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

Draft
Radiological and Engineering Assessment

Vicinity Property No. DUR 202

Remedial Actions
Contractor
for the
Uranium Mill Tailings
Remedial Actions
Project

MORRISON
KNUDSEN

Vicinity Property No. DUR 202

8507090516 850314
PDR WASTE
WM-48 PDR

DRAFT

THE RADIOLOGICAL AND ENGINEERING ASSESSMENT AND FINAL DESIGN FOR DURANGO PROPERTY

DU-202

March 14, 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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A. Survey Data Logs

1.0 EXECUTIVE SUMMARY

1.1 Introduction

Property DU-202 is an undeveloped park located on U.S. 550/160, Durango, CO.

1.2 Evaluation and Recommendation

1.2.1 Residual Radioactive Material Involvement

There are three areas of contamination located on 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 $12,300.00.

1.2.4 Schedule

The estimated duration of the remedial action effort is 3 to 5 days.

2.0 ENGINEERING FIELD SURVEY

2.1 Property Description

2.1.1 Property Use and Occupancy

Property DU-202 is a undeveloped park located on U.S. 550/160 and owned by the City of Durango. 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 follows:

A tract or parcel of land No. ISR of the State Department of Highways, Div[illegible]n of Highways, State of Colorado, Project No. RF 019-2[illegible] Sec. 2 containing 2.869 acres, more or less, in the NE 1/4 of the NW 1/4 of Section 32, Township 35 North, Range 9 West, of the New Mexico Principal Meridian, in La Plata County, Colorado, said tract or parcel being more particularly described as follows:

Beginning at a point from which the N 1/4 corner of said Section 32 bears N. 70° 40' 43" E. a distance of 1188.02 feet;

1. Thence S. 88° 27' W. a distance of 202.87 feet, to a point on the West line of the NE 1/4 of the NW 1/4 of said Section 32;

2. Thence S. 00° 41' W., along said 1/16th Sec. line, a distance of 311.64 feet.

3. Thence S. 35° 48' E., a distance of 233.00 feet;

4. Thence N. 54° 12' E., a distance of 282.85 feet;

5. Thence N. 25° 03" W., a distance of 375.99 feet, more or less, to the point of beginning.

The above described parcel contains 2.869 acres (125,951 sq. ft.), more or less.

2.1.3 Bordering Properties

It is located in a commercial area less than one quarter mile south of the old Vanadium Corp. of America mill tailings site. The property is bounded on the north by a commercial property; on the east by U.S. 550/160; on the south by open land; and on the west by the Animas River.

2.2 Existing Facilities and Structures

2.2.1 Structures

An underground concrete sewer lift station is the only structure located on this property. The remainder of the property is weed covered. A few large trees are scattered throughout the property.

2.2.2 Utilities

Utilities are serviced to the property as follows:

Electric power - Overhead from US 550/160.

Telephone - None.

Water - None.

Gas - None.

Sewer - As noted on Figure 4.1.

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 2.4.

TABLE 2.1

COMMERCIAL/INSTITUTIONAL

PROPERTY SURVEY DATA

GENERAL:

Facility Name: Park

Address: US 550/160

Owner: City of Durango

Occupancy: Employees/Occupants (Full Time): _____

Employees/Occupants (Part Time): _____

Remarks: _____

PROPERTY DESCRIPTION:

Structure: (Identify) Pumping Station

: SQ FT _____ Levels _____

: Construction Type Concrete

: Foundation _____

Remarks: Pumping Station is an underground concrete vault type with a manhole

Structure: (Identify) _____

: SQ FT _____ Levels _____

: Construction Type _____

: Foundation _____

Remarks: _____

TABLE 2.1

COMMERCIAL/INSTITUTIONAL

PROPERTY SURVEY DATE

Facility Name: Park

PROPERTY DESCRIPTION:

Driveway/Access: Concrete: _____ Asphalt: _____ Gravel: X

Remarks: _____

Sidewalks: Concrete: _____ Asphalt: _____

Remarks: None

Fences: Chain link _____ Mesh _____ Wood _____

Remarks: None

Grounds: Lawn None

Trees Various Sizes

Shrubs None

Grading Rough

Soil Type _____

Remarks Area is an open field with large trees around the site

Existing Survey Plot: _____

TABLE 2.1

COMMERCIAL/INSTITUTIONAL

PROPERTY SURVEY DATA

Facility Name: _____

UTILITIES: Heating: Gas _____ Electric _____ Oil _____

Hot Water _____ Other _____

Remarks: None

Air Conditioning: Elec. Heating Pump _____ Gas _____

Evap. Cooler _____ Other _____

Remarks: None

Electric Line Location: Overhead

Gas Line Location: None

Water Line Location: None

Sewer Line Location: None

Telephone Line Location: None

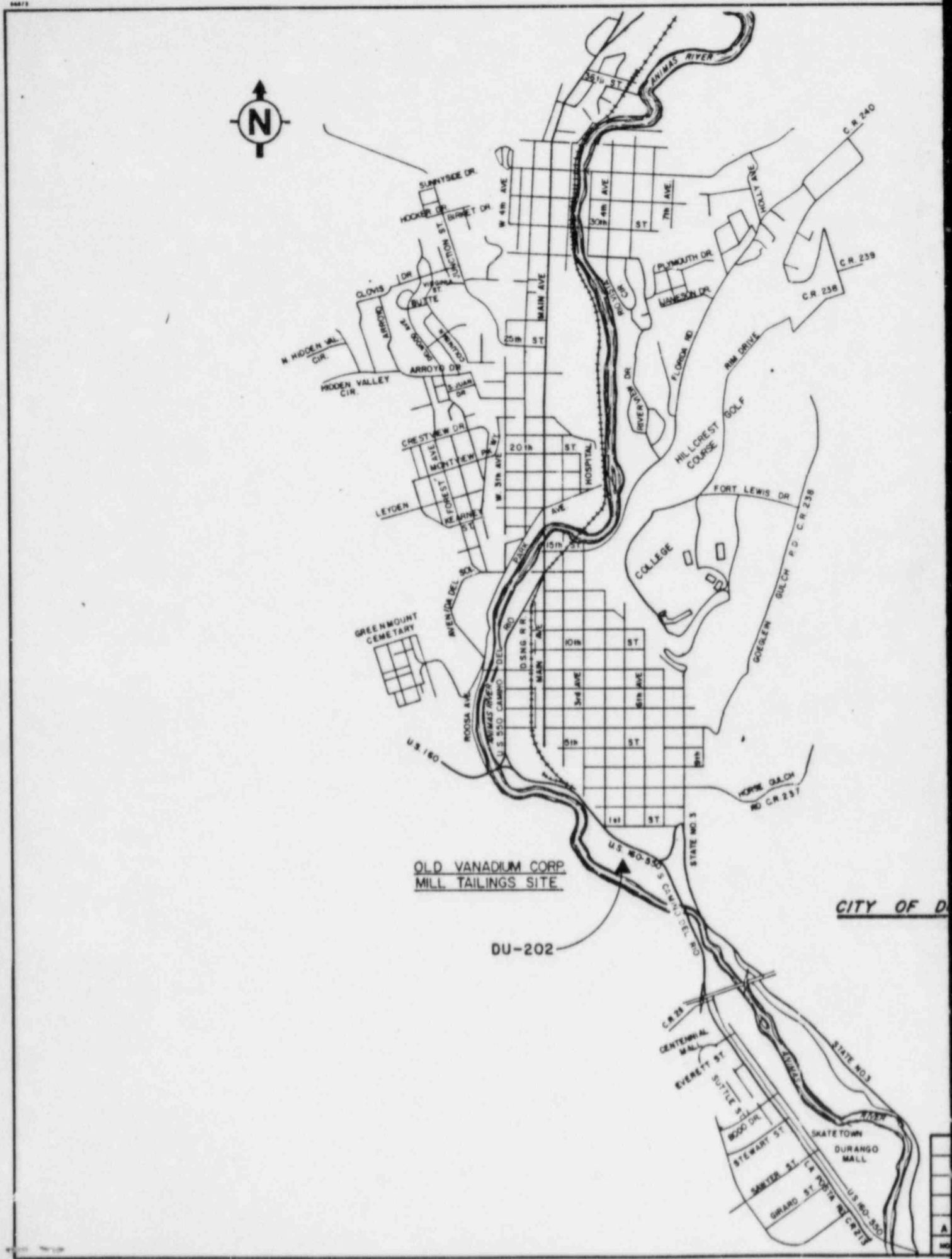
BUILDING CODES AND ZONING:

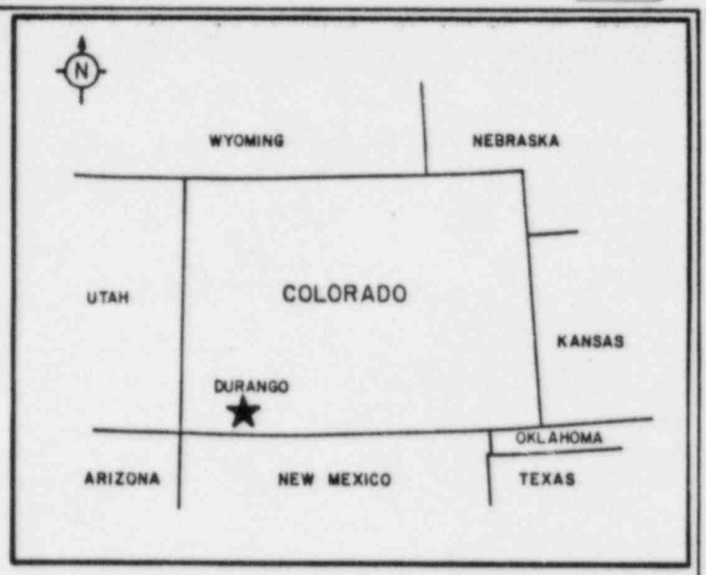
Building Code: UBC X BOCA _____

Remarks: _____

Zoning Jurisdiction: City of Durango

Present Facility Zoning: _____


N
ANIMAS RIVER
SUNNYSIDE DR.
HOOKER DR.
BURNET DR.
GLOVIS DR.
ARROYO DR.
HIDDEN VALLEY CIR.
N. HIDDEN VAL. CIR.
S. JUAN DR.
CHESTNEW DR.
LEYDEN
MAIN AVE
W 4th AVE
3rd AVE
7th AVE
25th ST
20th ST
15th ST
10th ST
5th ST
1st ST
HOSPITAL
RIVERSIDE DR.
PLYMOUTH DR.
WINDSOR 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
GREENMOUNT CEMETARY
ROOSA AVE
U.S. 550 CAMINO DEL RIO
DURANGO & SILVERTON N.G.R.R.
HORSE GULCH RD C.R 237
U.S. 160
OLD VANADIUM CORP. MILL TAILINGS SITE
DU-202
CITY OF D
C.R 23
CENTENNIAL MALL
EVERETT ST
SUTTLE ST
STATE HWY 3
ANIMAS
MAIN
SKATE TOWN
DURANGO MALL
8000 DR.
STEWART ST
SAWYER ST
LA PORTA RD
GIRARD ST
U.S. HWY 550



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8507090516 -01

DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL LOE	APPROVAL DH	PROJ ENG	APPROVAL DOE
7/30/85	FINAL REA SUBMITTAL	VDL	VCD	VCD	7/31	VCD	–

U. S. DEPARTMENT OF ENERGY
ALBUQUERQUE, NEW MEXICO

DESIGNED	DRAWN
VDL	VDL

CHECKED
REVIEWED
RECOMMENDED

FIGURE 2.1

VICINITY MAP DU-202

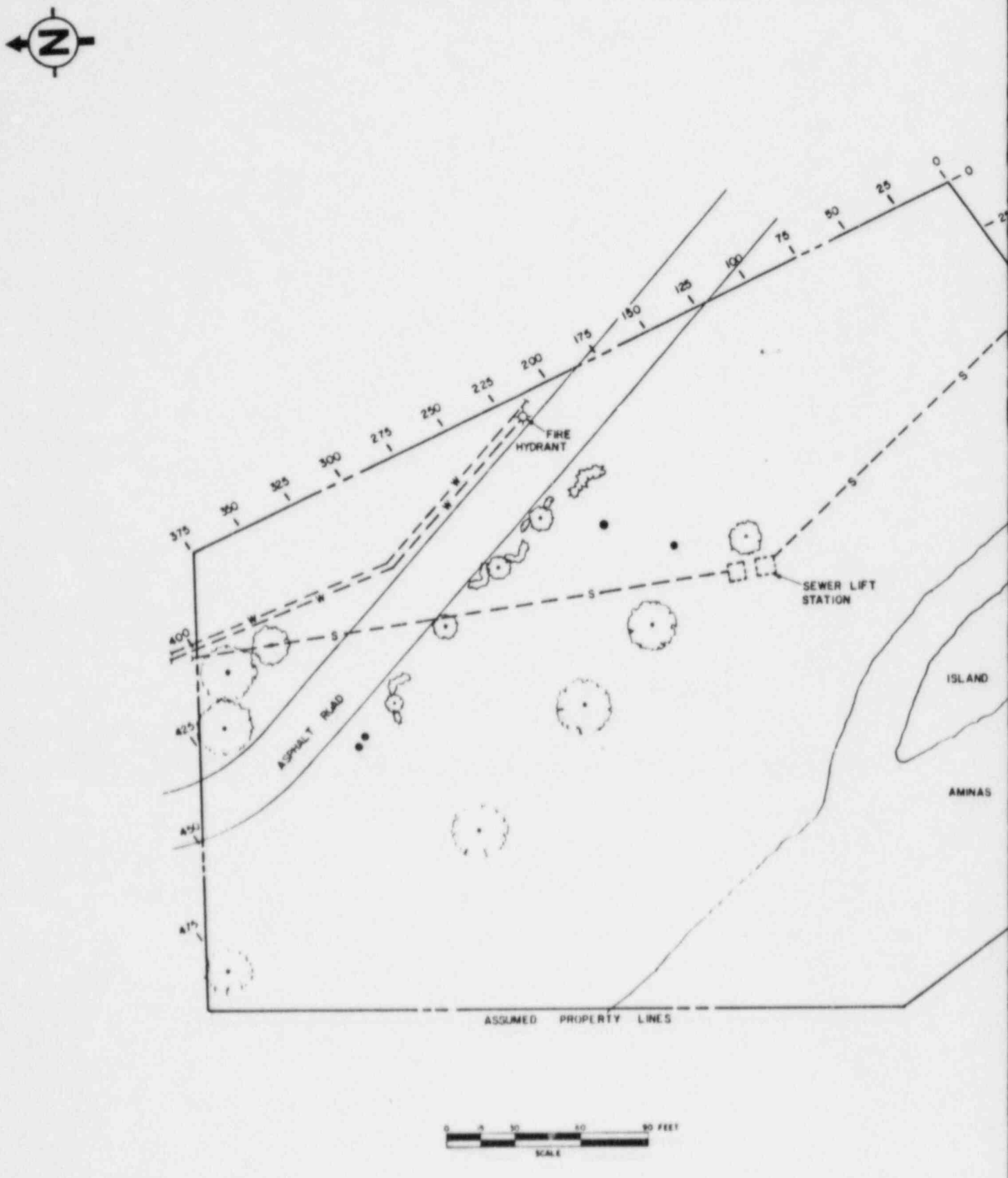
DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

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

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-202-005 REV. A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275
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375
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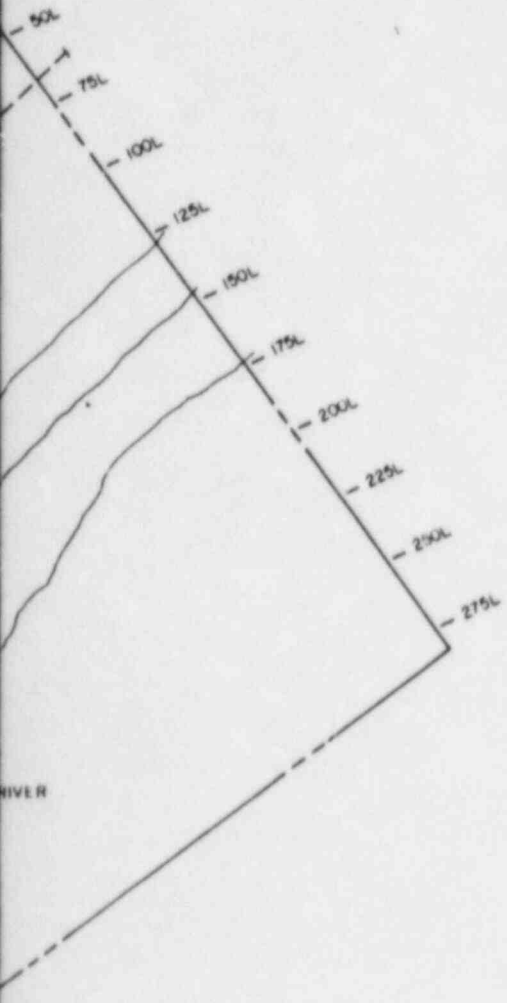
475
FIRE HYDRANT
SEWER LIFT STATION
ASPHALT ROAD
ISLAND
AMINAS
ASSUMED PROPERTY LINES
0
50
100
150 FEET
SCALE

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, 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.



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ALBUQUERQUE, NEW MEXICO

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REVIEWED					
RECOMMENDED					
APPROVED NR	DATE	DOE PROJECT MANAGER NR	DATE	DOE PROJECT ENGINEER NR	DATE

FIGURE 2.2

SITE PLAN DU-202

DURANGO, COLORADO

URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

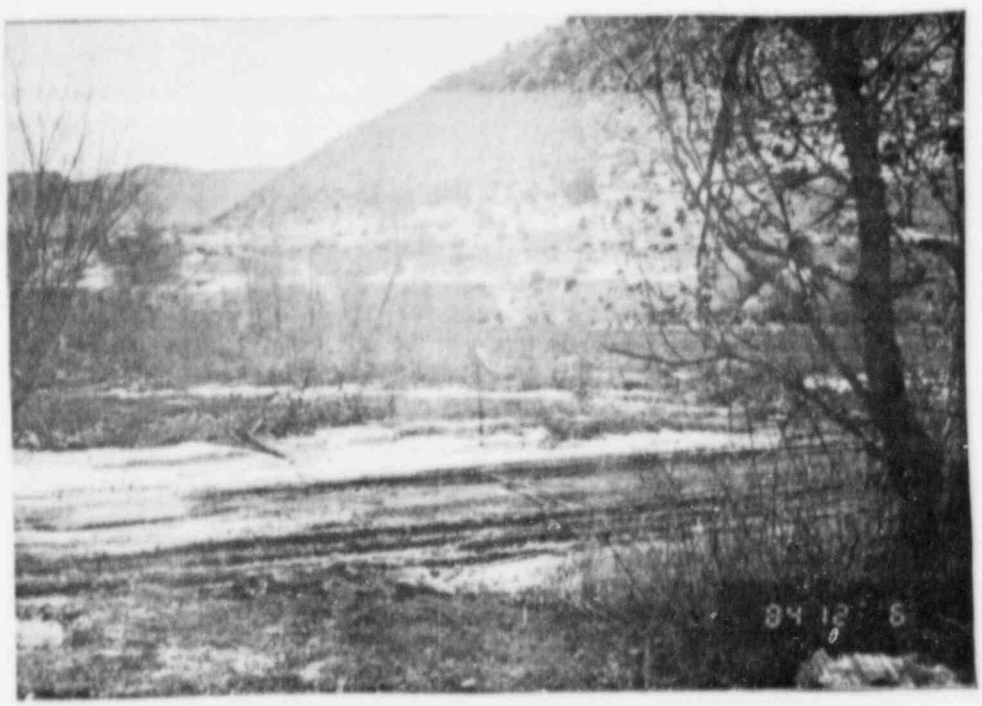
MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-202-010 REV A

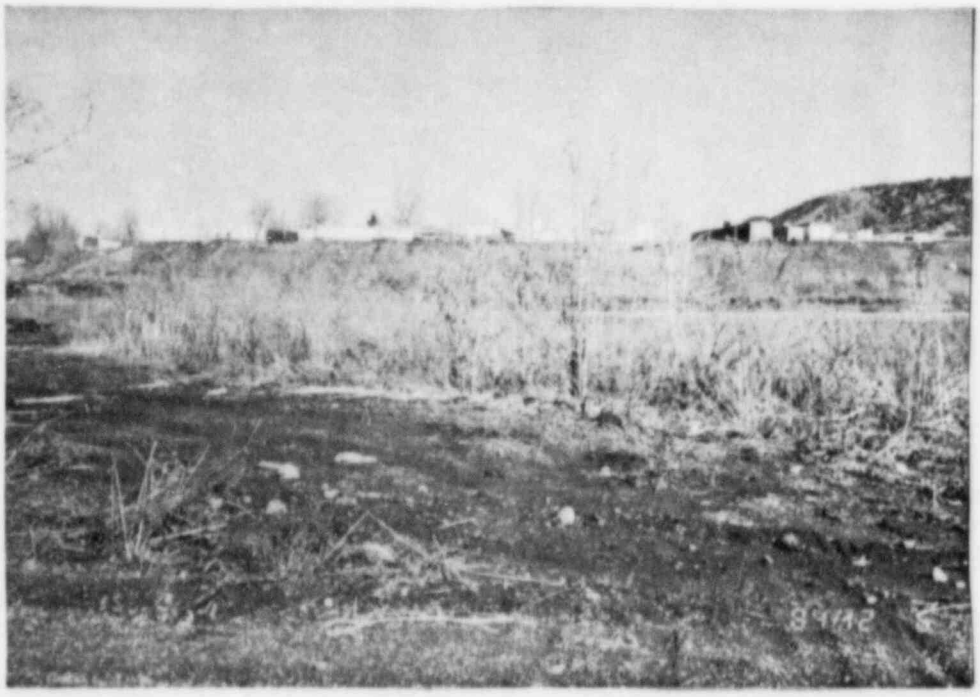
DATE	REVISIONS	DRAWN BY	CHECKED BY	APPROVAL QA	APPROVAL DH	PROJ ENG	APPROVAL DOE
2/20/90	FINAL REA SUBMITTAL	VDL	VCD	VCD		VCD	—

Park Area Looking Northwest



Park Area Looking West

Figure 2.3 Property Photos



Park Area Looking East

Park Area Looking South West

Figure 2.4 Property Photos

3.0 RADIOLOGICAL SURVEY AND ASSESSMENT

3.1 Introduction

A radiological survey of the proposed Gateway Park area was conducted to determine, before actual construction begins, if contaminated materials in excess of the EPA standards are present at this property. No buildings are presently on the property.

3.2 Gamma Exposure Rate Survey

3.2.1 Survey Method

The park area was surveyed in accordance with the RAC UMTRA Procedure 019. The survey was made on a 25' x 25' grid, with additional survey points in regions where elevated readings were found.

3.2.2 Survey Results

Surface gamma readings on the property, as shown in Figure 3.1, range from 15 to 35 micro R/hr. This may be compared with the background for the Durango site of about 12 micro R/hr.

3.3 Borehole Survey

3.3.1 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 monitored in compliance with the RAC UMTRA Procedure 019. Large rocks and trash were found in most of the holes augered; this made penetration below the contamination very difficult.

3.3.2 Survey Results

Contamination was found in 9 of the 21 holes augered. The location and depth of the contamination is described in Table 3.1 and is shown in Figure 3.1.

3.4 Estimated Extent of Contamination

Three distinct areas of contamination were identified in the survey. Area A has an estimated depth of contamination of 30 inches below the surface but it may be deeper closer to the river.

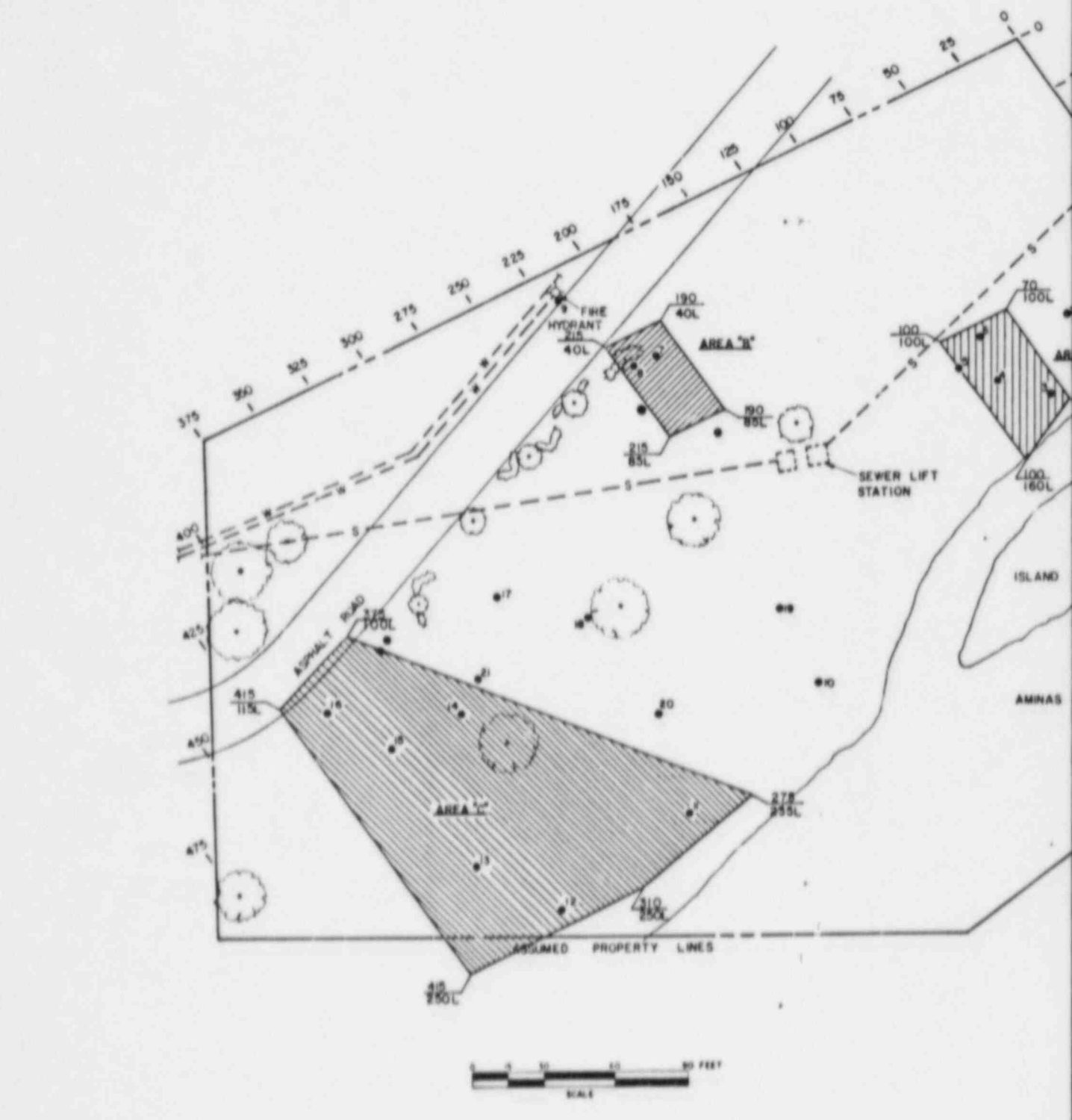
Area B has an estimated depth of 6 inches.

The largest of the three contaminated areas in the park region is Area C. The estimated depth of contamination in this Area is 12 inches, with possibly some pockets of contamination as deep as 24 inches.

It should be observed that the proposed building area of the Gateway Park is not in a contaminated area, so that construction there could proceed, if desired, before remedial action at the three areas of contamination is completed.

Table 3.1
BOREHOLE SURVEY
Property DU-202

HOLE	CONTAMINATION DEPTH
1	None
2	None
3	0-36"+*
4	0-24"*
5	None
6	12-30"*
7	0-12"*
8	None
9	None
10	None
11	12-24"
12	0-18"
13	None
14	0-12"
15	0-12"
16	0-18"
17	None
18	None
19	None
20	None
21	None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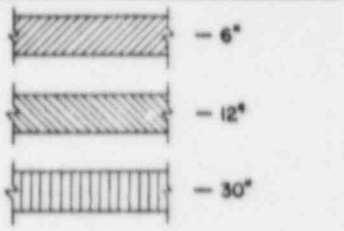
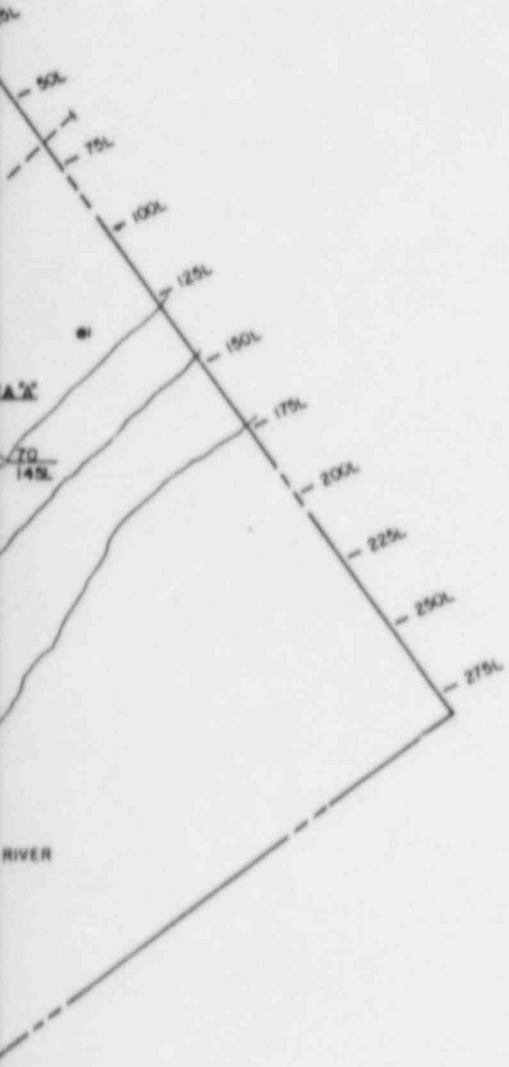
100
125
150
175
200
225
250
275
300
325
350
375
400
425
450
475
FIRE HYDRANT
190
40L
215
40L
AREA "B"
190
85L
215
85L
SEWER LIFT STATION
70
100L
100
100L
100
160L
ISLAND
AMINAS
ASPHALT ROAD
345
100L
415
115L
AREA "C"
275
255L
310
250L
410
250L
ASSUMED PROPERTY LINES
SCALE
FEET

LEGEND

④4 AUGER HOLE DESIGNATION

ESTIMATED DEPTH OF CONTAMINATION





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REVIEWED					
RECOMMENDED					
APPROVED	DATE	DOE PROJECT MANAGER	DATE	DOE PROJECT ENGINEER	DATE
NR		NR		NR	

FIGURE 5.1

RADIOLOGICAL SURVEY DATA DU-202

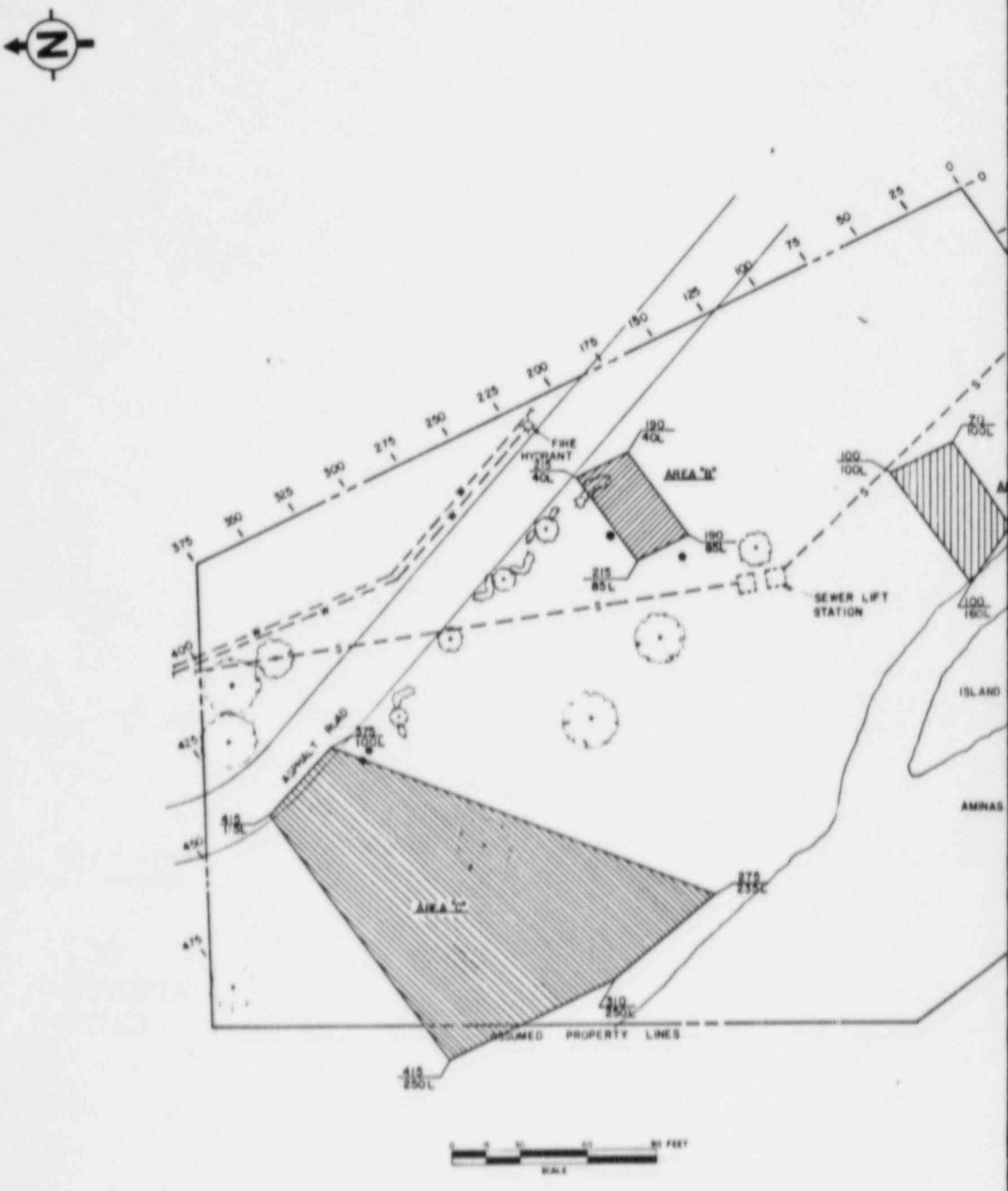
DURANGO, COLORADO
URANIUM MILL TAILINGS REMEDIAL ACTION PROJECT

MORRISON KNUDSEN

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. DU-202-015 REV. A

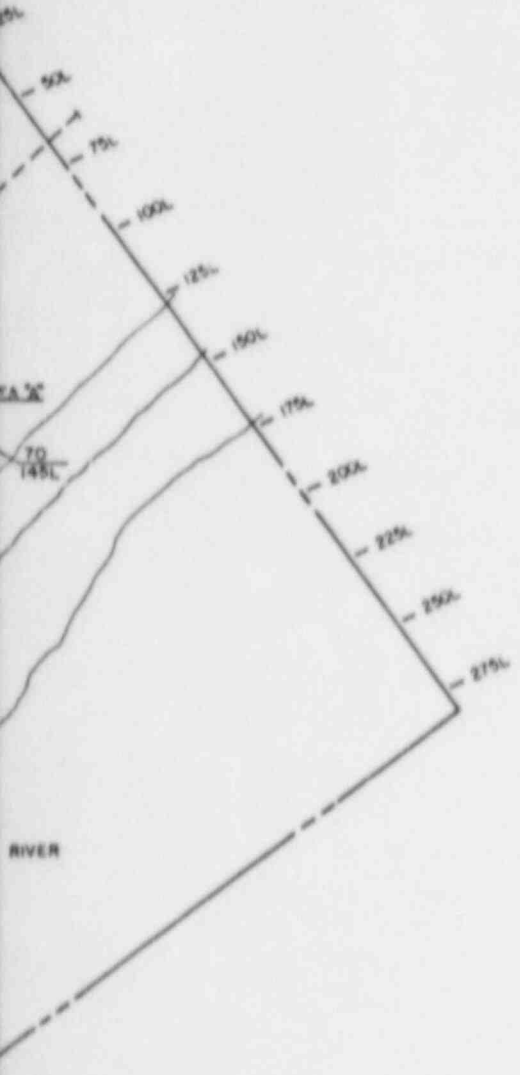
DATE	REVISIONS	VOL	DRAWN BY	CHECKED BY	APPROVED QA	APPROVED DA	PROJ ENG	APPROVED DOE
10/30/85	FINAL REA SUBMITTAL							


N
FIRE HYDRANT
AREA "B"
SEWER LIFT STATION
ISLAND
AMINAS
AREA "C"
ASSUMED PROPERTY LINES
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——	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-202.

   SECTION 02110
   CLEARING AND GRUBBING

   SECTION 02130
   CONTAMINATED MATERIAL REMOVAL

   SECTION 02200
   EXCAVATION AND BACKFILL

   SECTION 02500
   PAVING AND SURFACING

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"

- EXCAVATE AREA "A" TO A DEPTH OF 30 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL AND REGRADE TO ORIGINAL CONDITION

AREA "B"

- REMOVE AND REPLACE TREE WITH SAME TYPE AND SIZE AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.
- EXCAVATE AREA "B" TO A DEPTH OF 6 INCHES.
- BACKFILL EXCAVATED AREA WITH COMMON FILL AND REGRADE TO ORIGINAL CONDITION.

AREA "C"

- REMOVE AND REPLACE TREE WITH SAME TYPE AND SIZE AS APPROVED BY CONTRACTOR'S REPRESENTATIVE.
- EXCAVATE AREA "C" TO A DEPTH OF 12 INCHES. CONTRACTOR'S REPRESENTATIVE TO RESURVEY. IF FURTHER CONTAMINATION EXISTS, EXCAVATE AS DIRECTED BY CONTRACTOR'S REPRESENTATIVE.
- BACKFILL EXCAVATED AREA WITH COMMON FILL. TOP WITH 6 INCHES OF AGGREGATE BASE COURSE IN ASPHALT AREA.
- REPAVE ASPHALT AREA WITH 4 INCH THICK ASPHALT.

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1	[illegible]	FINAL REA SUBMITTAL	VDL	VDL	[illegible]	[illegible]	[illegible]	—

U. S. DEPARTMENT OF ENERGY
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DESIGNED/DRAWN	CHECKED	APPROVED	RECOMMENDED	APPROVED
VDL	[illegible]	[illegible]	[illegible]	[illegible]

FIGURE 4.1

EXCAVATION & RESTORATION PLAN DU-202

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-202-020 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-202:

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:

- Excavate contaminated materials to the depth shown in Figure 4.1.

- Backfill excavated areas with common fill.

- Repave road in Area "C" with a 6 inch aggregate base course and a 4 inches of asphalt.

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 1984 dollars. It is anticipated that the time required for the subcontractor to complete the work will be 3 to 5 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 $12,300.00.

Table 4.1
OPTION 2 COSTS

Activity	Unit Price	Quantity	Estimated Cost
Excavation (Mass)	4.00	674 cy	2696.00
Remove Trees	100.00	2 ea	200.00
Common Backfill	7.20	670 cy	4824.00
Aggregate Base Course	13.05	4 cy	52.20
Asphalt	6.00	23 sy	138.00
Replace Tree	300.00	2 ea	600.00

Subtotal	8510.20
5% Subcontractor's Contingency	425.51
20% Overhead and Profit	1702.04
Subtotal	10637.75
15% Contingency	1595.66
Total (Rounded)	12300.00

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 02110	CLEARING AND GRUBBING	X	
SECTION 02130	CONTAMINATED MATERIAL REMOVAL	X	
SECTION 02200	EXCAVATION AND BACKFILL	X	
SECTION 02500	PAVING AND SURFACING	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-202-020	Excavation & Restoration DU-202

APPENDIX A

SURVEY DATA LOGS

MORRISON KNUDSEN

DU202

OUTDOOR GAMMA SCREENING SURVEY DATA SHEET

DU-202

LOGGING CREW: ERNEST COUCH
LEVEN BENALLY, JR
EDWARD SCHULTZ

SHEET 1 OF 4 PAGE 1

DATE: JUNE 12, 1984

PROPERTY ID: GATEWAY PARK

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+00L	19740 18540	E+200+25L	18310 16460	0+00+75L	20300 18300	0+00+200L	18950 19410
0+00+00L	20270 21200	E+225+25L	17750 18520	0+00+75L	19940 19260	0+00+225+100L	20620 20750
0+00+00L	20000 19460	E+250+25L	18350 17760	0+00+75L	19250 18440	0+00+250+100L	23230 24840
0+00+00L	20450 21380	E+275+25L	19820 19750	0+00+75L	23250 22440	0+00+275+100L	24680 28370
0+00+00L	22240 21210	E+300+25L	16120 16330	0+00+100L	19390 18490	0+00+300+100L	22850 23890
0+00+00L	19430 20490	E+325+25L	16850 15780	0+00+125L	18140 18210	0+00+325+100L	16940 20540
0+00+00L	17940 17020	E+350+25L	17530 15810	0+00+150L	19310 17820	0+00+350+100L	18140 20470
0+00+00L	18520 17610	E+375+25L	16450 16250	0+00+175L	21040 19740	0+00+375+100L	16600 14850
0+00+00L	17630 17670	E+400+25L	18540 18040	0+00+200L	18890 19300	E+400+100L	18000 19170
0+00+00L	15460 16890	E+25+50L	28240 28670	0+00+225+75L	27970 25350	E+25+125L	28380 23610
0+00+00L	15410 15430	E+50+50L	22220 20640	0+00+250+75L	23630 23470	E+50+125L	16460 26290
0+00+00L	14690 13740	E+75+50L	23240 21440	0+00+275+75L	25350 24170	E+75+125L	31240 34890
0+00+00L	14890 15870	E+100+50L	17960 18670	0+00+300+75L	18130 19650	E+100+125L	23310 28260
0+00+00L	14790 14780	E+125+50L	19640 20210	0+00+325+75L	17840 16890	E+125+125L	21150 20380
0+00+00L	17030 16640	E+150+50L	21150 18680	0+00+350+75L	15190 17880	E+150+125L	19700 19320
0+00+00L	21820 20890	E+175+50L	19750 20480	0+00+375+75L	18540 15760	E+175+125L	21830 18660
0+00+25L	23490 21750	E+200+50L	27450 23890	0+00+400+75L	28420 23410	E+200+125L	19450 19440
0+00+25L	24490 20440	E+225+50L	28400 25470	0+00+425+75L	21040 23650	E+225+125L	20250 23700
0+00+25L	20650 20700	E+250+50L	20360 19400	0+00+450+75L	19930 23020	E+250+125L	24780 28030
0+00+25L	19840 19570	E+275+50L	17940 19370	0+00+475+75L	23540 22450	E+275+125L	28670 30650
0+00+25L	21340 18130	E+300+50L	17450 17900	0+00+500+75L	18520 19670	E+300+125L	26420 26470
0+00+25L	19820 18540	E+325+50L	18360 17680	0+00+525+75L	19110 18330	E+325+125L	21410 22290
0+00+25L	19250 17690	E+350+50L	17650 16320	0+00+550+75L	18770 18440	E+350+125L	24760 23810
0+00+25L	17210 18720	E+375+50L	18220 17480	0+00+575+75L	17870 18330	E+375+125L	23750 24780

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

VP-04A

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

LOGGING CREW: E Couch
E Schultz
L Benally

SHEET 2 OF 4 PAGE 2

DATE: 6-13-84

PROPERTY ID: Gateway Park
Durango, Co.

INSTRUMENT ID NO.: Ludlum 2220 #31972 4/4410

BACKGROUND CALCULATION:

#1 _____ + #2 _____ + #3 _____ = _____ ÷ 3 = 11504 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+400+125L	36470 / 31720	0+400 +175L	20340 / 23230	0+425 +350L	24010 / 23860	0+90 +120L	28200
0+75 +145L	26490 / 22750	0+200 +300L	18200 / 17700	0+90 +125L	28620	0+85 +120L	28550
0+100 +150L	20520 / 18200	0+225 +200L	19510 / 19530	0+35 +125L	29700	0+80 +120L	33860
0+125 +150L	20620 / 18460	0+250 +200L	22180 / 23330	0+40 +125L	27080	0+50 +115L	23360
0+150 +150L	20370 / 19980	0+275 +200L	32170 / 30750	0+25 +120L	23150	0+55 +125L	22520
0+175 +150L	19490 / 18920	0+300 +200L	33370 / 32750	0+30 +120L	25450	0+90 +115L	21080
0+200 +150L	36280 / 32720	0+325 +200L	35760 / 31160	0+38 +120L	27280	0+70 +115L	23860
0+225 +150L	26280 / 24720	0+350 +200L	52520 / 37500	0+40 +120L	32430	0+100 +110L	21500
0+250 0+150L	24530 / 23070	0+375 +200L	44850 / 34160	0+50 +120L	29240	0+95 +115L	23920
0+275 +150L	47490 / 32010	0+400 +200L	29140 / 27920	0+55 +135L	27090	0+90 +110L	26310
0+300 +150L	26340 / 25410	0+225 +225L	17370 / 18490	0+60 +125L	26710	0+85 +110L	23020
0+325 +150L	24750 / 23110	0+250 +225L	20310 / 20180	0+65 +125L	24070	0+75 +110L	22620
0+350 +150L	41340 / 34160	0+275 +225L	21530 / 20830	0+65 +120L	23840	0+200 +45L	24770
0+375 +150L	38540 / 34790	0+300 +225L	21800 / 21630	0+60 +120L	21780	0+200 +55L	20730
0+400 +150L	32490 / 30360	0+325 +225L	23440 / 23320	0+55 +120L	28710	0+200 +60L	20340
0+175 +125L	21810 / 19710	0+350 +225L	32360 / 32400	0+50 +120L	31910	0+205 +50L	22980
0+200 +125L	18360 / 18210	0+375 +225L	44410 / 33150	0+50 +115L	31540	0+210 +60L	33870
0+225 +125L	22320 / 22220	0+400 +225L	34090 / 31480	0+55 +115L	32120	0+210 +45L	21870
0+250 +125L	30490 / 29450	0+425 +225L	33350 / 27810	0+60 +115L	30680	0+210 +60L	19710
0+275 +125L	46320 / 32540	0+300 +250L	19040 / 15230	0+65 +115L	30107	0+210 +65L	21520
0+300 +125L	28080 / 26930	0+325 +250L	19440 / 20310	0+70 +115L		0+220 +55L	31490
0+325 +125L	30340 / 29180	0+350 +250L	21070 / 21950	0+80 +125L	23550	0+230 +75L	20960
0+350 +125L	32668 / 29720	0+375 +250L	22640 / 24410	0+65 +125L	25410	0+225 +75L	27540
0+376 +125L	30210 / 28870	0+400 +250L	28440 / 26570	0+90 +125L	21810	0+215 +75L	24470

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

VP-04A

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

LOGGING CREW: E Couch
L Benally
E Schultz

SHEET 3 OF 4 PAGE 3

DATE: 6-13-84

PROPERTY ID: Rotary Park
Durango, Co.

INSTRUMENT ID NO.: Ludlum 220 #31922 w/4410

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+262.5 +187.5L	28090	0+325 +162.5L	53130	0+225 +137.5L	31140	0+211.5 +260L	18200
0+250 +87.5L	32480	0+337.5 +162.5L	34640	0+237.5 +137.5L	34020	0+237.5 +260L	26620
0+237.5 +87.5L	18780	0+350 +162.5L	35540	0+262.5 +137.5L	35270	0+262.5 +260L	23080
0+225 +87.5L	17400	0+362.5 +162.5L	32000	0+281.5 +137.5L	28080	0+287.5 +260L	46400
0+237.5 +100L	31104	0+375 +162.5L	36090	0+312.5 +137.5L	30140	0+312.5 +260L	50870
0+262.5 +100L	29550	0+387.5 +162.5L	26640	0+337.5 +137.5L	25910	0+337.5 +260L	36170
0+262.5 +112.5L	29170	0+400 +162.5L	23470	0+362.5 +137.5L	41070	0+362.5 +260L	42080
0+250 +112.5L	27470	0+581.5 +150L	40690	0+387.5 +137.5L	21590	0+387.5 +260L	35300
0+237.5 +112.5L	26200	0+400 +137.5L	39410	0+381.5 +187.5L	25410	0+387.5 +260L	19050
0+225 +112.5L	23280	0+362.5 +137.5L	35740	0+375 +187.5L	25580	0+375 +281.5L	45710
0+237.5 +125L	29650	0+375 +137.5L	37360	0+362.5 +187.5L	42580	0+362.5 +212.5L	31300
0+262.5 +125L	25000	0+362.5 +137.5L	34810	0+350 +187.5L	39800	0+350 +212.5L	25090
0+262.5 +137.5L	37380	0+362.5 +150L	41180	0+337.5 +187.5L	31050	0+337.5 +212.5L	31930
0+250 +137.5L	29790	0+350 +137.5L	40880	0+325 +187.5L	39760	0+325 +212.5L	31590
0+237.5 +137.5L	31620	0+337.5 +137.5L	33180	0+312.5 +187.5L	32270	0+312.5 +212.5L	27910
0+225 +137.5L	27410	0+312.5 +150L	35900	0+300 +187.5L	22080	0+300 +212.5L	31540
0+212.5 +162.5L	27730	0+325 +137.5L	20980	0+287.5 +187.5L	33580	0+287.5 +212.5L	29720
0+187.5 +162.5L	35630	0+312.5 +137.5L	23700	0+275 +187.5L	33140	0+275 +212.5L	34130
0+250 +162.5L	33220	0+300 +137.5L	30990	0+262.5 +187.5L	28650	0+262.5 +212.5L	23970
0+262.5 +162.5L	34920	0+287.5 +137.5L	33480	0+250 +187.5L	30220	0+250 +212.5L	24360
0+275 +162.5L	26480	0+275 +137.5L	40480	0+237.5 +187.5L	25260	0+237.5 +212.5L	24270
0+287.5 +162.5L	27510	0+262.5 +137.5L	34230	0+225 +187.5L	24320	0+225 +212.5L	23240
0+300 +162.5L	36780	0+250 +137.5L	26090	0+212.5 +187.5L	21000	0+337.5 +225L	19380
0+312.5 +162.5L	29480	0+237.5 +137.5L	25090	0+200 +187.5L	18390	0+262.5 +225L	21400

REMARKS: All Readings are in Counts per Minute (cpm)
Top - are Contact Measurements
Bottom - are 1 meter above Ground Level.

MORRISON KNUDSEN

OUTDOOR GAMMA SCREENING
SURVEY DATA SHEET

LOGGING CREW: Conde
Benally
Schultz

SHEET 4 OF 4 PAGE 4

DATE: 6-13-84

PROPERTY ID: Gateway Park

INSTRUMENT ID NO.: Ludlum 2220 #31973

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+287.5 +2.5L	26600	0+50 +12.5L	21770				
0+312 +2.5L	29970	0+62.5 +12.5L	19860				
0+337.5 +2.5L	30570	0+75 +12.5L	32080				
0+362.5 +2.5L	39700	0+87.5 +12.5L	25090				
0+387.5 +2.5L	36690	0+75 +62.5L	20490				
0+387.5 +237.5L	36390	0+87.5 +62.5L	17230				
0+375 +237.5L	42480	0+75 +87.5L	18650				
0+362.5 +237.5L	31260	0+62.5 +125L	21850				
0+350 +237.5L	35650						
0+337.5 +237.5L	25340						
0+325 +237.5L	24190						
0+312.5 +237.5L	27790						
0+300 +237.5L	21430						
0+287.5 +237.5L	19080						
0+275 +237.5L	20280						
0+287.5 +250L	19060						
0+312.5 +250L	22060						
0+337.5 +250L	22810						
0+362.5 +250L	26980						
0+387.5 +250L	23510						
0+00 +12.5L	21190						
0+12.5 +12.5L	53500						
0+25 +12.5L	17870						
0+37.5 +12.5L	22010						

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

VP.04A

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: ERNIE COUCH, LEVON BENALLY, JR, EDWARD SCHULTZ

INSTRUMENT ID NO. LUDLUM 2220 # 31982

SHEET 1 OF 6 PAGE 1

DATE: 6-13-84

PROPERTY ID: GATEWAY PARK

AREA: DURANGO, COLO.

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+25+125L		HOLE ID: 0+50+112.5L		HOLE ID: 0+75+140L		HOLE ID: 0+90+125L	
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"	27880	0"	32290	0"	31450	0"	31250
6"	35500	6"	39840	6"	43950	6"	45130
12"	42220	12"	35980	12"	54580	12"	51630
18"	36190	18"	28380	18"	64290	18"	48180
24" 22	34570	24"	23750	24"	55620	24"	36130
30"		30"		30"	54190	30"	
36"		36"		36"	53530	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 HOLES DRILLED AS DEEP AS POSSIBLE
TRASH AND ROCKS PREVENTED DRILLING TO DEPTH
BACKGROUND MEASUREMENTS = 23,000 CPM

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: ERNIE COUCH
LEVON BENALLY, JR
EDWARD SCHULTZ

SHEET 2 OF 6 PAGE 2
DATE: 6-13-84
PROPERTY ID: GATEWAY PARK
AREA: Durango, Colorado

INSTRUMENT ID NO. LUDLUM 2220 #31982

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+60 +112.5L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	28580
6"	37385
12"	31870
18"	26660
24"	24210
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(6)
HOLE ID: 0+85+105L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	23710
6"	32620
12"	29840
18"	48640
24"	48490
30"	46350
~~36~~ 34	29170
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(7)
HOLE ID: 0+200+52L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	28040
6"	44500
12"	40980
18" 1/4	30880
24"	
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(8)
HOLE ID: 0+210+52L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	20590
6"	23990
12"	22880
18"	21540
24"	
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

REMARKS: ALL HOLES DRILLED UNTIL LARGE ROCK OR BOULDERS AND TRASH PREVENTED FURTHER DRILLING BACKGROUND MEASUREMENTS ≈ 23,000 CPM

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: Ernest Couch
Levon Benally, Jr
Edward Schultz

INSTRUMENT ID NO. Ludlum 2220 # 31982

SHEET 3 OF 6 PAGE 3

DATE: June 13, 1984

PROPERTY ID: Gateway Park

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: 0+220+230L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	19630
6"	22100
12"	20970
~~18"~~ 13	20180
24"	
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(10)

HOLE ID: 0+225+205L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	21180
6"	26740
12"	37700
18"	35470
24"	24040
~~30"~~ 27	19380
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(11)

HOLE ID: 0+300+230L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	21170
6"	24160
12"	35620
18"	52840
24"	45940
30"	36020
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(12)

HOLE ID: 0+367.5+237.5L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	29880
6"	43740
12"	52810
18"	36810
24"	26530
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

REMARKS: All Holes Drilled until Large Rock or Boulders and trash prevented further drilling. Background Measurements = 23,000 cpm.

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: Ernest Gulch
Levon Benally, Jr.
Edward Schultz

INSTRUMENT ID NO. Ludlum 2220 # 31982

SHEET 4 OF 6 PAGE 4

DATE: June 13, 1984

PROPERTY ID: Gateway Park

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: 0+387.5+210L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

(14) HOLE ID: 0+354+150L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

(15) HOLE ID: 0+387.5+150L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

(16) HOLE ID: 0+400+125L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN	DEPTH	COUNTS/.1MIN
SURFACE		SURFACE		SURFACE		SURFACE	
0"	29400	0"	46490	0"	43030	0"	40330
6"	34760	6"	59460	6"	48710	6"	55880
12"	33960	12"	43950	12"	43070	12"	55600
18"	31290	18"	30370	~~18~~ 15	33960	18"	51070
~~24~~ 21	29990	~~24~~ 21	26990	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 Holes Drilled until Large Rock or Boulders and Trash prevented further Drilling. Background Measurements ≈ 23,000 cpm.

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: Ernest Couch
Levon Bennett, Jr
Edward Schultz

INSTRUMENT ID NO. Ludlum 2220 # 31982

SHEET 5 OF 6 PAGE 5

DATE: June 13, 1984

PROPERTY ID: Gateway Park

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.

(17)
HOLE ID: 0+312.5+113.5
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	23120
6"	33390
12"	43330
18"	35790
24"	30160
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(18)
HOLE ID: 287.5+137.5L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	27040
6"	34780
12"	31210
18"	25410
~~24~~ 20	23560
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(19)
HOLE ID: 0+220+170L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	27240
6"	25900
12"	25240
18"	23040
~~24~~ 20	22740
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

(20)
HOLE ID: 0+287+187L
TIME DRILLED:
TIME LOGGED:
SOIL TYPE:

DEPTH	COUNTS/.1MIN
SURFACE	
0"	26950
6"	26680
12"	28630
18"	
24"	
30"	
36"	
42"	
48"	
54"	
60"	
66"	
72"	
78"	
84"	
90"	
96"	

REMARKS: All Holes Drilled until large Rock or Boulders and trash prevented Further Drilling. Background measurements ≈ 23,000 cpm.

MORRISON KNUDSEN

BOREHOLE LOG

LOGGING CREW: Ernest Couch
Levon Bennay, Jr.
Edward Schultz

INSTRUMENT ID NO. Ludlum 2220 #34782

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DATE: June 13, 1984

PROPERTY ID: Gateway Park

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.

(21)

HOLE ID: GL340+40L		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		SURFACE		SURFACE		SURFACE	
0"	27190	0"		0"		0"	
6"	29590	6"		6"		6"	
12"	27990	12"		12"		12"	
18"	22600	18"		18"		18"	
~~24~~ 20	21900	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 Holes Drilled until large Rock or Boulders and trash prevented further Drilling. Background measurement ≈ 23,000 cpm

MORRISON-KNUDSEN COMPANY, INC.

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