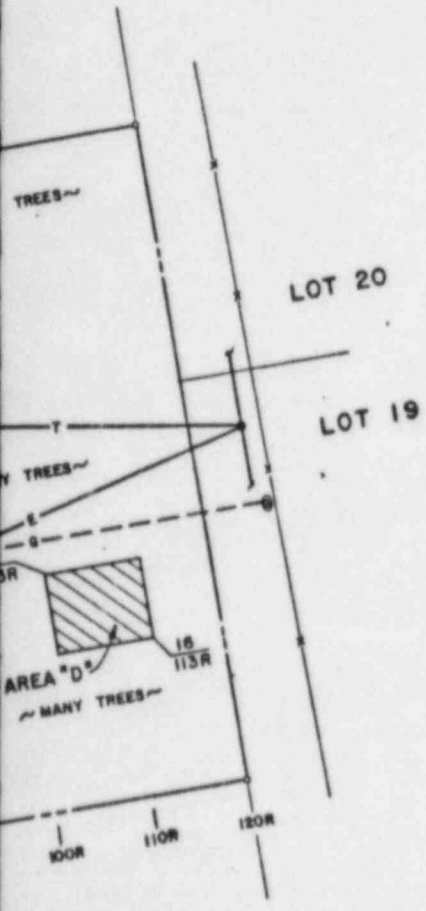
PROPERTY LINE (TYP)
67.5 55R
67.5 60R
67.5 80R
GARDEN
MANY
GRAVEL
60 92R
CLOTHES LINE
67.5 08L
CURB
CEDAR
61 28R
HEDGE
FLOWER BED
SNOWBALL BUSH
AREA "A"
AREA "B"
35 60R
35 75R
28 75R
LAWN
WILLOW
HOUSE
WALK
PATIO
28 70R
8" MAPLE
10 70R
10 78R
SHED
4.5' HIGH CONCRETE WALL
00 78R
DRIVE
LAWN
60R
00 55R
70R
80R
90R
LOT 14
50R
40R
30R
20R
10R
00 08L
10L
0
0+00
0+10
0+20
0+30
0+40
0+50
0+60
0+70
0+80
SIDEWALK
RIO VISTA CIRCLE
SCALE



SCOPE OF WORK:

AREA "A"

- PROTECT CONCRETE SIDEWALK ALONG RIO VISTA CIRCLE DURING EXCAVATION.
- INVENTORY TREES AND SHRUBS, NOTING TYPE AND LOCATION OF EACH AND REMOVE.
- DEMOLISH AND REMOVE CONCRETE DRIVEWAY, SIDEWALK AND PORCH NOTING SIZE AND ELEVATION OF EACH.
- EXCAVATE AREA "A" TO A DEPTH OF 24 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL. TOP CONCRETE AREA WITH 6 INCHES OF COMPACTED STRUCTURAL FILL. TOP LAWN AREA WITH 6 INCHES OF TOPSOIL AND SOD.
- CONSTRUCT NEW 4 INCH THICK CONCRETE DRIVEWAY AND SIDEWALK TO SAME SIZE AND ELEVATION OF THAT REMOVED.
- CONSTRUCT NEW PORCH AND STEP TO SAME SIZE AND ELEVATION OF THAT REMOVED WITH A MINIMUM 4 INCH THICK SLAB.
- REPLACE TREES AND SHRUBS WITH SAME TYPE AND SIZE AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.

AREA "A_1"

- REMOVE AND SALVAGE CHAIN LINK FENCE AS REQUIRED FOR EXCAVATION. REPLACE WHEN CONSTRUCTION HAS BEEN COMPLETED.
- EXCAVATE AREA A_1 TO A DEPTH OF 30 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL AND TOP WITH FILTER FABRIC AND 6 INCHES OF GRAVEL.

AREA "B"

- REMOVE AND STORE MISCELLANEOUS ITEMS IN STORAGE SHED AND REPLACE WHEN CONSTRUCTION HAS BEEN COMPLETED.
- REMOVE, SALVAGE AND REPLACE FENCE AS REQUIRED FOR EXCAVATION.
- DEMOLISH AND REMOVE STORAGE SHED AND PATIO COVER.
- DEMOLISH AND REMOVE CONCRETE SIDEWALK AND PATIO NOTING SIZE AND ELEVATION.
- EXCAVATE AREA "B" TO A DEPTH OF 18 INCHES. PROTECT CRAWL SPACE ACCESS DURING EXCAVATION.
- BACKFILL EXCAVATED AREA WITH COMMON FILL AND TOP WITH
  - (1) 12 INCHES OF TOPSOIL IN GARDEN AND FLOWER BED AREA.
  - (2) 6 INCHES OF TOPSOIL IN LAWN AREA AND SOD.
  - (3) 6 INCHES OF COMPACTED STRUCTURAL FILL IN SIDEWALK AND PATIO AREA.
- CONSTRUCT NEW 4 INCH THICK CONCRETE SIDEWALK AND PATIO TO SAME SIZE AND ELEVATION OF THAT REMOVED.
- CONSTRUCT NEW PATIO COVER AND STORAGE SHED AS PER FIGURE 4.2.

AREA "C"

- REMOVE, SALVAGE AND REPLACE FENCE AS REQUIRED FOR EXCAVATION.
- REMOVE HEDGE NOTING SIZE AND TYPE.
- EXCAVATE AYEA "C" TO A DEPTH OF 18 INCHES. PROTECT CONCRETE WALL DURING EXCAVATION.
- BACKFILL EXCAVATED AREA WITH COMMON BACKFILL AND TOP WITH 12 INCHES OF TOPSOIL.
- REPLACE HEDGE WITH SAME TYPE AND SIZE AS THAT REMOVED.

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)	G, W or E METER
(X)	G or W VALVE
	PROPERTY PIN
●	POWER POLE

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

AREA "D"

- REMOVE TREE AS REQUIRED FOR EXCAVATION.
- HAND EXCAVATE AREA "D" TO A DEPTH OF 18 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL AND TOP WITH 6 INCHES OF TOPSOIL AND SOD.
- REPLACE TREE WITH SIMILAR TYPE AND SIZE AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.

NOTES:

1. THE LATEST REVISION OF THE FOLLOWING TECHNICAL SPECIFICATIONS APPLY TO THE REMEDIAL ACTION WORK REQUIRED FOR PROPERTY NO. DU-029.

   SECTION 02050
   DEMOLITION

   SECTION 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.

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

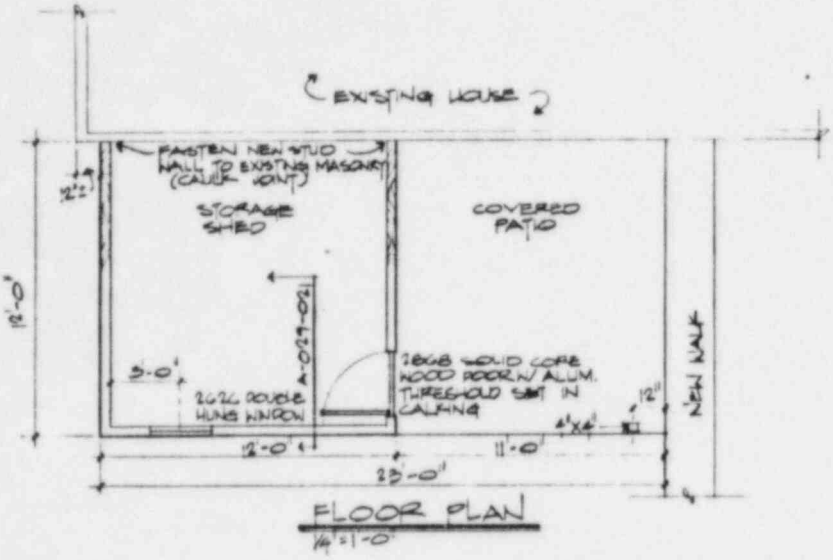
DESIGNED/DRAWN	RP				
CHECKED					
REVIEWED					
RECOMMENDED					
APPROVED	NR	DATE	DOE PROJECT MANAGER NR	DATE	DOE PROJECT ENGINEER NR

FIGURE 4.1
EXCAVATION & RESTORATION PLAN DU-029
DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796
DRAWING NO. DU-029-020 REV. A

NO.	DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LDE	APPROVAL DH	PROJ ENG	APPROVAL DOE
1	10/87	FINAL REA SUBMITTAL	LDE	HAP	HAP	DH	[illegible]	—



FLOOR PLAN
1/4" = 1'-0"

2 PLY BUILT-UP RO

1/2" CDX PLYWOOD WITH 15# FELT

2"X8" ROOF JOIST @ 2'-0" O.C.

METAL DRIP

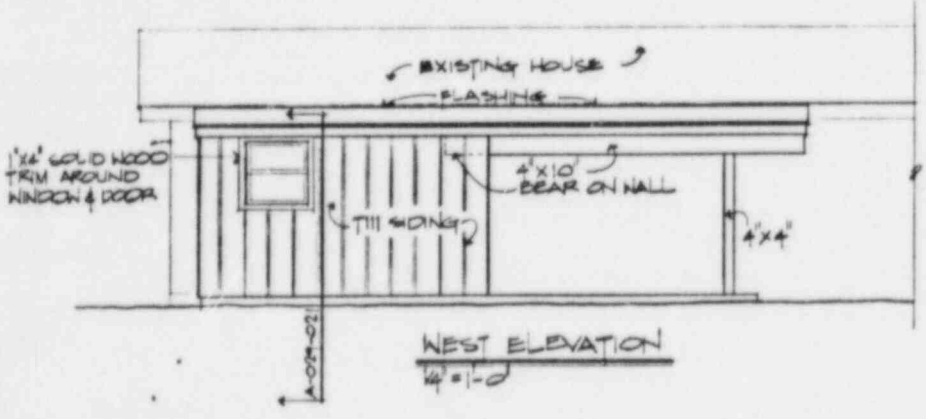
1"X10" SOLID FASCIA

1/2" CDX PLYWOOD

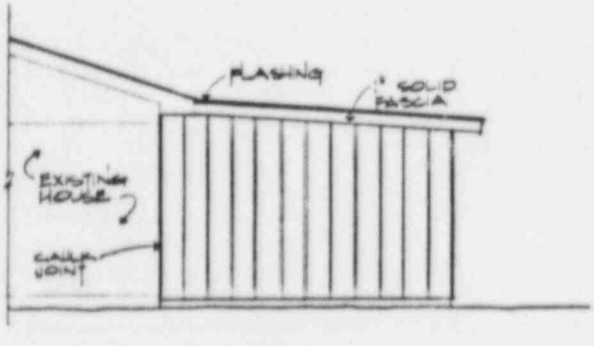
2"X4" @ 16" O.C.

T111 SIDING

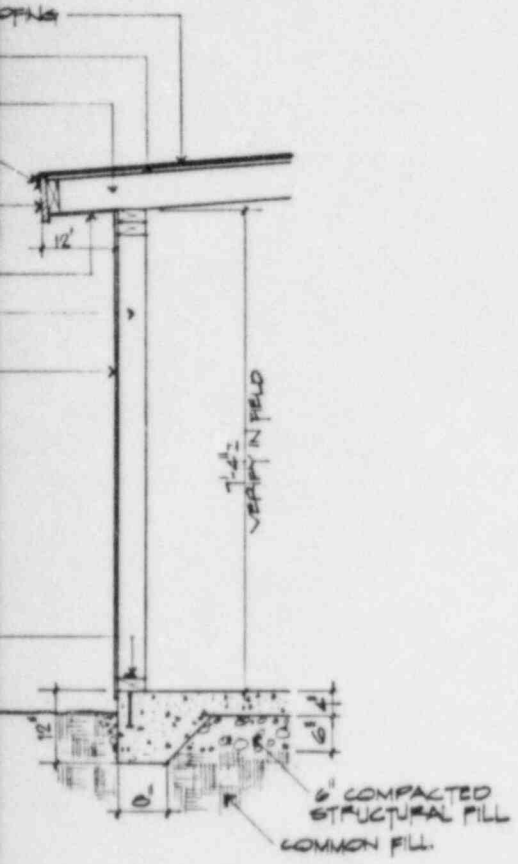
ANCHOR BOLTS @ 4'-0" O.C.



WEST ELEVATION
1/4" = 1'-0"



NORTH ELEVATION
1/4" = 1'-0"



WALL SECTION A-029-021
3/4"=1'-0"

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED	DRAWN	FIGURE 4.2
	MRA	PLAN, SECTION, & ELEVATIONS DU-029
CHECKED		DURANGO, COLORADO
REVIEWED		URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT
RECOMMENDED		

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

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-029-021 REV. A

DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LDE	APPROVAL DH	PROJ. ENG	APPROVAL DOE
9/22/85	FINAL REA SUBMITTAL	MRA	[illegible]	[illegible]	[illegible]	[illegible]	—

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 02200	EXCAVATION AND BACKFILL	X	
SECTION 02480	LANDSCAPING	X	
SECTION 02200	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.

Drawing Number	Drawing Title
DU-029-020	Excavation & Restoration Plan DU-029
DU-029-021	Plan, Section, & Elevations DU-029

APPENDIX A

SURVEY DATA LOGS

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

LOGGING CREW: E. COUCH
L. BENALLY, JR

SHEET 1 OF 7 PAGE 1

DATE: JUNE 4, 1984

PROPERTY ID: DH-029

INSTRUMENT ID NO.: Ludlum 2220 #31972 W/4410 #16527

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+10L	47840 / 45440	0+00+20R	27000 / 38560	0+00+60R	54230 / 51240	0+00+110R	15740 / 16660
0+10+10L	169770 / 58890	0+10+20R	70630 / 44080	0+05+60R	70440 / 59420	0+10+110R	14460 / 15660
0+20+10L	125540 / 94550	0+20+20R	27350 / 40100	0+00+70R	23660 / 21250	0+20+100R	14660 / 16380
0+30+10L	123610 / 70530	0+30+20R	100050 / 60310	0+10+70R	21120 / 23250	0+30+100R	14960 / 15740
0+40+10L	137930 / 75820	0+40+20R	48540 / 48900	0+20+70R	23250 / 23320	0+40+100R	13760 / 15220
0+50+10L	116330 / 68566	0+50+20R	71400 / 63320	0+30+70R	53180 / 34240	0+50+10R	14230 / 14370
0+60+10L	121620 / 60720	0+60+20R	53500 / 43490	0+40+70R	19840 / 19860	0+60+90R	13970 / 14010
0+67.5+10L	145750 / 77810	0+67.5+20R	21450 / 29480	0+50+70R	16090 / 17420	0+67.5+90R	15240 / 14710
0+00+00	47970 / 46110	0+00+28R	51300 / 62330	0+66+70R	15300 / 15560	0+00+110R	16370 / 15110
0+10+00	56260 / 34140	0+10+28R	18540 / 22460	0+00+80R	18840 / 21070	0+10+110R	15740 / 17350
0+20+00	47530 / 39260	0+20+28R	21260 / 30470	0+10+80R	17180 / 18430	0+20+110R	25260 / 22550
0+30+00	19370 / 32090	0+30+28R	19960 / 34080	0+20+80R	16720 / 17840	0+30+110R	15460 / 18080
0+40+00	17250 / 26070	0+40+28R	56860 / 60740	0+30+80R	22650 / 19780	0+40+110R	14840 / 13570
0+50+00	18190 / 24460	0+50+28R	76210 / 55500	0+40+80R	19430 / 17280	0+50+110R	15270 / 13940
0+60+00	17870 / 22630	0+60+28R	66660 / 41310	0+50+80R	16760 / 16460	0+67.5+90R	16280 / 15160
0+67.5+00	20130 / 23200	0+67.5+30R	39850 / 33960	0+60+80R	16540 / 16470	0+00+120R	14540 / 13920
0+00+40R	26740 / 31510	0+00+40R	64520 / 51360	0+00+90R	16940 / 16780	0+10+120R	14110 / 15630
0+10+10R	47150 / 47350	0+05+40R	148100 / 91060	0+10+90R	16940 / 16780	0+20+120R	15190 / 15130
0+20+10R	36620 / 35580	0+60+40R	93670 / 44280	0+20+90R	15160 / 16190	0+30+120R	15640 / 16250
0+30+10R	23030 / 23780	0+67.5+40R	24370 / 31770	0+30+90R	16440 / 15440	0+40+120R	14890 / 14410
0+40+10R	24720 / 29320	0+20+50R	65510 / 71810	0+40+90R	15420 / 15220	0+67.5+120R	14150 / 14730
0+50+10R	50640 / 24866	0+05+50R	136450 / 26520	0+50+90R	15660 / 16220		
0+60+10R	23040 / 24260	0+60+50R	34[illegible] / 29710	0+60+90R	17200 / 16650		
0+67.5+10R	18760 / 20150	0+67.5+50R	24230 / 25180	0+67.5+90R	17410 / 17490		

REMARKS: ALL READINGS ARE IN COUNTS PER MINUTE (cpm)
TOP - ARE CONTACT MEASUREMENTS
BOTTOM - READINGS TAKEN 1 METER ABOVE GROUND LEVEL
L BENALLY, JR

VP-04A

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

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

SHEET 2 OF 7 PAGE 2

DATE: 6-4-84

PROPERTY ID: DU-029

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+30+60R	21930 / 22470						
0+40+50R	26550 / 24570						
0+30+40R	30120 / 29840						
0+30+30R	17604 / 21050						

REMARKS: ALL READINGS ARE IN COUNTS PER MINUTE (CPM)
TOP - ARE CONTACT READINGS
BOTTOM - THESE READINGS WERE TAKEN 1 METER ABOVE GROUND LEVEL.

VP-04A

MORRISON KNUDSEN

INTERIOR SURVEY DATA LOG/HOT SPOT

SURVEY CREW E. COUCH
L. BENALLY, JR.
E. COUCH

SHEET 3 OF 7 PAGE 3
DATE JUNE 19, 1984
PROPERTY ID # DU-029
PROJECT

GAMMA SCINTLLATOR HOT SPOT DATA

2220 INSTRUMENT ID # 2220 # 31972 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:		
NE Corner	19760	16 ✓
	19310	17
NW Corner	17650	16 ✓
	18460	16
LOCATION:		
SE Corner	22840	18 ✓
	26110	19
SW Corner	42980	24 ✓
	39400	23
LOCATION:		
Center	30170	20 ✓
	29640	20

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION:		
LOCATION:		
LOCATION:		

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION:		
LOCATION:		
LOCATION:		

COMMENTS: 12' X 12' SHED
TOP - ARE CONTACT MEASUREMENTS
BOTTOM - ARE 1 METER READINGS
BACK GROUND MEASUREMENTS 11,500 CPM.

VP-02B

MORRISON KNUDSEN

BOREHOLE LOG

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

INSTRUMENT ID NO. Ludlum #31982

SHEET 4 OF 7 PAGE 4

DATE: JUNE 19, 1984

PROPERTY ID: DU-029

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)		(2)		(3)		(4)	
HOLE ID: 0+30+24R		HOLE ID: 0+50+20R		HOLE ID: 0+2+40R		HOLE ID: 0+4+40R	
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		SURFACE		SURFACE		SURFACE	
0"	102870	0"	41110	0"	126910	0"	85230
6"	154610	6"	56930	6"	233390	6"	120020
12"	100620	12"	52440	12"	251480	12"	72690
18"	48980	18"	35520	18"	99090	18"	37150
24" 22	32910	24"	24710	24"	49810	24"	26370
30"		30" 27	23400	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: BACKGROUND MEASUREMENTS 23,000 CPM
ALL HOLES WERE DRILLED UNTIL LARGE ROCKS OR BOULDERS PREVENTED FURTHER DRILLING.

MORRISON KNUDSEN

BOREHOLE LOG

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

INSTRUMENT ID NO. Ludlum 3198

SHEET 5 OF 7 PAGE 5

DATE: JUNE 19, 1984

PROPERTY ID: DU-029

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: 01327OR		(6) HOLE ID: 01401BOR		(7) HOLE ID: 01601OR		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		SURFACE		SURFACE		SURFACE	
0"	43460	0"	17020	0"	22200	0"	
6"	59580	6"	18320	6"	383780	6"	
12"	65900	12"	20580	12"	333780	12"	
18"	37050	18"	21080	18"	128320	18"	
24"/21"	30480	24"	20360	24"	60020	24"	
30"		30"/26"	19880	30"/27"	49050	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 MEASUREMENTS 23,000 CPM
ALL HOLES WERE DRILLED UNTIL LARGE ROCKS OR BOULDERS PREVENTED FURTHER DRILLING.

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: ERNEST COUCH
LEVON BENALLY, JR.
ED SCHMITZ

SHEET 6 OF 7 PAGE 6

DATE: JUNE 14, 1984

PROPERTY ID: DU-029

INSTRUMENT ID NO. LUDLUM # 3128

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.

(8) HOLE ID: 0+20 110L TIME DRILLED: TIME LOGGED: SOIL TYPE:		(9) HOLE ID: 0+55 110L TIME DRILLED: TIME LOGGED: SOIL TYPE:		(10) HOLE ID: 0+15 115R TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	250800	0"	150140	0"	128560	0"	
6"	671620	6"	448370	6"	219480	6"	
12"	228250	12"	431620	12"	175350	12"	
18"	76140	18"	164950	18"	73080	18"	
24"	40280	24"	57600	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: Background core hole over 23,000 cpm
All holes drilled until rock prevented drilling
further
Holes were core bored through sidewalk
and driveway

UB 018

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: Bonally, Tennis, Council

SHEET 7 OF 7 PAGE 7

DATE: 6-20-84

PROPERTY ID: DU-029

INSTRUMENT ID NO. Ludlum # 31982

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.

(11) HOLE ID: 0456+66E		(12) HOLE ID: 0409+81E		(13) HOLE ID: Center		HOLE ID:	
TIME DRILLED:		TIME DRILLED:		TIME DRILLED: 0?		TIME DRILLED:	
TIME LOGGED:		TIME LOGGED:		TIME LOGGED: Shed		TIME LOGGED:	
SOIL TYPE:		SOIL TYPE:		SOIL TYPE:		SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	18200	0"	17170	0"	28740	0"	
6"	20320	6"	22330	6"	53880	6"	
12"	23550	12"	29040	12"	62380	12"	
18"	21420	18"	26670	16"	44980	18"	
24"	20820	24"	23720	24"		24"	
~~30~~ 28"	21250	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: Background bore hole 23,000 cpm
All holes bored until encountering rock

UR-648

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

Supplemental Data

LOGGING CREW: Ernest Couch
Edward Schultz
Julius Bitzilly

SHEET 1 OF 7 PAGE 1

DATE: October 29, 1984

PROPERTY ID: DU-029

INSTRUMENT ID NO.: LUD 2220 #31988 Ludlum #1629

BACKGROUND CALCULATION:

#1 _____ + #2 _____ + #3 _____ = _____ ÷ 3 = 11500 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+20 +105R	54290 30780	uR/hr (illegible)	30				
0+25 +110R	18680 21160		17				
0+20 +115R	16340 16490		16				
0+15 +110R	21860 24620		18				
0+10 +110R	17340 19340		17				
0+67 +84R	18480 18720		17				
0+64 +88R	44820 23070		26				
0+64 +82R	51610 22950		29				

REMARKS: Top readings are contact lower readings are 1 meter distance, all counts in CPM.

VP-04A

MORRISON KNUDSEN

INTERIOR SURVEY DATA LOG/HOT SPOT Supplemental Data

SURVEY CREW Ernest Couch, Edward Schultz, Julius Bitzilly

SHEET 2 OF 7 PAGE 3

DATE October 29, 1994

PROPERTY ID # DU-029

PROJECT

GAMMA SCINTLLATOR HOT SPOT DATA

2220 INSTRUMENT ID # #219880/4410 #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: Garage		
NE	17250 / 15070	17
NW	17630 / 21000	17
SE	22070 / 26130	19
SW	18290 / 14550	17
C	15340 / 13530	16
LOCATION:		
LOCATION:		

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION:		
LOCATION:		
LOCATION:		

HOT SPOT ID #	COUNTS /0.1MIN	RATE uR/h
LOCATION:		
LOCATION:		
LOCATION:		

COMMENTS: Top readings are contact, lower readings are 1 meter distance, background is 11500 apm. all counts in CPM.

VP-028

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch
Edward Schultz
Julius Estilly

SHEET 3 OF 7 PAGE 3

DATE: October 29, 1984

PROPERTY ID: DU-029

INSTRUMENT ID NO. LND 2220 #3982 4440 #1653

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: D+10+110R		HOLE ID: D+64+88R		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	17310	SURFACE	44820	SURFACE		SURFACE	
0"	17210	0"	53870	0"		0"	
6"	18820	6"	62300	6"		6"	
~~12"~~ 11	19660	~~12"~~ 8	52390	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: Shovel holes, shallow holes are due to rocky ground, background is 23000 cpm, all counts in CPM.

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch, Edward Schultz, Julian Bitzilly

SHEET 4 OF 7 PAGE 4

DATE: October 29, 1984

PROPERTY ID: DU-029

INSTRUMENT ID NO. UNO 2220 #319524/440 #16528

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: 0+20+110R TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: 0+20+100R TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: 0+25+110R TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: 0+20 ~~0+25~~+115R TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE	18680	SURFACE	16370
0"	61750	0"	16540	0"	19440	0"	17260
6"	73850	6"	18770	6"	21140	6"	16520
~~12~~ 8	46040	~~12~~ 10	19410	12"	21380	~~12~~ 8	16670
18"	Rock	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: Shovel holes, shallow holes are due to rocky ground, background is 23000 cpm, all counts in CPM.

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch
Edward Schultz
Julius Bitrilly

SHEET 5 OF 7 PAGE 5

DATE: October 16, 1984

PROPERTY ID: DU-024

INSTRUMENT ID NO. HD 2220 #1982 w/ Labo #16528

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: Water pipe TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: TIME DRILLED: TIME LOGGED: SOIL TYPE:	
DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	21090	0"		0"		0"	
6"	25880	6"		6"		6"	
~~12"~~ 8"	26950	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: All readings are horizontal water pipe had large hole. Background is 23000 cpm, all counts in CPM, Crawl space

VP-048

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch
Edward Schultz
Julius Bitzilly

SHEET 6 OF 7 PAGE 6
DATE: October 16, 1984
PROPERTY ID: DU-029
AREA: Durango, Colorado

INSTRUMENT ID NO. LUD2220 #3983 #4410 #1652 8

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: E WALL TIME DRILLED: TIME LOGGED: SOIL TYPE:		HOLE ID: W. Wall 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	21140	SURFACE	17510	SURFACE	19250	SURFACE	19360
0"	20640	0"	18560	0"	20160	0"	18710
6"	21860	6"	20260	6"	21190	6"	20380
Hole 4"	22630	Hor 4"	21620	Hor 4"	20840	Hor 4"	20460
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: All readings are in crawl spaces
Horz = horizontal hole under footings some at right angles. Shallow holes are due to rocky ground. Background is 23000 cpm, all counts in CPM.

MORRISON KNUDSEN

BOREHOLE LOG

Supplemental Data

LOGGING CREW: Ernest Couch, Edward Schultz, Julius Bitsilly

SHEET 7 OF 7 PAGE 7

DATE: October 16, 1984

PROPERTY ID: DU-029

INSTRUMENT ID NO. WD-2220 #31982 w/ 1410 #76528

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: 0+50+28R		HOLE ID: 0+6+35R		HOLE ID: 0+52+55R		HOLE ID: 0+3+75R	
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		SURFACE		SURFACE	36340	SURFACE	27380
0"	84660	0"	142250	0"	35920	0"	27210
6"	116280	6"	184350	6"	41730	6"	34840
12"	85980	12"	99970	12"	35220	12"	38970
18"	54590	18"	58470	18"	29120	18"	32290
24"	39190	~~24"~~ 21	49070	24"	27080	24"	25810
30"	33650	30"		~~30"~~ 28	26540	30"	25680
36"		36"		36"		~~36"~~ 31	24880
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 bore holes are due to rocky ground, background is 23000 cpm, all counts in CPM.

MORRISON-KNUDSEN COMPANY, INC.

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