

## Department of Energy

Albuquerque Operations Office  
P.O. Box 5400  
Albuquerque, New Mexico 87185-5400

DEC 09 1996

Mr. Joseph J. Holonich, Chief  
Uranium Recovery Branch  
Office of Nuclear Materials Safety  
And Safeguards  
Mail Stop T7J9  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Dear Mr. Holonich:

In accordance with the Uranium Mill Tailings Radiation Control Act of 1978 (Public Law 95-604), the Environmental Protection Agency (EPA) Standards (40 CFR part 192), and the Memorandum of Understanding between the U.S. Department of Energy (DOE) and the U.S. Nuclear Regulatory Commission (NRC) (GM004-85AL26037), two copies of the supplemental standards application for the Slick Rock, Colorado, site gas line right-of-way are submitted for NRC concurrence. This application is being forwarded in advance of the Slick Rock site Completion Report, which is scheduled to be delivered to the NRC in early 1997.

If you have any questions, please contact me at (505) 845-4030.

Sincerely,

J. M. Pape  
Site Manager  
UMTRA Team  
Environmental Restoration Division

Enclosure  
Application for Supplemental Standards

cc:

See page 2

170060  
9612180132 961209  
PDR WASTE  
WM-86 PDR

WM-86  
N204  
1/1

✓ Mr. Joseph J. Holonich

2

DEC 09 1996

cc w/enclosure:

C. Abrams, NRC

P. Oliver, CDPHE - Grand Junction

W. Naugle, CDPHE

cc w/o enclosure:

S. Hamp, ERD

R. D'Arezzo, RAC

E. Artiglia, TAC

W. Migdal, TAC

APPENDIX K

RECOMMENDATION FOR APPLICATION OF SUPPLEMENTAL STANDARDS

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RECOMMENDATIONS

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Attachment A	- Right of Way and Easement
Attachment B	- KN Energy Correspondence Regarding Gas Line Remediation (dated March 20, 1996)
Attachment C	- MK-Ferguson's Response to KN Energy Correspondence (dated March 29, 1996)
Attachment D	- Telecon with Umetco Regarding KN Energy's Position on Remediation

EXHIBITS

Request for Comments from the Owner  
Comments from the Owner (pending)



## K.1 Applicable EPA Criteria

Supplemental Standards Recommendation is in accordance with the regulations set by the Environmental Protection Agency (EPA) in 40 CFR 192. The potential and applicable criteria as stated in 40 CFR 192.21 are as follows:

- X        a) Remedial action would pose a clear and present risk of injury to workers or to members of the public
- b) Remedial action would directly cause excessive environmental harm
- X        c) The cost of remedial action at the vicinity site is unreasonably high relative to long-term benefits
- d) The cost of remedial action for cleanup of a building is unreasonably high relative to benefits
- e) There is no known remedial action
- f) Radionuclides other than Radium-226 and its decay products are present

An "X" indicates the appropriate subsection(s) for this recommendation.

## K.2 Introduction

This Supplemental Standards Recommendation pertains to the mill tailings contamination within 10 feet either side of a natural gas pipeline that crosses through the Union Carbide(UC) processing site. The attached drawings depict the deposits of tailings in the areas for which Supplemental Standards is being considered. The extent of contamination left along the pipeline Right of Way is approximately 1,730 cubic yards.

### K.2.1 Common Location and Legal Description

The Supplemental Standards Recommendation areas are along the pipeline Right of Way crossing the UC Site. One area starts approximately 100 feet south of the gas plant property (SR-008) and continues south approximately 600 feet, where the pipeline turns east. The second area is on the east side of the site where the pipeline Right of

Way runs adjacent to County Road S8 where the road turns southeast toward the county road bridge. The third area is also on the east side of the site running along the west side of the county road going toward the river. This area is just south of the second area, as described above. These areas encompass approximately 57,000 square feet.

The Right of Way and Easement for the pipeline is included as Attachment 'A'.

K.2.2 Major Physical Features

The area around the Supplemental Standards Areas is the UC Site and has been remediated.

K.2.3 Land Use

The land along the pipeline is not used for any particular purpose currently. The Madame Curie Area may be used from time to time by the occasional river rafter or camper. The land use is not expected to change in the future.

K.2.4 Owner's Input

The owner will be notified and input will be summarized in this section, when received.

K.3 Radiological Data

Appendix [REDACTED] contains the radiological data that is relevant to this Supplemental Standards Recommendation.

The radiological conditions within the Supplemental Standards Recommendation areas are summarized as follows:

- a. Exposure rate range at one meter over contaminated areas - 5 to 14  $\mu\text{R/hr}$ .
- b. Average exposure rate at one meter over contaminated area(s) - 6  $\mu\text{R/hr}$ .

Background for the Slick Rock locale is 10  $\mu\text{R/hr}$ . All data reported includes background.

K.3.1 Health Risk Analysis

The analysis of health risks is presented in

Way runs adjacent to County Road S8 where the road turns southeast toward the county road bridge. The third area is also on the east side of the site running along the west side of the county road going toward the river. This area is just south of the second area, as described above. These areas encompass approximately 57,000 square feet.

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K.3.1 Health Risk Analysis

The analysis of health risks is presented in

Table K.T1. Exposure potentials are compared with two criteria as follows:

- a. Long-term exposures are examined based on an allowable exposure rate of 100 mRem per year above background (hereinafter referred to as 100 mRem dose).
- b. Short-term unusual exposures are examined based on an allowable exposure rate of 500 mRem per year above background (hereinafter referred to as 500 mRem dose.).

The maximum gamma dose rate at waist level recommended by the International Commission on Radiological Protection (ICRP, 1977, 1978) in DOE ORDER 5400.5 (March 1990) is 100 mRem dose. This is the dose limit for an individual member of the general public. Doses which exceed 100 mRem dose are acceptable when the higher exposures do not persist for long periods and when the average annual dose over an individual's lifetime is expected to be less than 100 mRem dose. The ICRP and the DOE suggest that dose rates be reduced to "as low as is reasonably achievable", but also state that no annual dose shall exceed 500 mRem dose. The health risk analysis presented in this Recommendation for Supplemental Standards has compared the dose rates measured at waist level with the recommendation of the ICRP and DOE regarding waist level exposures.

The long-term exposure analysis considers three scenarios showing the following:

- a. The required number of hours of continuous exposure to obtain the 100 mRem dose. This scenario is intended to model the exposure received by an individual residing on the site in the extreme case where no time away from the site is considered.
- b. The hours per day of exposure during a continuous one year period required to receive the 100 mRem dose. This scenario is intended to represent a maximum allowable daily exposure by an

individual who occupies the point where the high gamma reading occurs.

- c. The hours per day of exposure during a one year period utilizing week days only (260 days) required to receive the 100 mRem dose. This scenario models the potential exposure that could be received by an individual working in the area the indicated number of hours daily for one year.

The short-term unusual exposure analysis also considers three potential scenarios as follow:

- a. The required number of hours of continuous exposure to obtain the 500 mRem dose. The intent of this scenario is to allow examination of the estimated time of continuous exposure required to receive the allowable dose.
- b. The number of 48-hour temporary occupancy periods in one year necessary to receive a 500 mRem dose. This scenario represents the case where an individual occupies the site for repair work or other short-term purposes.
- c. The number of 24-hour periods of exposure in one year necessary to receive a 500 mRem dose. This scenario considers emergency operations to perform repair work at the site.

The worst case scenario is based on zero background and maximum gamma rates that were measured without consideration of the relative physical location of each.

In every case, the scenarios presented above can be described as unlikely, but possible. The scenarios do not create a model of likely situations, but present data that can be used to evaluate the potential for a health hazard if this Supplemental Standards Recommendation is approved.

The maximum known gamma exposure rate, occurring along the pipeline 550 feet south of the gas plant fence line, is equal to the



worst case scenario. The worst case scenario is defined to be the amount of time per day that an individual would have to occupy the maximum dose rate location to receive 100 mRem in one year. It is highly unlikely for this situation to occur due to both the length of time required and the remote location of the exposure rates.

#### K.4 Remediation Alternatives

Three alternatives are available for all properties. Each alternative may have several options. The evaluation of an alternative action in any area of tailings contamination logically includes consideration of the cost and health risk associated with the available choice. The three alternatives considered are: Complete Remediation, Partial Remediation and Application of Supplemental Standards for materials left in place, or Application of Supplemental Standards for "No Remediation".

##### K.4.1 Alternative 1 - Complete Remediation (All Contaminated Material)

###### K.4.1.1 Work Description

The work required for this alternative is to purge the gas from the line, partial excavation by machine (small backhoe), and hand excavate down to, and around the gas line. If the pressure in the pipeline is not removed the hazards of excavating around the pipeline would be too great. If the pressure is removed from the pipeline, the owner, KN Energy, will have to be compensated for the gas released and potential lost revenue. Additional costs would be incurred for pressure testing the line before putting it back into service. This would raise the overall cost of remediation. Backfill around the pipeline would be hand placed up to an elevation specified by KN Energy, and then backfilled by small backhoe up to final grade and reseeded.

The owner, KN Energy, has not given access to perform this option.

This would require a substantial amount of work and monies compared to the amount of benefits received from remediation.

K.4.1.2 Health Risk Analysis

Health risks in the Supplemental Standards Application area, due to tailings contamination, would be reduced to within the EPA standards.

K.4.1.3 Construction Parameters

Implementation of this alternative would require releasing of existing natural gas from the pipeline, extensive hand labor during excavation and backfill operations, and final restoration of the property.

K.4.1.4 Engineering Data

No areas of contamination which exceed the EPA standards will remain in place. The estimated Subcontractor cost of remedial action work required for this alternative is \$215,317.00. A tabulation of the cost estimate elements is presented in Table K.T2. The estimated volume of contaminated materials to be removed is 4,522 cubic yards. The average cost to remove the tailing would be \$47.62 per cubic yard.

K.4.2 Alternative 2 - Partial Remediation and Application of Supplemental Standards for materials left in place (Remediate top six inches of soil)

K.4.2.1 Work Description

The work involved in this alternative would be to remediate



the top six inches of soil in the areas of consideration. This alternative will remove all the contamination on the surface above the pipeline, but will leave all contaminated material beneath the top six inches down to the pipeline.

K.4.2.2 Health Risk Analysis

Health risks on the surface due to tailings contamination would be reduced to within the EPA standards. Contamination would remain in place below the top six inches of soil.

K.4.2.3 Construction Parameters

Exercising this option would involve removing only the top six inches of soil. The gas in the line would not have to be purged, thus eliminating the need for a pressure test. All hand labor for excavating and backfilling would also be avoided. The top six inches of tailings materials could be removed by machine at a reasonable cost.

K.4.2.4 Engineering Data

No areas of contamination which exceed the EPA standards will remain in place in the top six inches of soil. The amount of contamination exceeding EPA standards remaining in place is 1,730 cubic yards. The estimated Subcontractor cost of remedial action work required for this alternative is \$93,571.00.

A tabulation of the cost estimate elements is presented in Table K.T3. The estimated volume of contaminated materials to be removed is 1,730 cubic yards. The average cost to remove the tailings would be \$54.09 per cubic yard.

K.4.3      Alternative 3 - No Remediation - Application  
              of Supplemental Standards.

K.4.3.1    Work Description

No work is required for this  
alternative.

K.4.3.2    Health Risk Analysis

The health risks associated with  
this alternative are approximated  
in Table K.T1. There is a very low  
probability that allowable gamma  
dose rates will be exceeded based  
on the data present in Table K.T1.

K.4.3.3    Construction Parameters

Construction is not required for  
this alternative.

K.4.3.4    Engineering Data

No cost is associated with this  
alternative. All areas of  
contamination which exceed the EPA  
standards will remain in place.  
The amount of contamination  
exceeding EPA standards to be left  
in place is 4,522 cubic yards.

K.5            Summary

The data in Table K.T1 suggests that there are no  
identifiable significant health risks if this  
Supplemental Standards Recommendation for Partial  
Remediation (Alternative 2) is approved. In the worst  
case, a person would have to occupy the point of high  
gamma exposure for a continuous period of 7143 hours to  
receive a 100 mRem dose. It is highly unlikely for an  
individual to be exposed for the amount of time  
necessary to exceed the recommended annual maximum dose  
of 100 mRem due to both the length of time required and  
the remote location of the exposure rates.

Each alternative examined by this Recommendation can be  
summarized as follows:

Alternative I - Complete Remediation (All Contaminated  
Material)

Pipeline Right of Way

Health Risk - Reduced to within EPA standards

Estimated Construction Cost - \$215,317.00

Approximate Volume of Contaminated Materials  
Removed - 4,522 cubic yards

Approximate Volume of Contaminated Materials  
Remaining - 0 cubic yards

Alternative 2 - Partial Remediation and Application of  
Supplemental Standards for materials left in place  
(Remediate top six inches of soil)

Health Risk - Reduced to within EPA standards  
at surface. Contamination remains below the  
top six inches.

Estimated Construction Cost - \$93,571.00

Approximate Volume of Contaminated Materials  
Removed from Pipeline Right of Way - 2,792  
cubic yards

Approximate Volume of Contaminated Materials  
Remaining Within the 20 Foot Corridor - 1,730  
cubic yards

Alternative 3 - No Remediation - Application of  
Supplemental Standards.

Health Risk - See Appendix K. Table K.T1

Estimated Construction Cost - \$0

Approximate Volume of Contaminated Materials  
Removed - 0 cubic yards

Approximate Volume of Contaminated materials  
Remaining - 4,522 cubic yards

K.6

Recommendations

Alternative 2 - Partial Remediation and Application of  
Supplemental Standards for materials left in place  
(Remediate top six inches of soil) should be applied in  
accordance with 40 CFR 192.21 Criteria A and C (see  
Section K.1).

TABLE K.T1  
HEALTH RISK ANALYSIS  
PROPERTY SR-006

SCENARIO	RESULTS
100 mRem Dose	
A. Required number of hours of continuous exposure to obtain the 100 mRem dose.	7143 hours
B. The hours per day of exposure during a continuous one year period required to receive the 100 mRem dose.	20 hours per day
C. The hours per day of exposure during a one year period utilizing week days only (260 days) required to receive the 100 mRem dose.	A 100 mRem dose could not be reached at 24 hours a day 260 days a year.
500 mRem Dose	
A. The required number of hours of continuous exposure to obtain the 500 mRem dose.	The 500 mRem could not be reached standing at the point of the highest gamma continuously in one year.
B. The number of 48 hour temporary occupancy periods in one year necessary to receive a 500 mRem dose.	The 500 mRem could not be reached standing at the point of the highest gamma continuously in one year.
C. The number of 24-hour periods of exposure in one year necessary to receive a 500 mRem dose.	The 500 mRem could not be reached standing at the point of the highest gamma continuously in one year.

The results are figured from using the point of the highest gamma. A person would have to stand on the point continuously to achieve the dose given.

TABLE K.T2  
COST ESTIMATE FOR ALTERNATIVE 1  
COMPLETE REMEDIATION

ACTIVITY NO.	ACTIVITY	UNIT PRICE	QUANTITY	ESTIMATED COST
001	Machine Excavation (1/2 exc. quantity)	20.00	2,261 cy	\$45,220.00
002	Hand Excavation (1/2 exc. quantity)	28.00	2,261 cy	63,308.00
003	Compacted Common Fill (hand and machine)	10.43	4,522 cy	47,164.00
004	Native Seed, Mulch and Fertilizer	550.00	0.90 ac	495.00
005	Compensation for Depressurizing Line	2,700.00	1 ls	2,700.00
006	Temporary Pipe Shoring, Madam Curie Area	4,000.00	1 ls	4,000.00
007	Out of Service Monthly Fee	1,000.00	3 mo	3,000.00
008	Pressure Test Gas Line	5,000.00	1 ls	5,000.00

Subtotal	\$170,887.00
5% Subcontractor's Contingency	8,544.00
20% Overhead & Profit	<u>35,886.00</u>
Total (Rounded)	\$215,317.00

TABLE K.T3  
COST ESTIMATE FOR ALTERNATIVE 2  
PARTIAL REMEDIATION

RECOMMENDED ALTERNATIVE

ACTIVITY NO.	ACTIVITY	UNIT PRICE	QUANTITY	ESTIMATED COST
001	Machine Excavation (1/2 exc. quantity)	20.00	865 cy	\$17,300.00
002	Hand Excavation (1/2 exc. quantity)	28.00	865 cy	24,220.00
003	Compacted Common Fill (hand and machine)	10.43	1,730 cy	18,043.00
004	Compensation for Depressurizing Line	2,700.00	1 ls	2,700.00
005	Temporary Pipe Shoring, Madam Curie Area	4,000.00	1 ls	4,000.00
006	Out of Service Monthly Fee	1,000.00	3 mo	3,000.00
007	Pressure Test Gas Line	5,000.00	1 ls	5,000.00

Subtotal	\$74,263.00
5% Subcontractor's Contingency	3,713.00
20% Overhead & Profit	<u>15,595.00</u>
Total (Rounded)	\$93,571.00





N 59.500

N 59.000

N 58.500

N 58.000

E 58.000

E 58.300

E 58.500

E 59.000

8" 150 PSI  
10' 0"

GAS PLANT  
AREA  
SEE FIGURE 2



**LEGEND:**

---G---

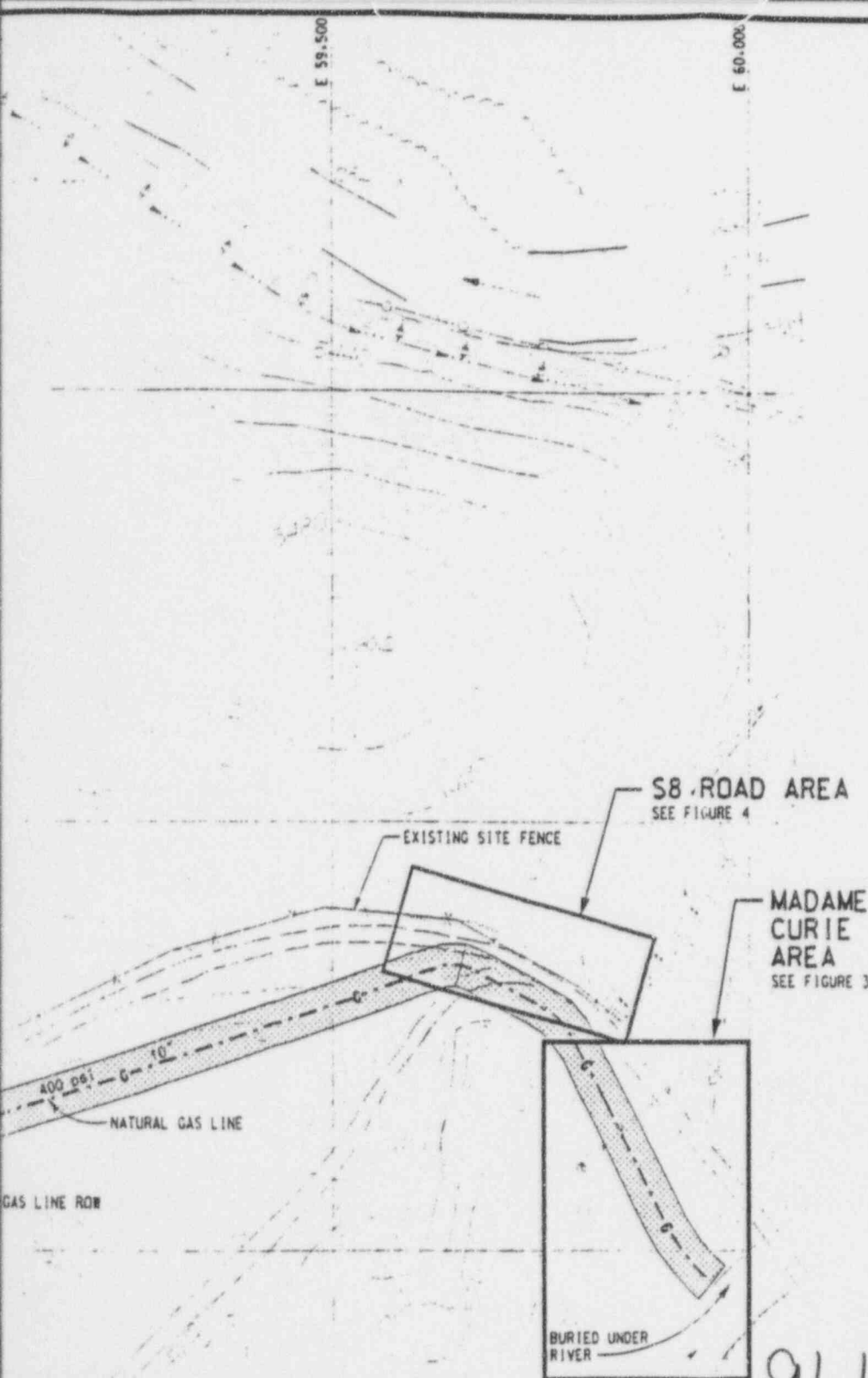
UNDERGROUND HIGH PRESSURE NATURAL GAS LINE, 10" DIAMETER



50' NATURAL GAS LINE RIGHT OF WAY

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APERTURE  
CARD**

Also Available on  
Aperture Card



100 0 100 200  
SCALE FEET

**U. S. DEPARTMENT OF ENERGY**  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

**SUPPLEMENTAL STANDARDS AREAS**



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/GOVERNMENT GROUP  
UMTRA PROJECT  
800 NORTH 4TH ST. SUITE 1700, DENVER, CO 80202

PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

FIGURE 1

REV.



50' ROW

1+03.41

2+00.43

3+00.67

3+93.44

5+06.69

6+58.46

N 58500

5530

25.5

# NOTES

1. CONTOURS SHOWN ARE ORIGINAL GRADE BEFORE REMEDIATION.
2. FINAL SITE GRADES AFTER REMEDIATION ARE SIMILAR TO ORIGINAL GRADES.
3. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELII

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## LEGEND



AREA WITH Ra226 LEVELS ABOVE  
15 pCi/g BELOW TOP 6" OF SOIL

X

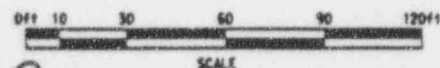
DOSE RATE SURVEY READING LOCATION

2+00.43

CROSS SECTION LOCATION

---G---

UNDERGROUND NATURAL GAS LINE



9612180132-02

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

POST EXCAVATION  
SOIL SAMPLE, RADIATION SURVEY  
GAS PLANT AREA



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL GROUP  
UMTRA PROJECT  
ONE MARKET STREET TOWER, SUITE 400, SAN FRANCISCO, CA 94102

PROJECT NO.

DE-AC04-83AL18796

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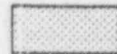
FIGURE 2



### NOTES

1. CONTOURS SHOWN ARE BOTTOM OF EXCAVATION AFTER REMOVAL OF CONTAMINATED SOILS.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND



AREA WITH Rn226 LEVELS ABOVE  
15 pCi/g BELOW TOP 6" OF SOIL

x

DOSE RATE SURVEY READING LOCATION

23+85

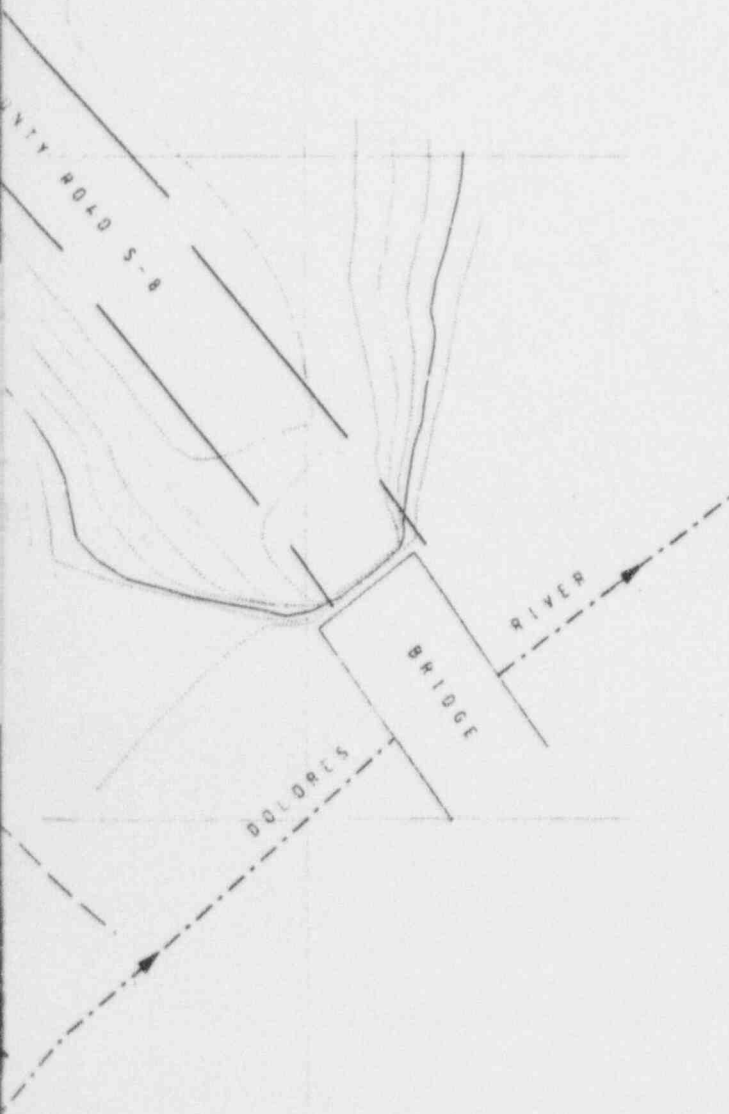
CROSS SECTION LOCATION

---G---

UNDERGROUND NATURAL GAS LINE

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APERTURE  
CARD

Also Available on  
Aperture Card



15 0 15 30  
SCALE FEET

9612180132-03

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

POST EXCAVATION  
SOIL SAMPLE, RADIATION SURVEY  
MADAME CURIE AREA



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL GROUP  
UMTRA PROJECT  
ONE MARKET, STEWART TOWER, SUITE 400, SAN FRANCISCO, CA 94105

PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

FIGURE 3



5410

5460

COUNTY ROAD S-6

A

B

C

G

G

5470

5460



**NOTE**

1. CONTOURS SHOWN ARE ORIGINAL GRADE BEFORE EXCAVATION.

**LEGEND**



AREA WITH Ra226 LEVELS ABOVE  
15 pCi/g BELOW TOP 6" OF SOIL

x

DOSE RATE SURVEY READING LOCATION



CROSS SECTION LOCATION



UNDERGROUND NATURAL GAS LINE

**ANSTEC  
APERTURE  
CARD**

Also Available on  
Aperture Card

9612180132-04

15 0 15 30  
SCALE FEET

**U.S. DEPARTMENT OF ENERGY**  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

**POST EXCAVATION  
SOIL SAMPLE, RADIATION SURVEY  
S-8 ROAD AREA**



**MORRISON KNUDSEN CORPORATION**  
ENVIRONMENTAL GROUP  
**UNTRA PROJECT**

ONE MARKET STREET TOWER, SUITE 400, SAN FRANCISCO, CA 94105

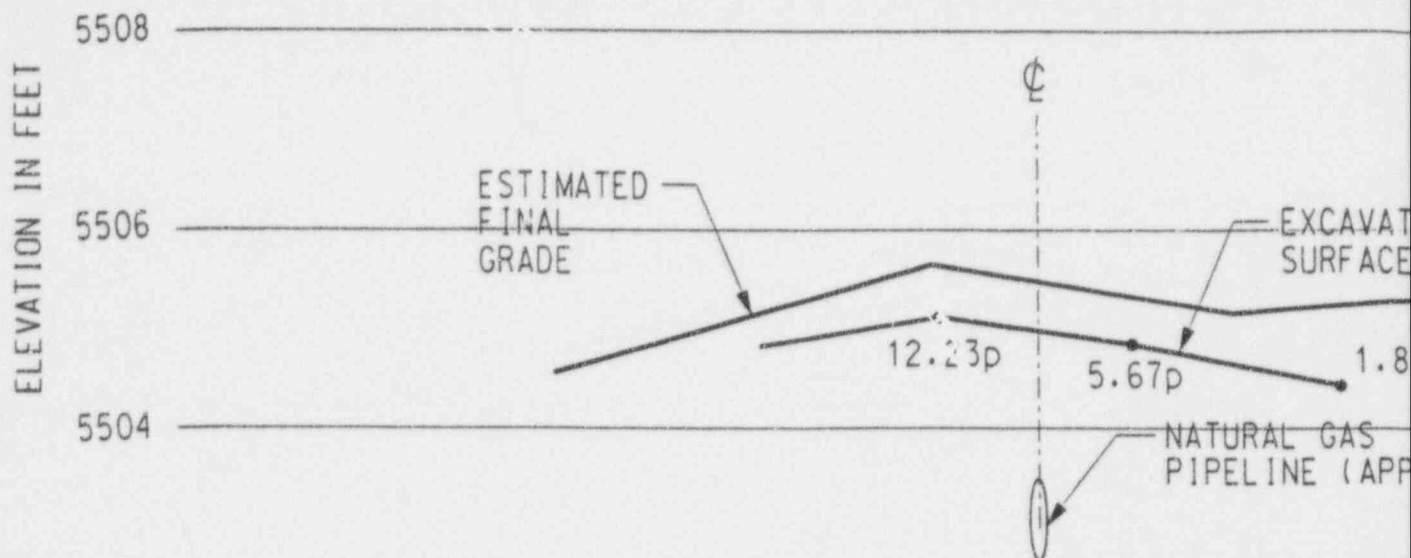
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**DE-AC04-83AL18796**

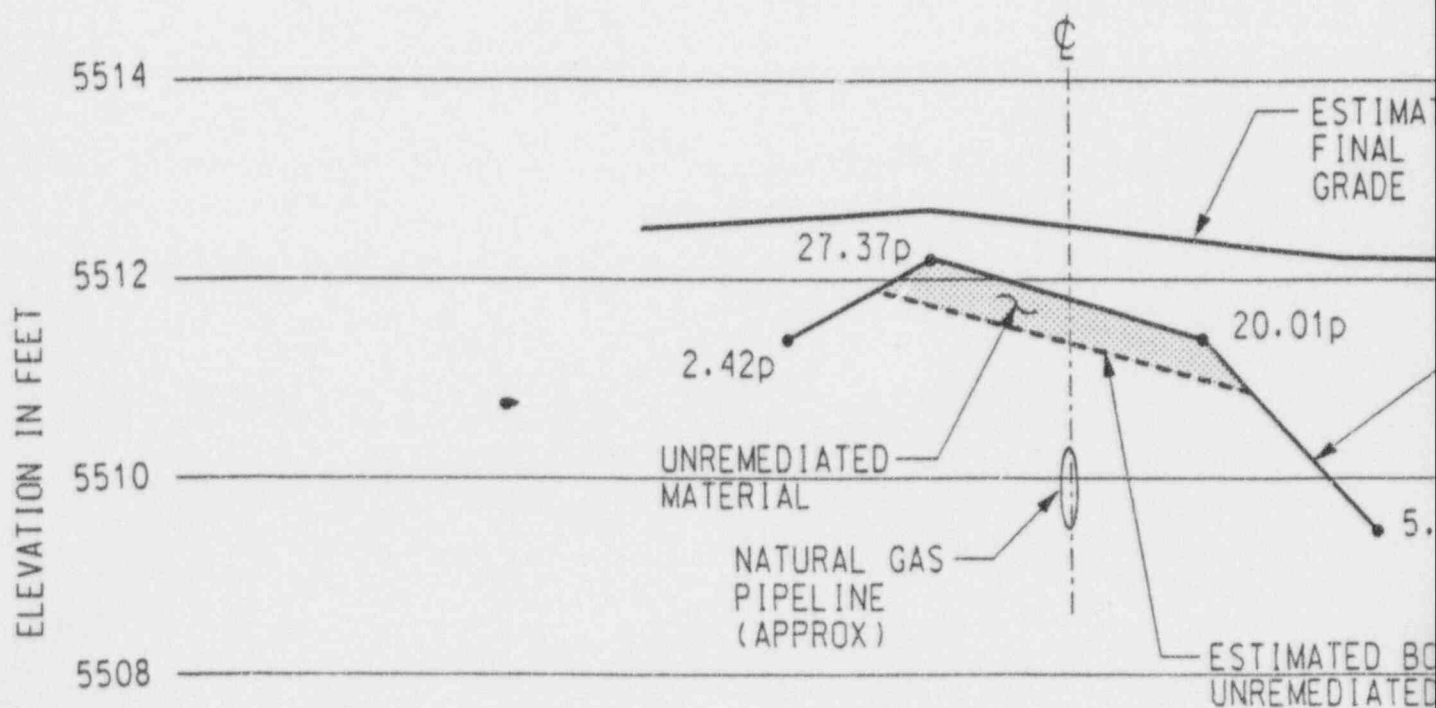
DRAWING NO.

**FIGURE 4**

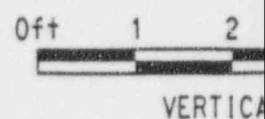
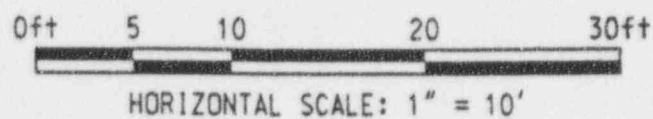




## SECTION 1+03.41



## SECTION 2+00.43



## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

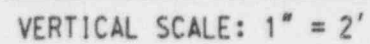
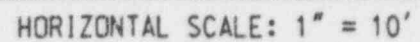
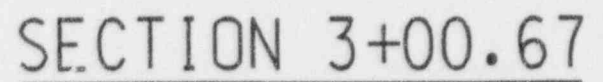
EXCAVATED  
SURFACE

TTOM LIMIT OF  
MATERIAL

9612180132-05

4 6ft  
SCALE: 1" = 2'

U. S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTIONS AT STATION 1+03.41 & STATION 2+00.43	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL GROUP UMTRA PROJECT ONE MARKET STREET TOWER, SUITE 400, SAN FRANCISCO, CA 94105	PROJECT NO. DE-AC04-83AL18796 DRAWING NO. FIGURE 5



## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

GRADE

5520

EXCAVATED  
SURFACE

5518

BOTTOM LIMIT OF  
D MATERIAL

5516

ELEVATION IN FEET

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

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U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 3+00.67



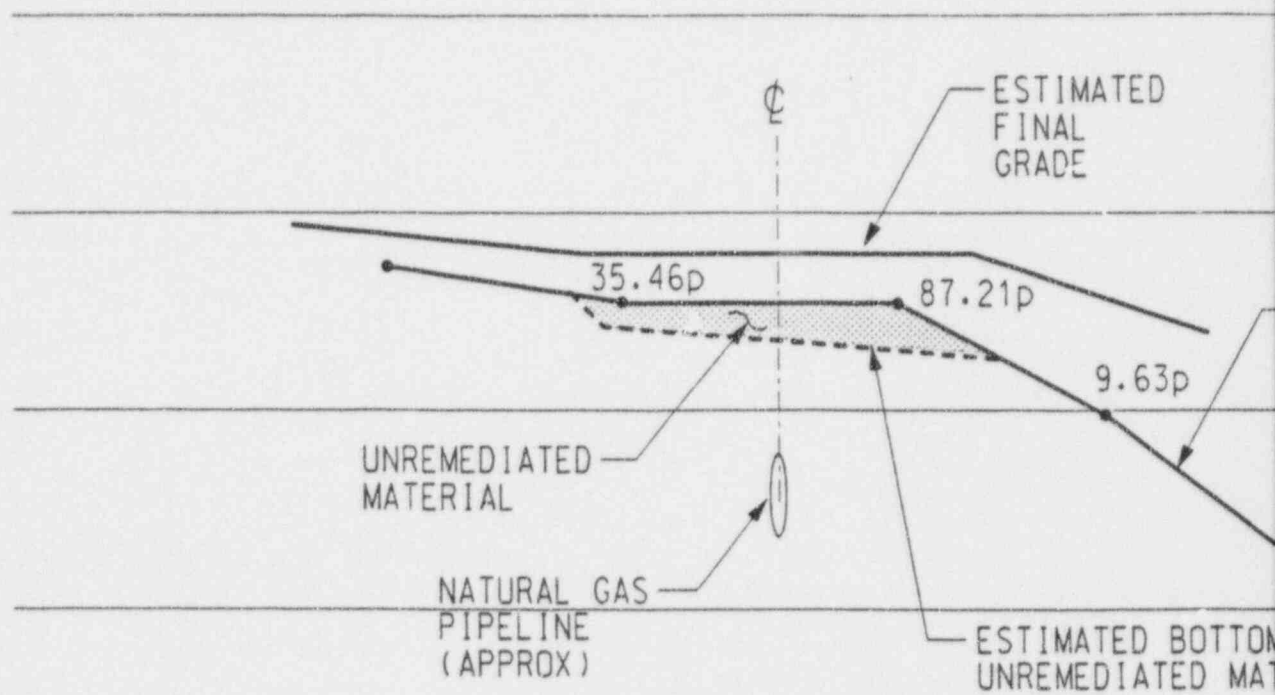
MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL GROUP  
UMTRA PROJECT  
ONE MARKET STREET TOWER, SUITE 400, SAN FRANCISCO, CA 94102

PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

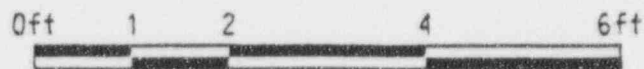
FIGURE 6



## SECTION 3+93.44



HORIZONTAL SCALE: 1" = 10'



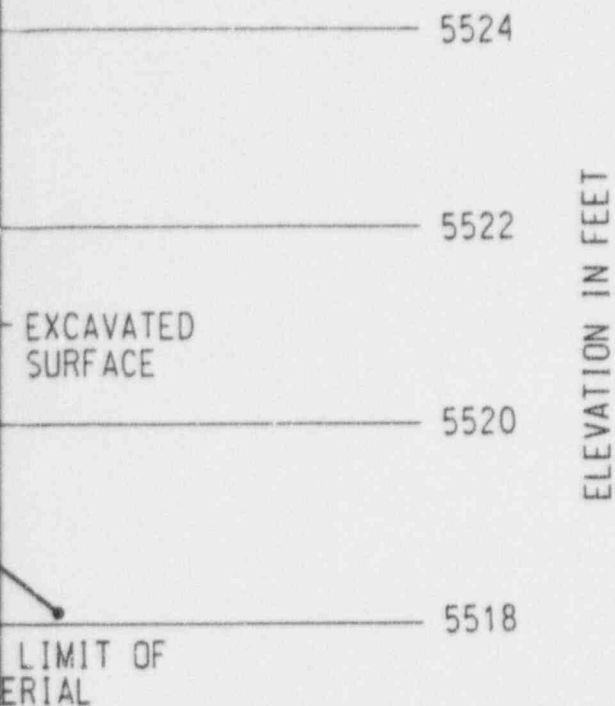
VERTICAL SCALE: 1" = 2'

## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

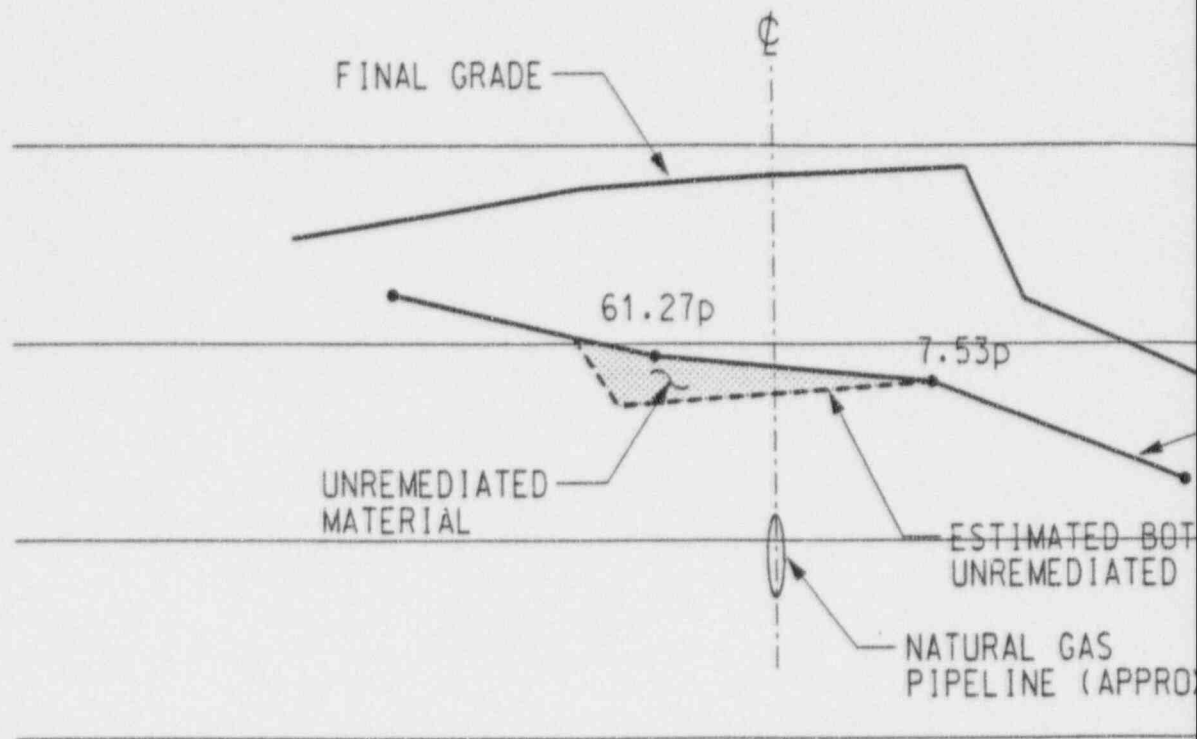


ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

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U. S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION AT STATION 3+93.44	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL GROUP UMTRA PROJECT ONE MARKET, STEWART TOWER, SUITE 400, SAN FRANCISCO, CA 94103	PROJECT NO. DE-AC04-B3AL18796 DRAWING NO. FIGURE 7



## SECTION 5+06.69

0ft 5 10 20 30ft

HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft

VERTICAL SCALE: 1" = 2'

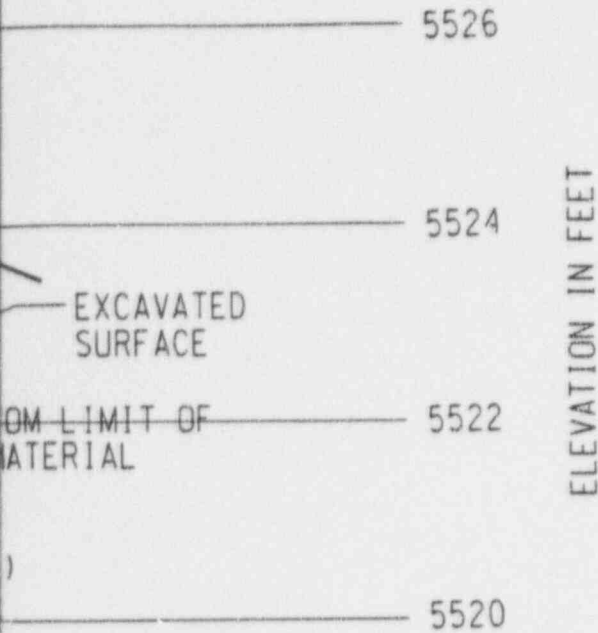


## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION



ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

9612180132-08

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 5+06.69



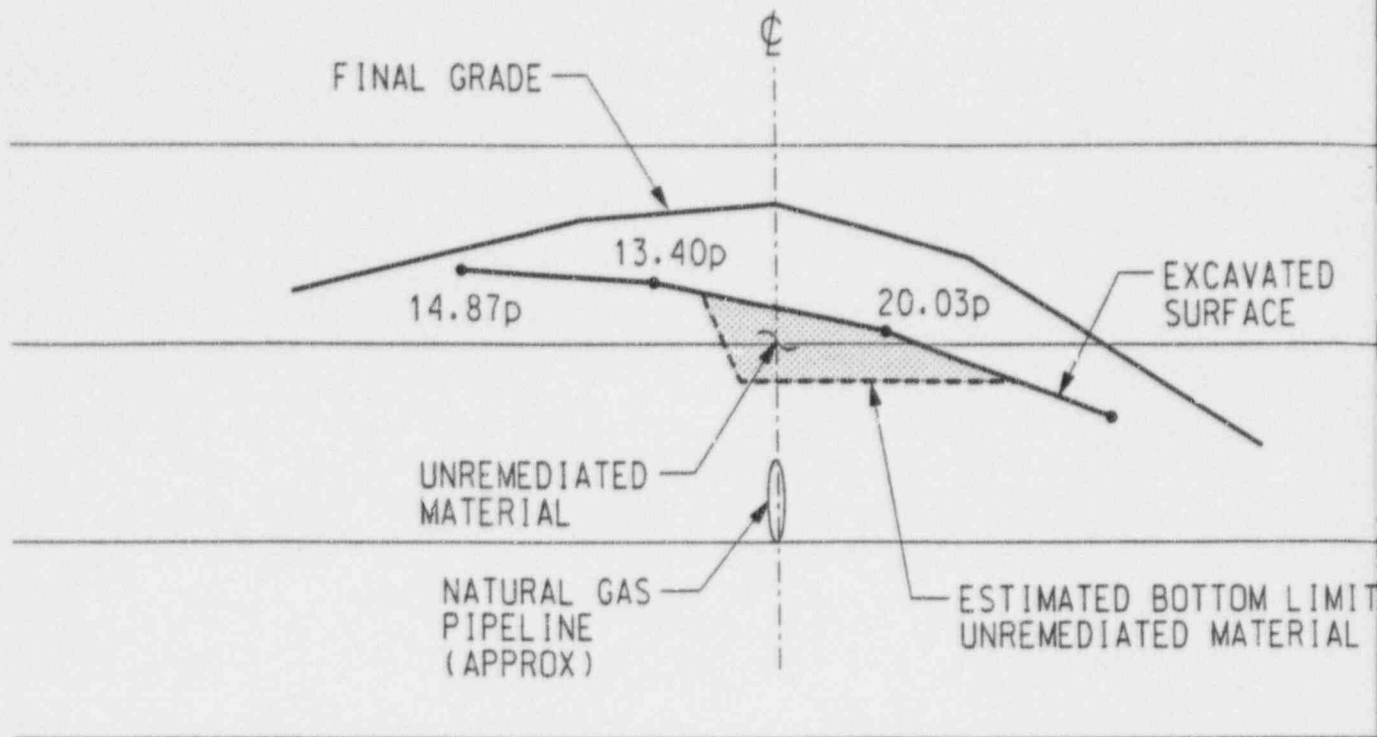
MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL GROUP  
UMTRA PROJECT  
ONE MARKET STREET TOWER, SUITE 400, SAN FRANCISCO, CA 94102

PROJECT NO.

DE-AC04-83AL18796

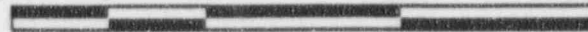
DRAWING NO.

FIGURE 8



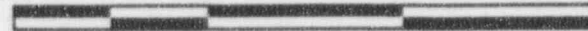
## SECTION 6+38.46

0ft 5 10 20 30ft



HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft



VERTICAL SCALE: 1" = 2'

## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

ELEVATION IN FEET

5528

5526

5524

5522

OF

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

9612180132-09

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 6+38.46



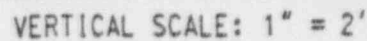
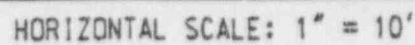
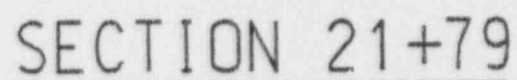
MORRISON KNUDSEN CORPORATION  
ENGINEERING GROUP  
UMTRA PROJECT  
ONE MARKET STREET, TOWER, SUITE 400, SAN FRANCISCO, CA 94102

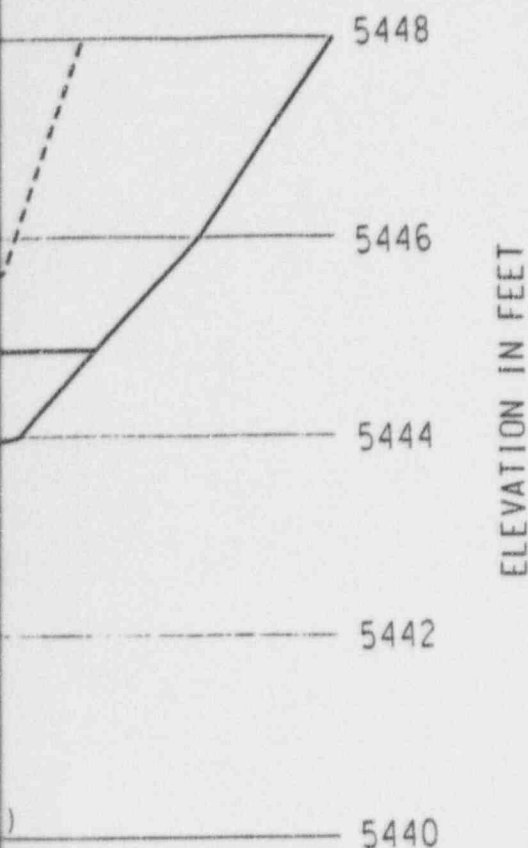
PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

FIGURE 9





### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND

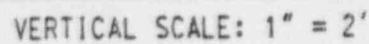
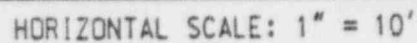
- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

9612180132-10

U. S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION AT STATION 21+79	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL/GOVERNMENT GROUP UMTRA PROJECT <small>400 HOWARD ST. SAN FRANCISCO, CA 94105</small>	PROJECT NO. DE-AC04-83AL18796 DRAWING NO. FIGURE 10





### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

ELEVATION IN FEET

5446

5444

5442

5440

5438

5436

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

91012180132-11

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 22+07



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL GOVERNMENT GROUP  
UMTRA PROJECT  
480 HOWARD ST. SAN FRANCISCO, CA 94105

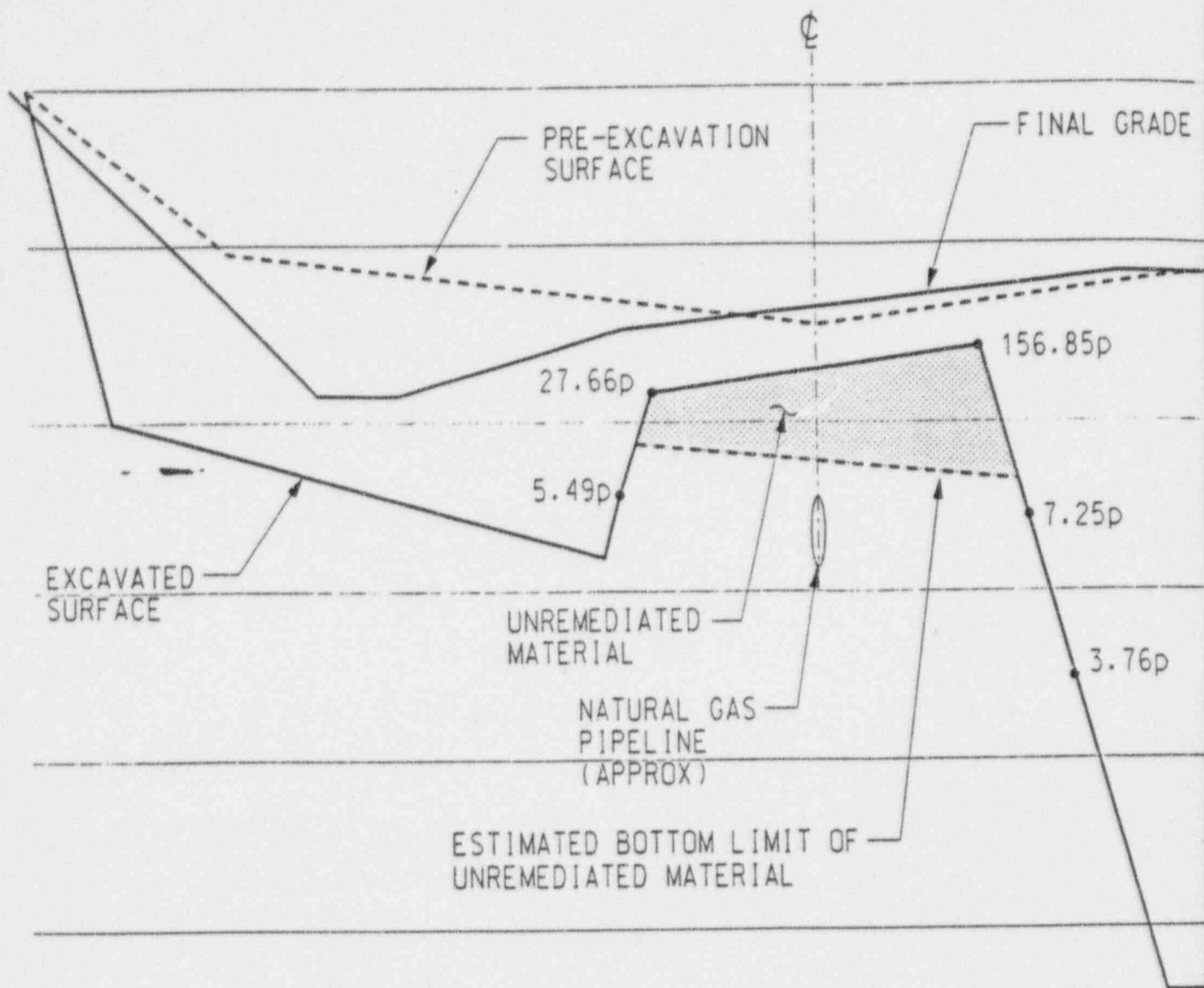
PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

FIGURE 11

REV



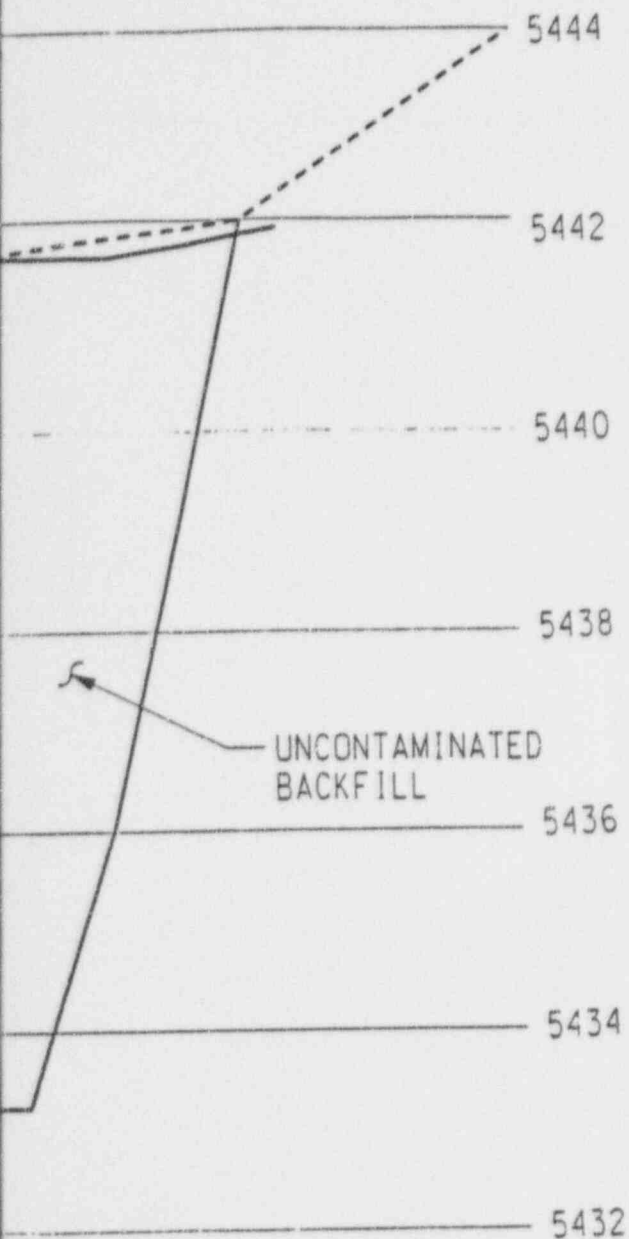
## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION



ELEVATION IN FEET

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

4 6ft  
= 2'

9612180132-12

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 22+38



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/GOVERNMENT GROUP  
UMTRA PROJECT  
180 HOWARD ST. SAN FRANCISCO, CA 94102

PROJECT NO.

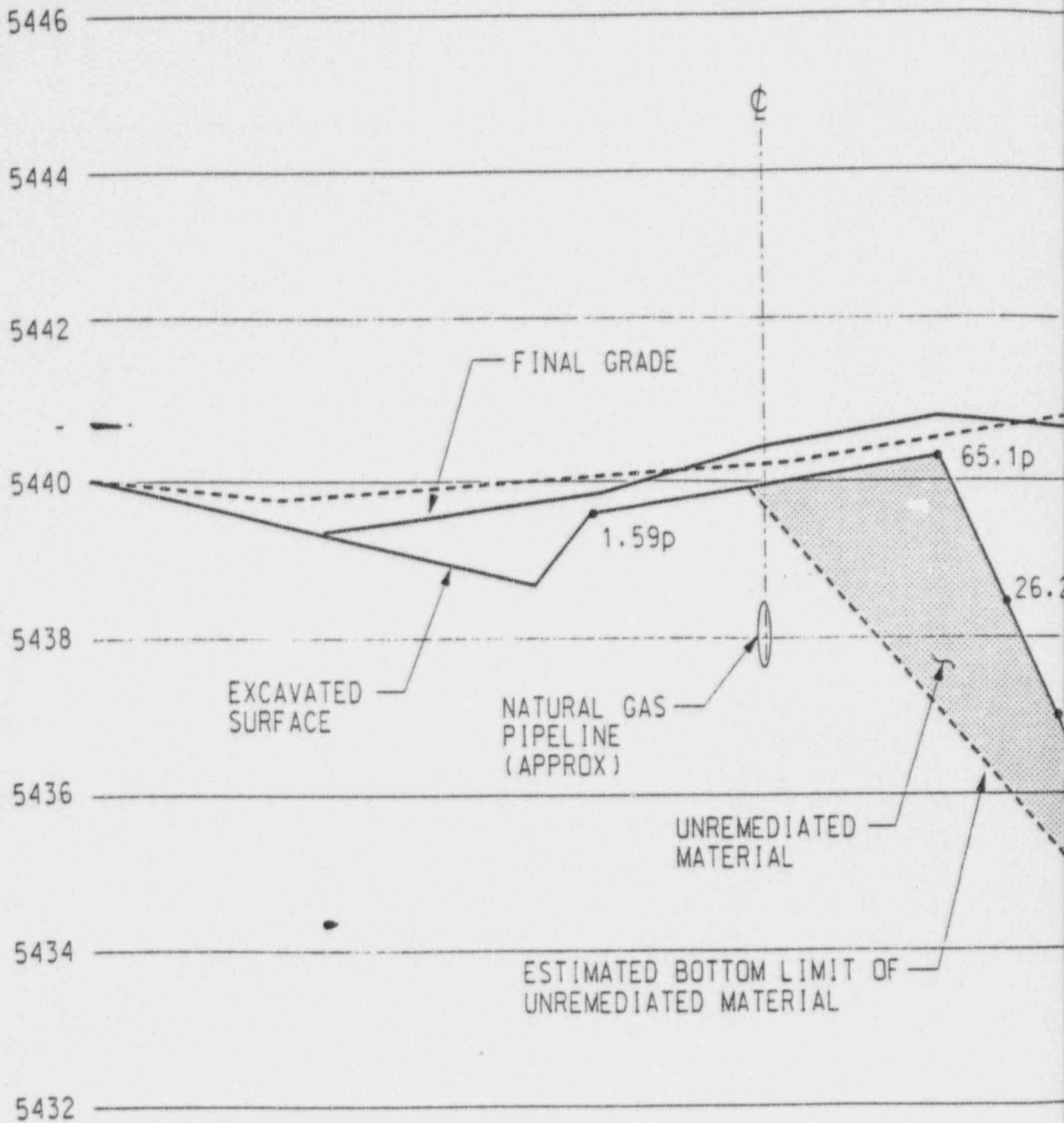
DE-AC04-83AL18796

DRAWING NO.

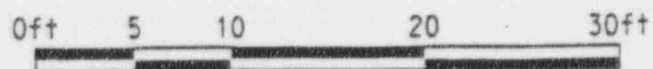
FIGURE 12

REV.

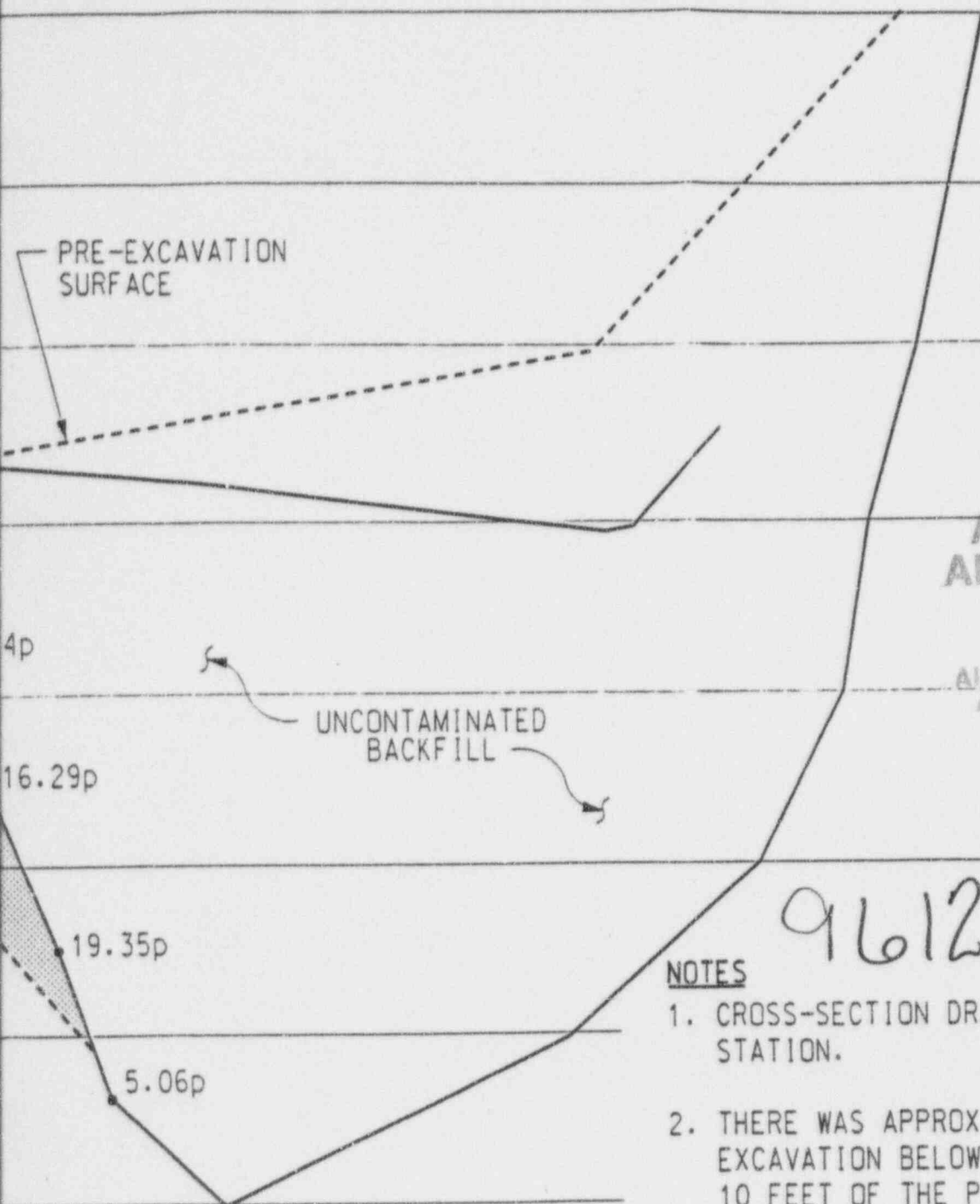
ELEVATION IN FEET



SECTION 22+68



HORIZONTAL SCALE: 1" = 10'



ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

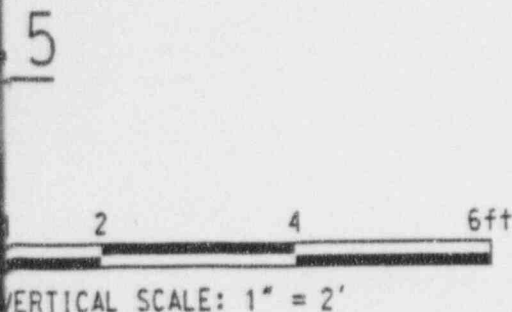
9612180132-13

#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

#### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION



U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 22+68.5



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/GOVERNMENT GROUP  
UMTRA PROJECT  
100 HAYWARD ST. SAN FRANCISCO, CA 94103

PROJECT NO.  
DE-AC04-83AL18796

FIGURE 13

5444

- 5442



P = pCi/g (PICO CURIES PER GRAM)

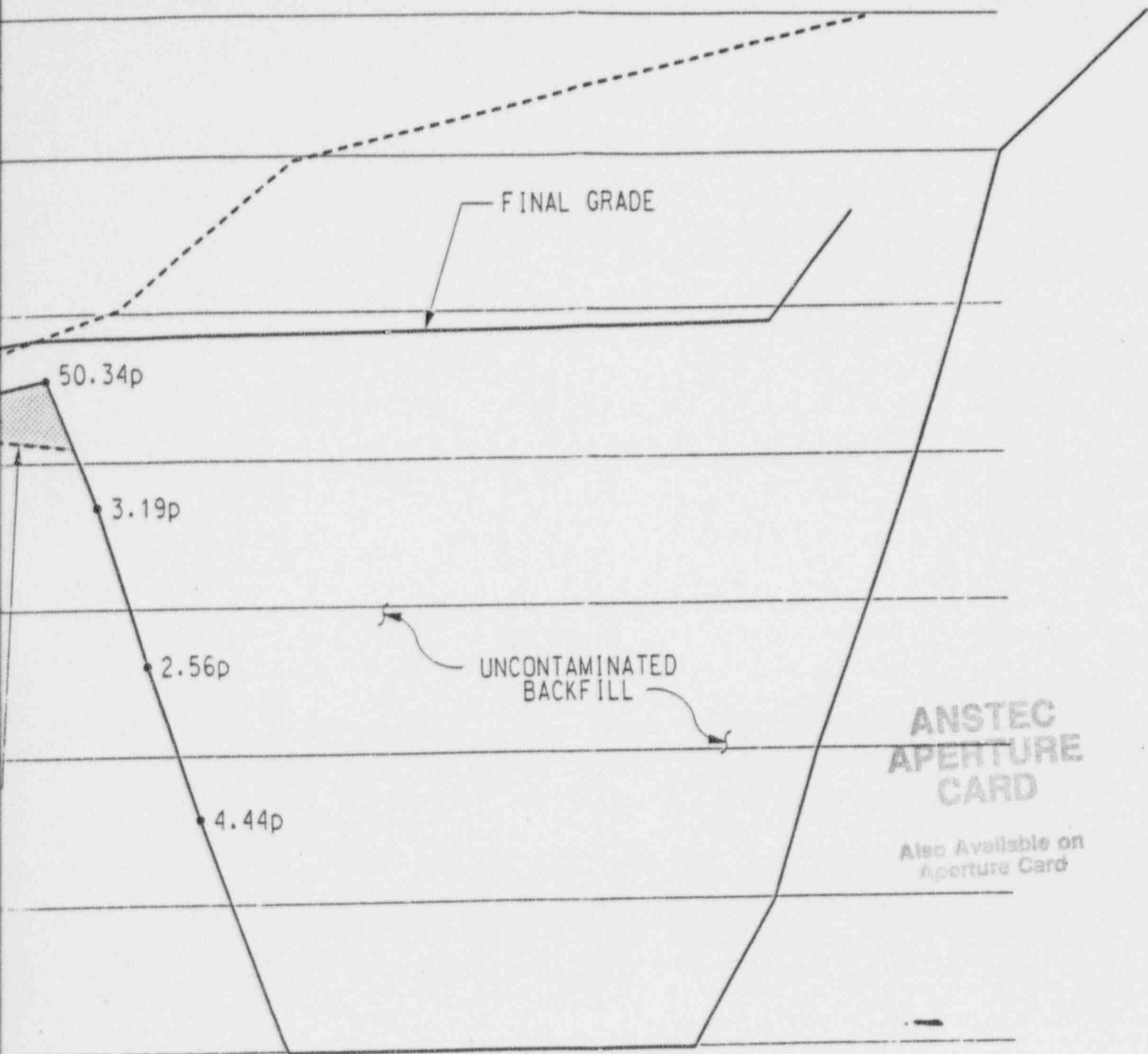
5430

0ft 5 10 20 30ft

Of + 1

VERT 1



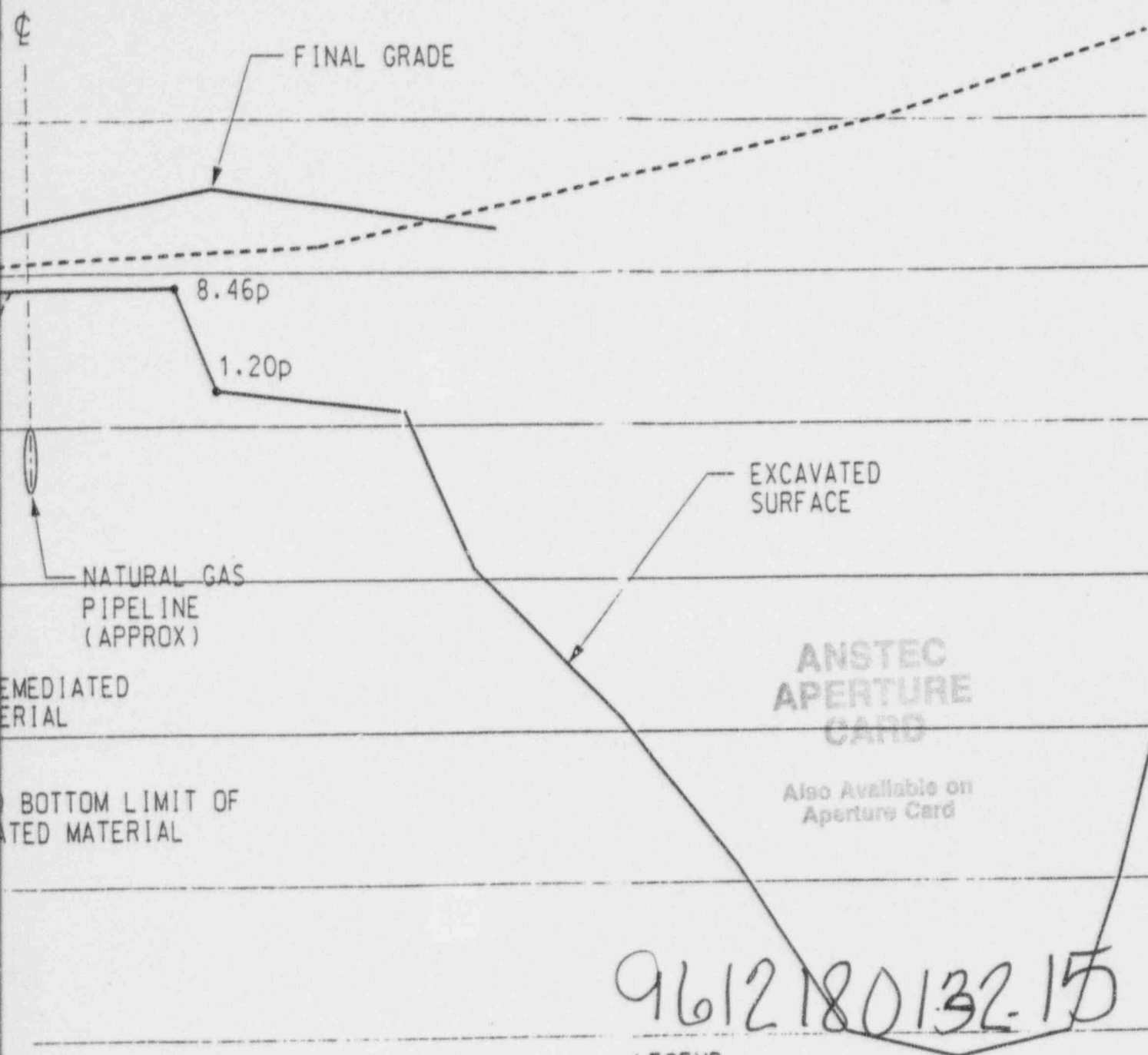


2 4 6ft  
 AL SCALE: 1" = 2'

961218D132-14

U.S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION AT STATION 22+99.5	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL & CONSTRUCTION GROUP UMTRA PROJECT 180 HEDDARD ST. SAN FRANCISCO, CA 94102	PROJECT NO. DE-AC04-83AL18796 DRAWING NO. FIGURE 14 REV.





9612180132.15

# LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

4 8 12ft  
 CAL SCALE: 1" = 2'

U. S. DEPARTMENT OF ENERGY  
 ALBUQUERQUE, NEW MEXICO

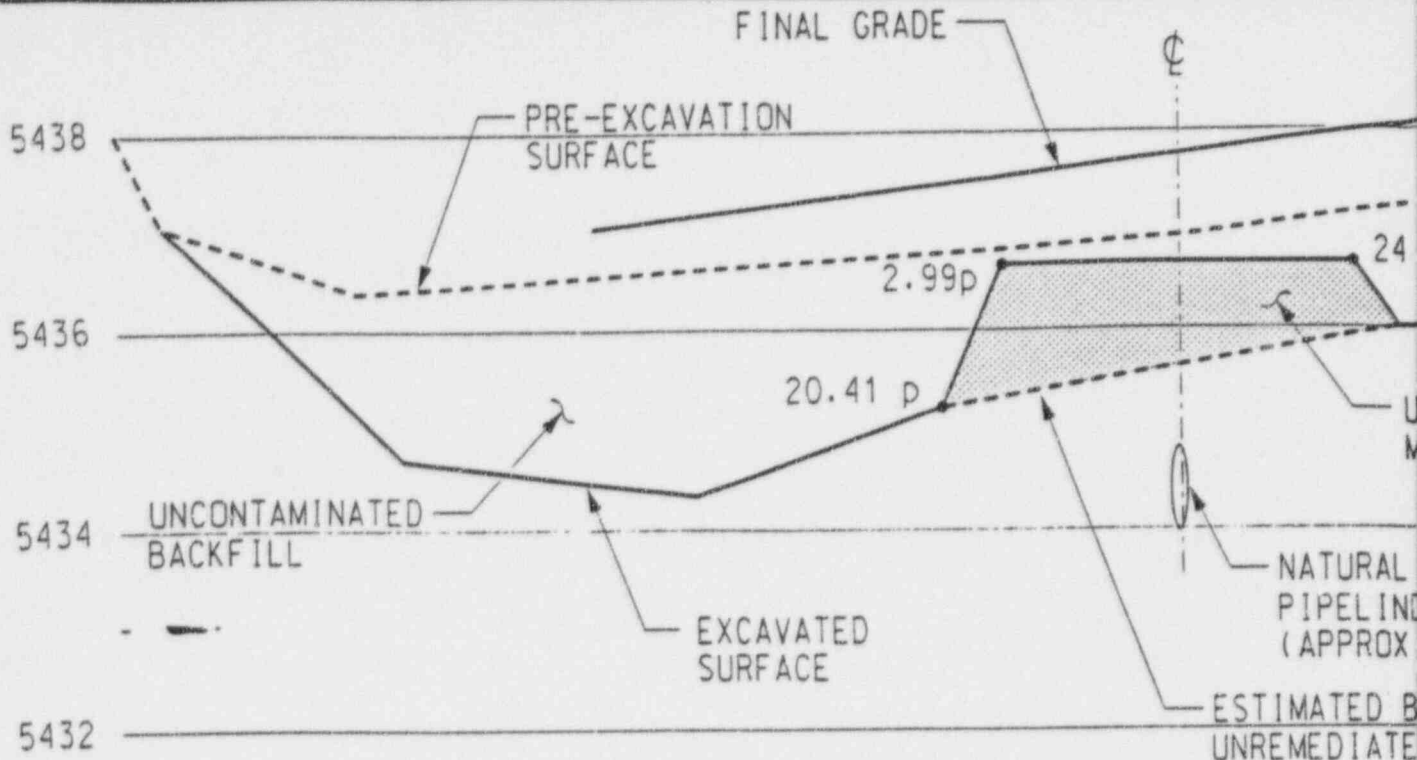
SLICK ROCK SITE  
 SLICK ROCK, COLORADO

SECTION AT STATION 23+26

MORRISON KNUDSEN CORPORATION  
 ENVIRONMENTAL & GEOTECHNICAL GROUP  
 UMTRA PROJECT  
 800 HOWARD ST. SAN FRANCISCO, CA 94103

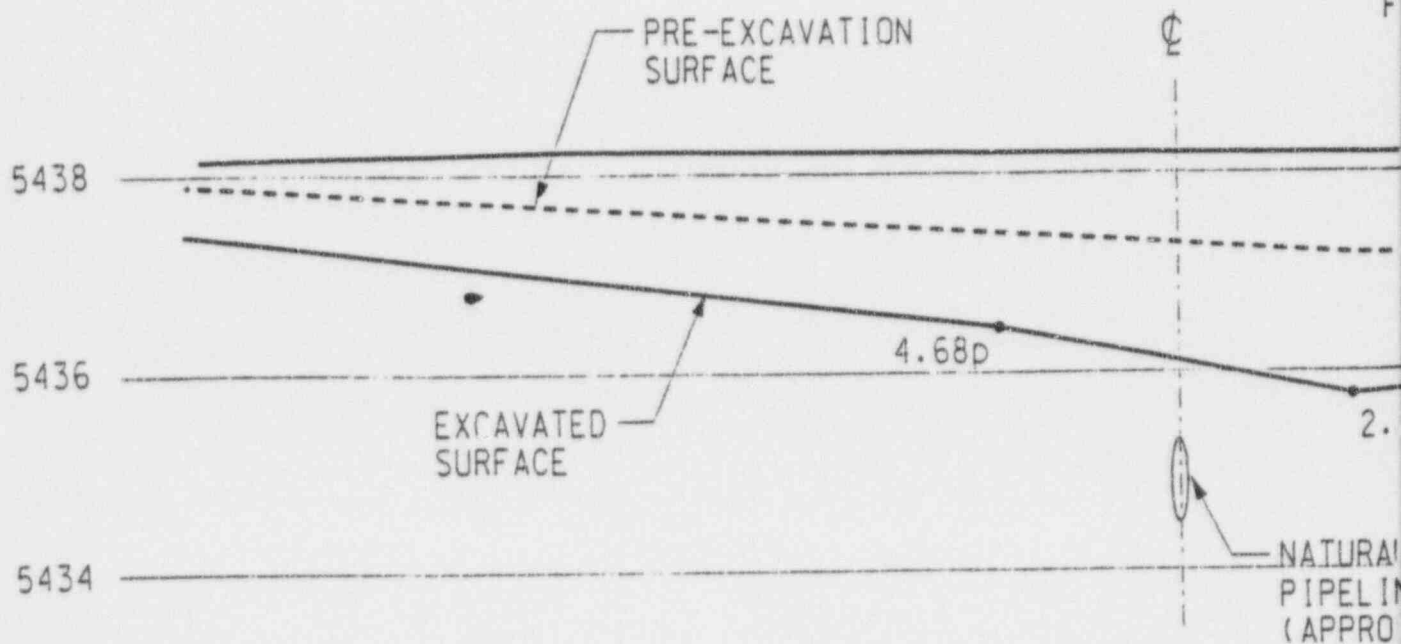
PROJECT NO.  
 DE-AC04-83AL18796  
 DRAWING NO.  
 FIGURE 15

ELEVATION IN FEET



## SECTION 23+52

ELEVATION IN FEET



## SECTION 23+85

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2  
VERTICAL SCALE

## NOTES

1. CROSS-SECTIONS DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

ANSTEC  
APERTURE  
CARD

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Aperture Card

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U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTIONS AT  
STATION 23+52 & STATION 23+85



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/GOVERNMENT GROUP  
UMTRA PROJECT  
300 HAYWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO.

DE-AC04-83AL18796

DRAWING NO.

FIGURE 16

REV.

96p

UNREMIEDIATED  
MATERIAL

GAS

BOTTOM LIMIT OF  
D MATERIAL

INAL GRADE

20p

GAS

UE  
( )

4

6ft

E: 1" = 2'

RELOCAT  
COUNTY

PRE-EXCAVATION  
SURFACE

5470

FINAL GRADE

3±

1

UNCONTAMINATED BACKFILL

5460

ELEVATION IN FEET

5450

EXCAVATED  
SURFACE

85.09p

1.38p

5440

0ft 5 10 15ft

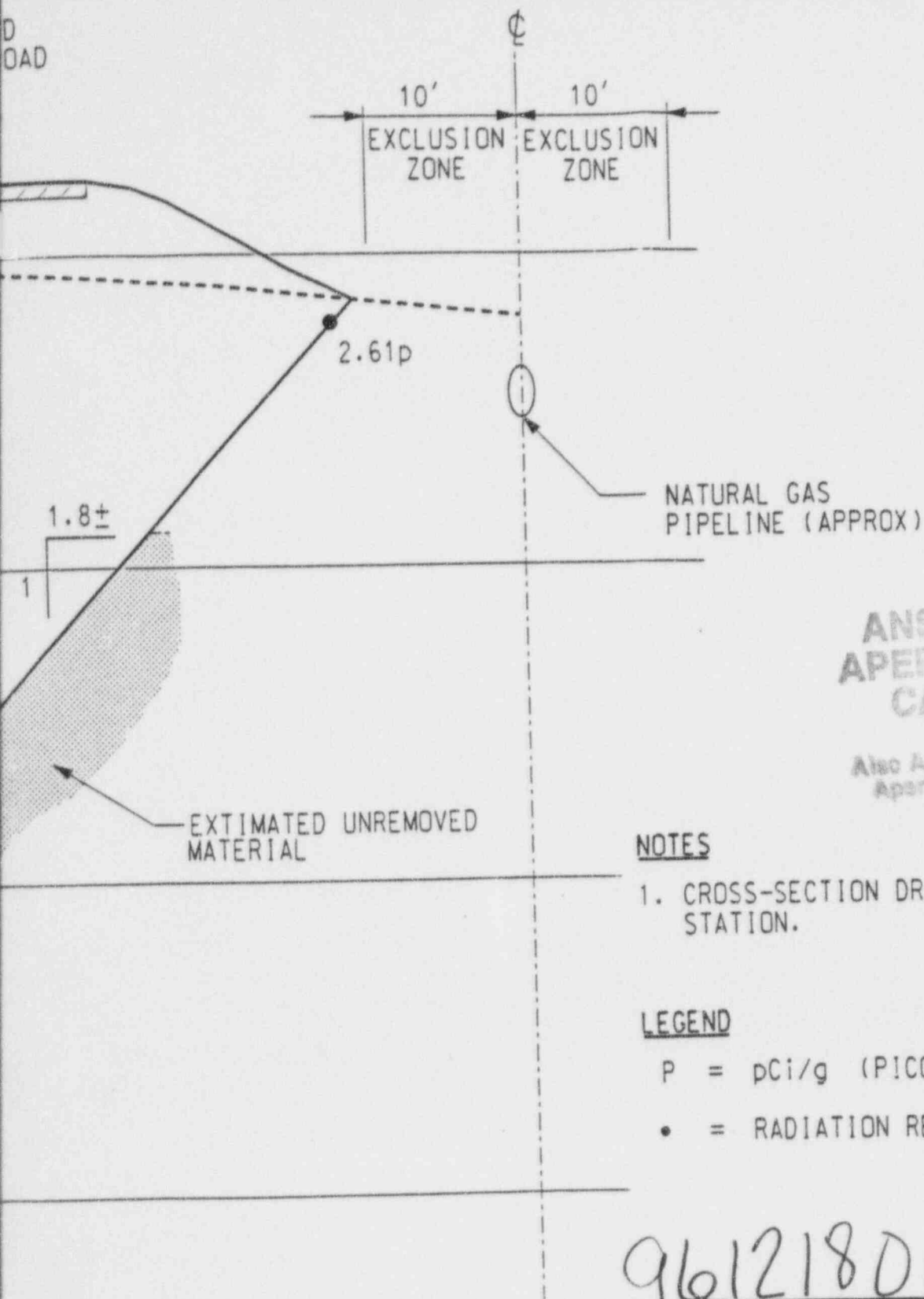
HORIZONTAL SCALE: 1" = 10'

0ft 2.5 5 7.5ft

VERTICAL SCALE: 1" = 5'



D  
OAD



ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

ESTIMATED UNREMOVED  
MATERIAL

### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.

### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

SECTION A

9612180132-17

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION A



MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/GOVERNMENT GROUP  
UMTRA PROJECT  
601 HOWARD ST., SAN FRANCISCO, CA 94105

PROJECT NO.

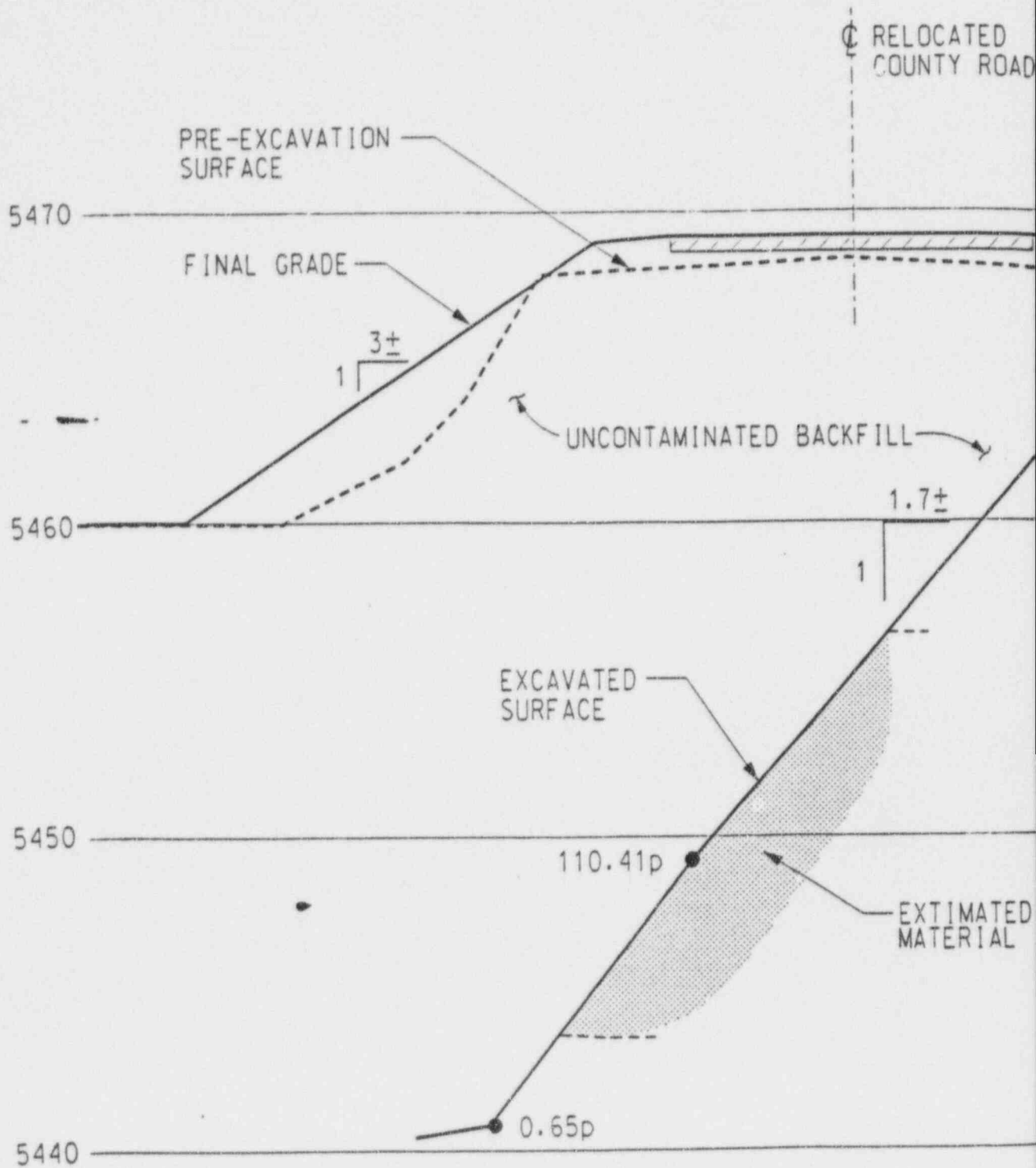
DE-AC04-83AL18796

DRAWING NO.

FIGURE 17

REV

ELEVATION IN FEET

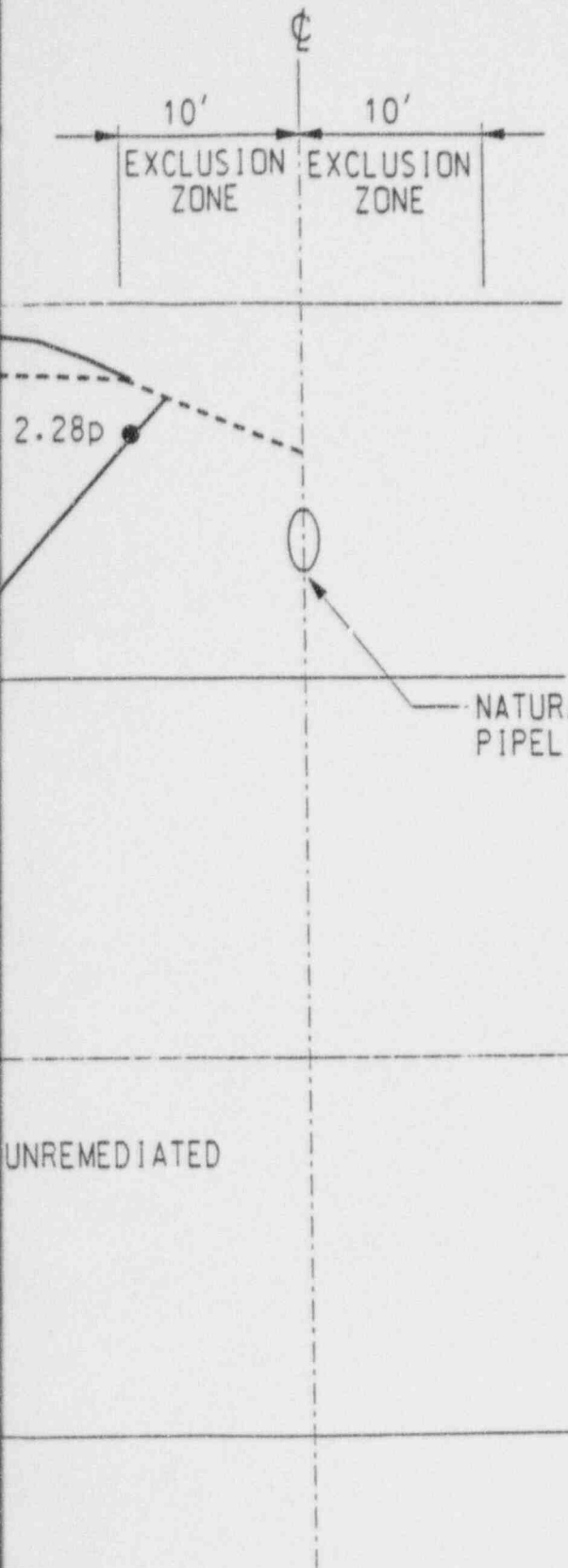


0ft 5 10 15ft

HORIZONTAL SCALE: 1" = 10'

0ft 2.5 5 7.5ft

VERTICAL SCALE: 1" = 5'



# NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.

## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

UNREMEDIED

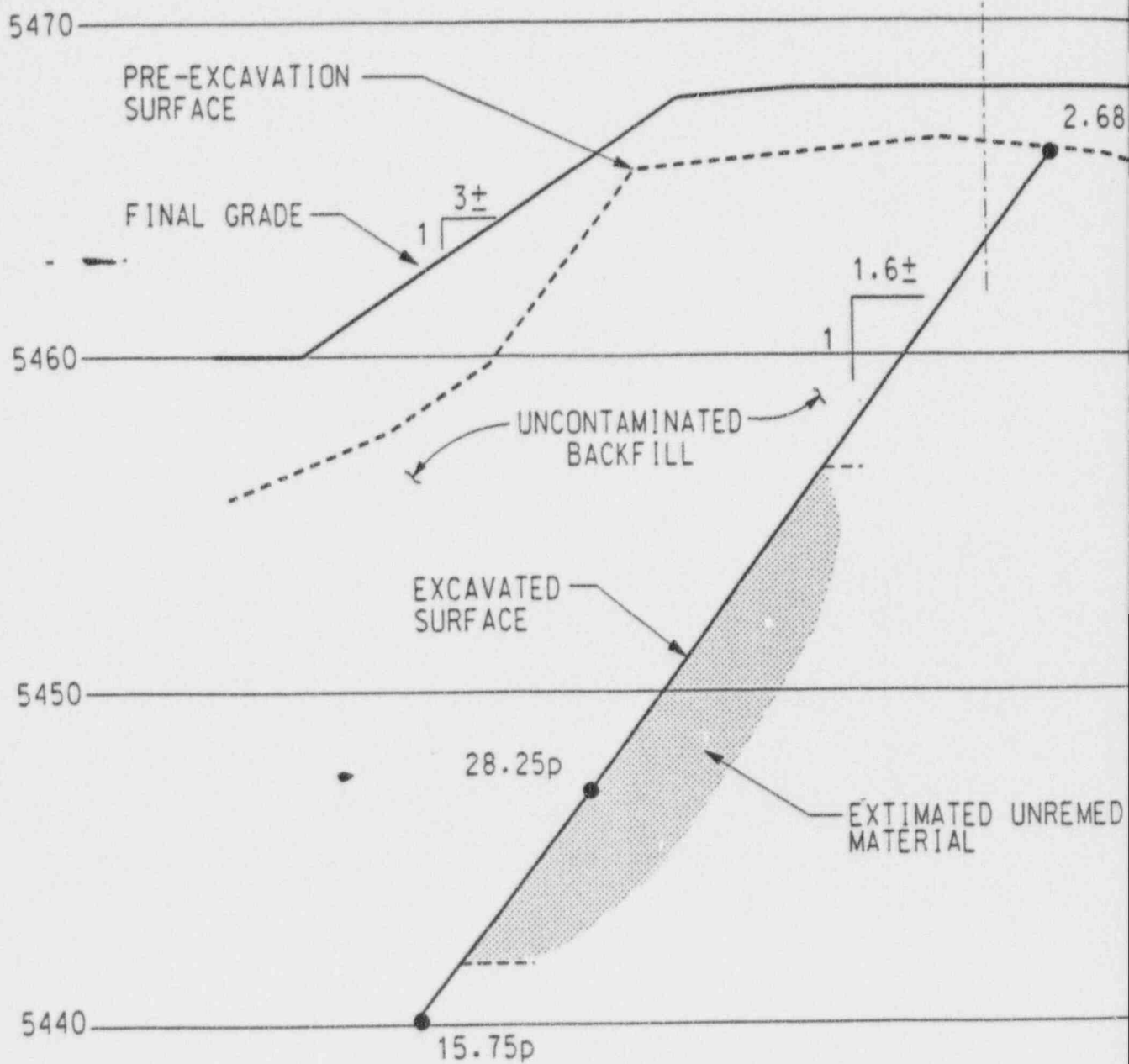
SECTION B

9612180132-18

U.S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION B	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL/GOVERNMENT GROUP UMTRA PROJECT 801 HOWARD ST. SAN FRANCISCO, CA 94105	PROJECT NO. DE-AC04-83AL18796 DRAWING NO. FIGURE 18 REV.

RELOCATE  
COUNTY R

ELEVATION IN FEET



0ft 5 10 15ft

HORIZONTAL SCALE: 1" = 10'

0ft 2.5 5 7.5ft

VERTICAL SCALE: 1" = 5'


## NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

 = MATERIAL WITH Ra-226 CONCENTRATIONS GREATER THAN 15 pCi/g ABOVE BACKGROUND

ANSTEC  
APERTURE  
CARD

Also Available on  
Aperture Card

9612180132-19

SECTION C

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE  
SLICK ROCK, COLORADO

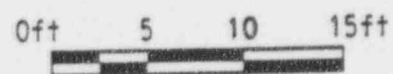
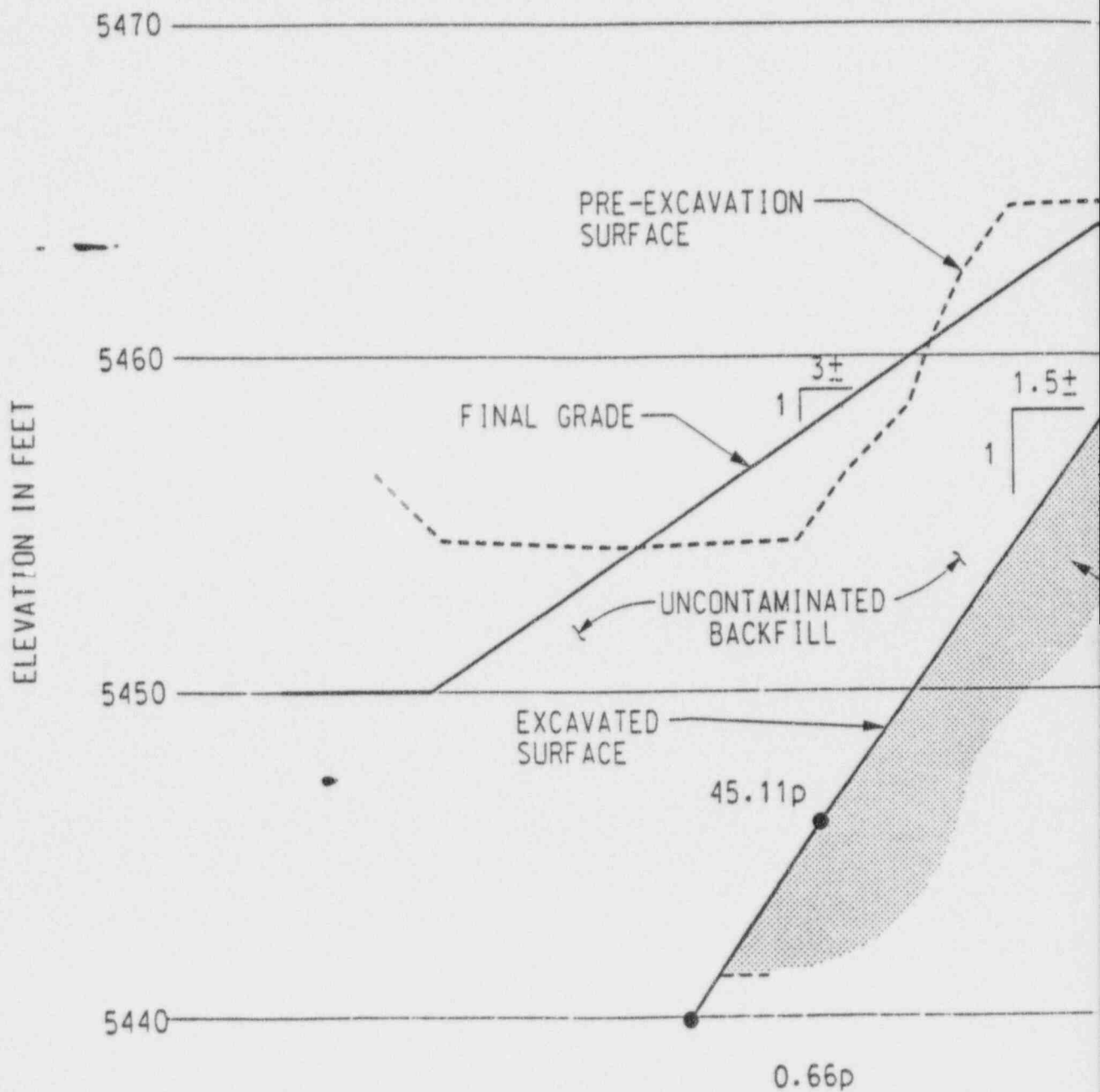
SECTION C

 MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL/CONSTRUCTION GROUP  
UMTRA PROJECT  
480 HAYWARD ST. SAN FRANCISCO, CA 94102

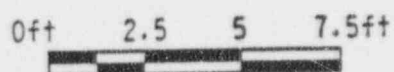
PROJECT NO.  
DE-AC04-83AL18796

DRAWING NO.  
FIGURE 19

REV.



HORIZONTAL SCALE: 1" = 10'



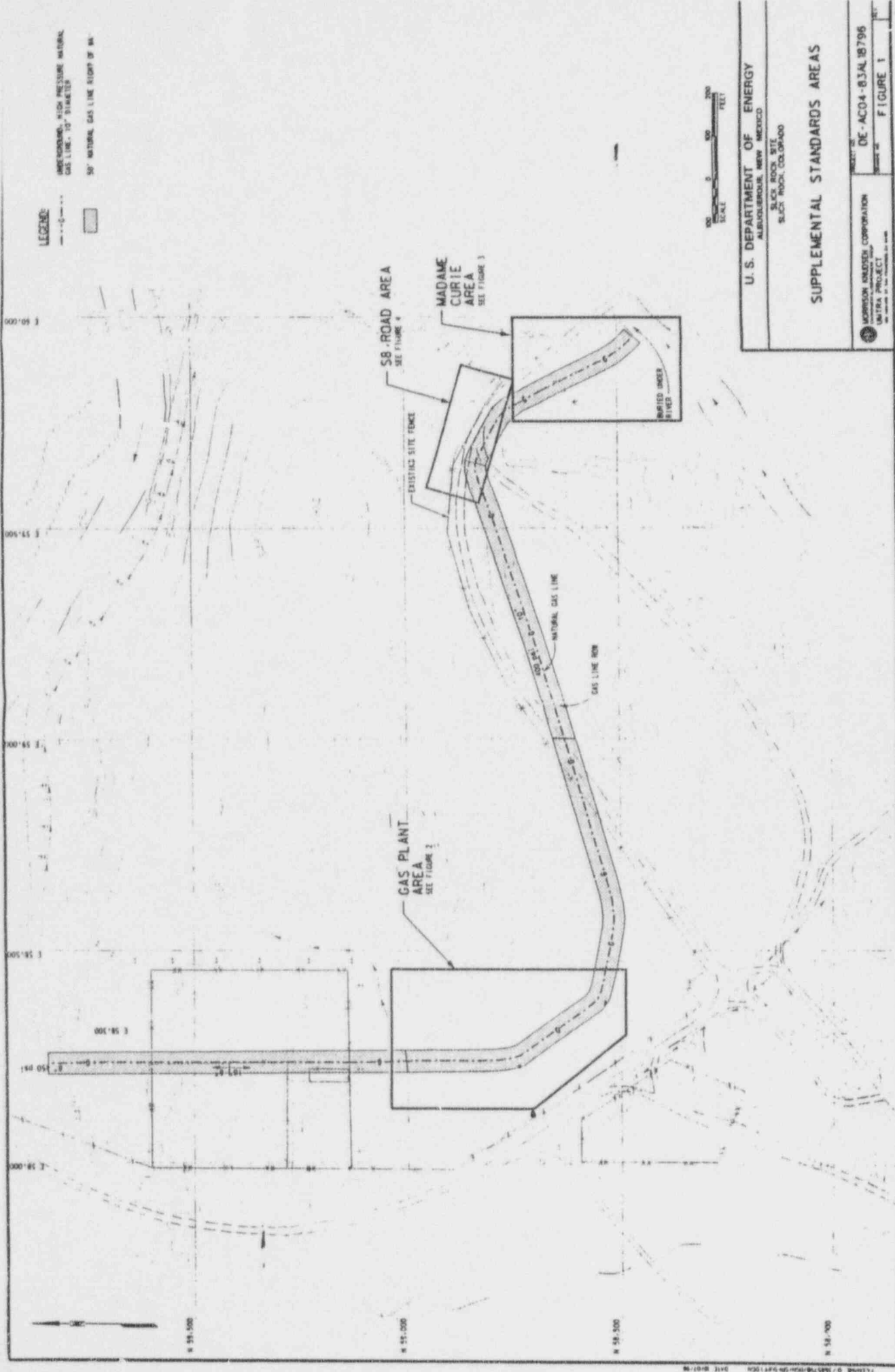
VERTICAL SCALE: 1" = 5'





**LEGEND:**

- HIGH PRESSURE NATURAL GAS LINE - 10" DIAMETER
- 30" NATURAL GAS LINE (COMP. BY 34")



U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SAN JOSE, NEW MEXICO  
SUNNY ROCK, COLORADO

**SUPPLEMENTAL STANDARDS AREAS**

MORRISON ANDERSON CORPORATION  
INTRA PROJECT

DC-AC04-83AL18796

FIGURE 1

# NOTES

1. CONTIGUOUS SURFACES ARE ORIGINAL GRADE BEFORE RECONSTRUCTION.
2. FINAL SITE CHANGES AFTER RECONSTRUCTION ARE SIMILAR TO ORIGINAL GRADES.
3. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PERIMETER.

## LEGEND

- AREA WITH RADIATION LEVELS ABOVE 15 RENT/BELT TOP 6" OF SOIL
- DOSE RATE SURVEY READING LOCATION
- CROSS SECTION LOCATION
- UNDERGROUND NATURAL GAS LINE

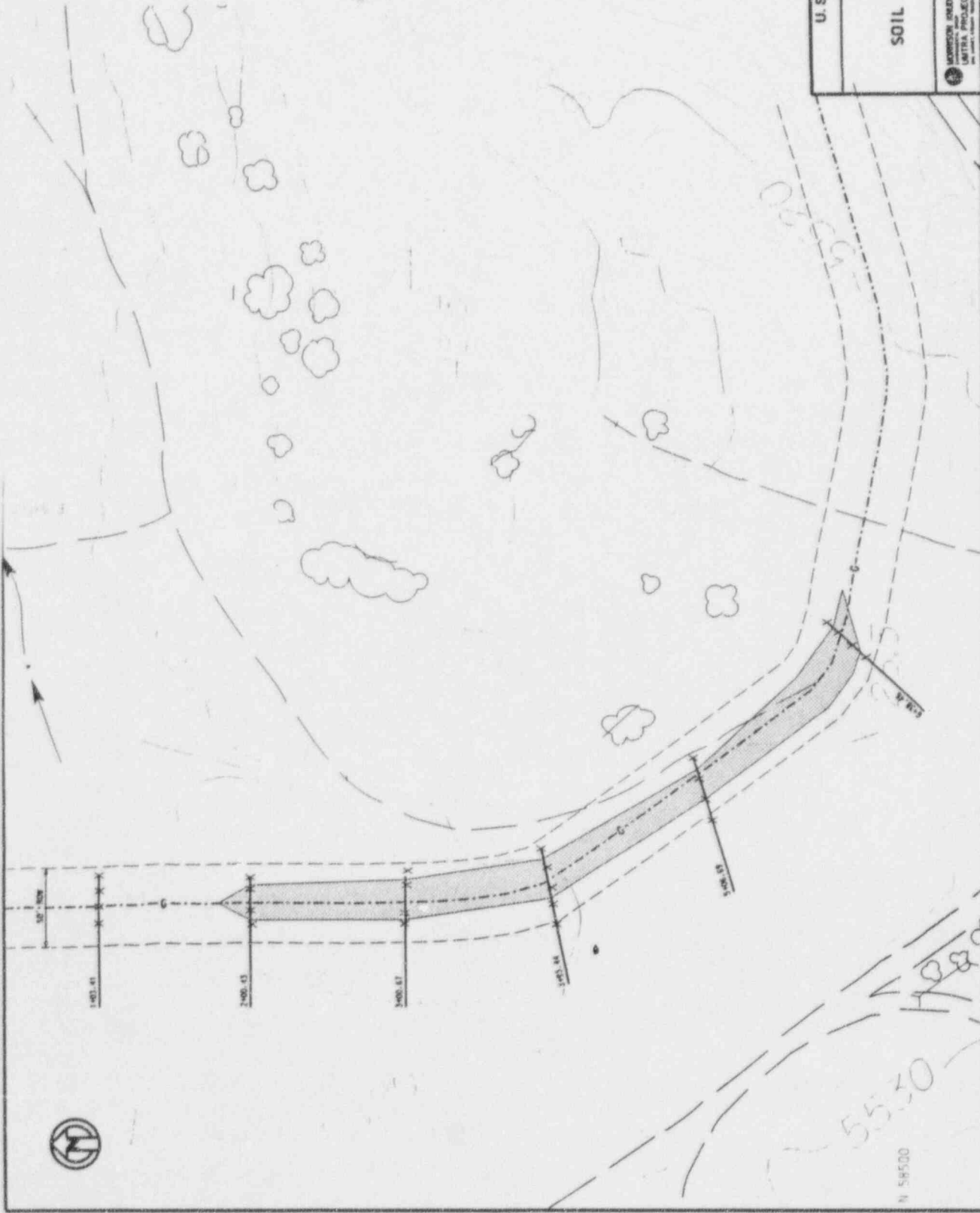


U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SUCK ROCK SITE  
SUCK ROCK, COLORADO

## POST EXCAVATION SURVEY SOIL SAMPLE, RADIATION SURVEY GAS PLANT AREA

MORRISON ANDERSON CORPORATION  
LANTIRA PROJECT  
DE-AC04-83AL18796  
FIGURE 2



# NOTES

1. CONTOURS SHOWN ARE BOTTOM OF EXCAVATION AFTER REMOVAL OF CONTAMINATED SOILS.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND



AREAS WITH RADON LEVELS ABOVE 15 pCi/l BELOW 100 FT OF SOIL



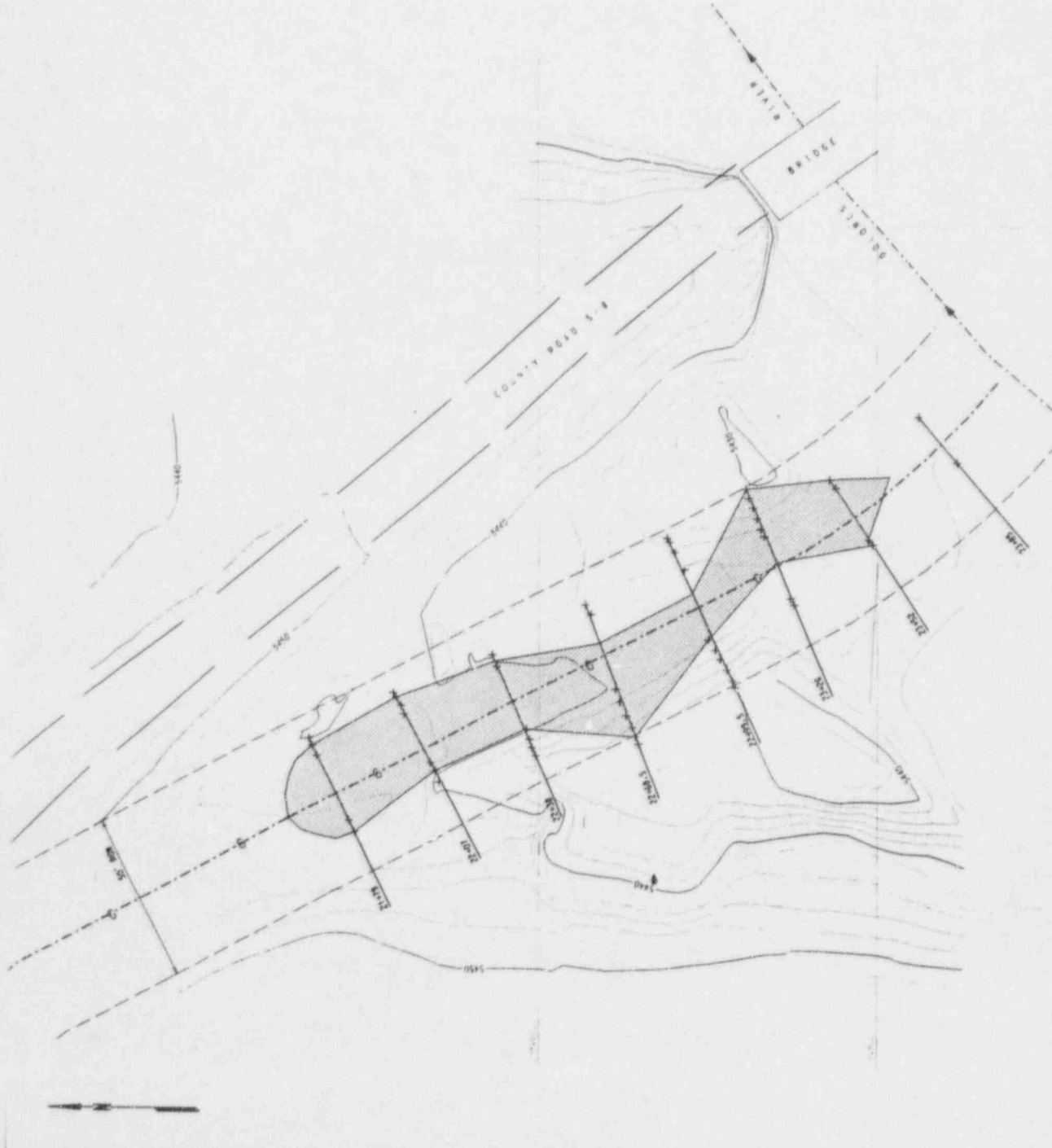
DOSE RATE SURVEY READING LOCATION



CROSS SECTION LOCATION



UNDERGROUND NATURAL GAS LINE



U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

SLUG BOSS SITE

SLUG BOSS, COLORADO

## POST EXCAVATION SURVEY SOIL SAMPLE: RADIATION SURVEY MADAME CURIE AREA

PROJECT NO. DE-AC04-83AL18796

FIGURE 3

MORRISON ENGINEERING CORPORATION

UNTRA PROJECT

FOR CREDIT, PROJECT NUMBER, DATE, AND THE FOLLOWING TO BE

**NOTE**

1. CONTAINS SHOWN ARE ORIGINAL GRADE BEFORE EXCAVATION

**LEGEND**



AREA WITH ROCK LEVELS ABOVE  
15 FEET BELOW TOP OF SOIL

X

DOSE RATE SURVEY READING LOCATION



CROSS SECTION LOCATION



UNDERGROUND MATERIAL GAS LINE



U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

SLICK ROCK SITE

SLICK ROCK, COLORADO

**POST EXCAVATION SURVEY  
SOIL SAMPLE, RADIATION SURVEY  
S-8 ROAD AREA**

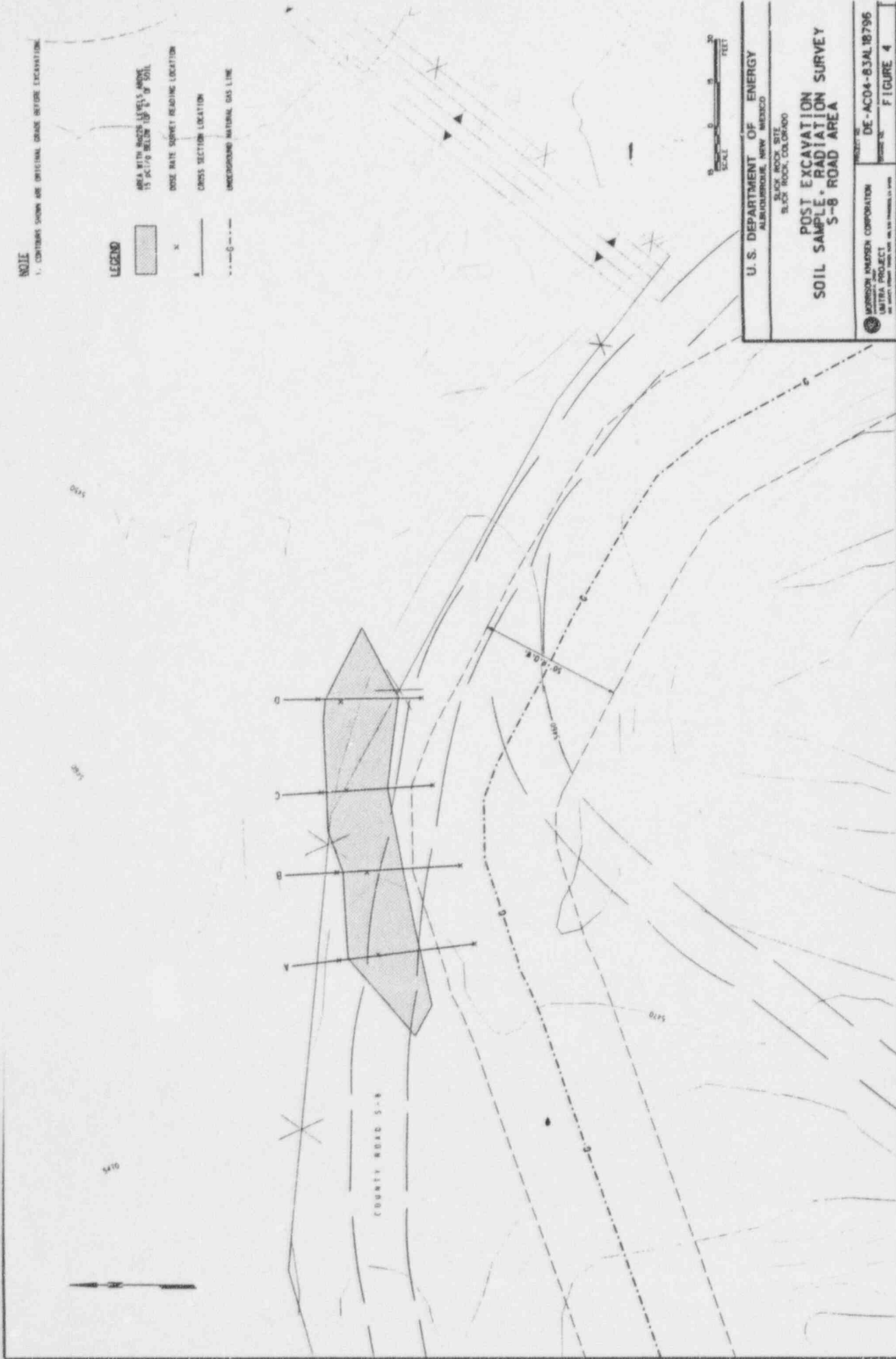
MORRISON JENSEN CORPORATION

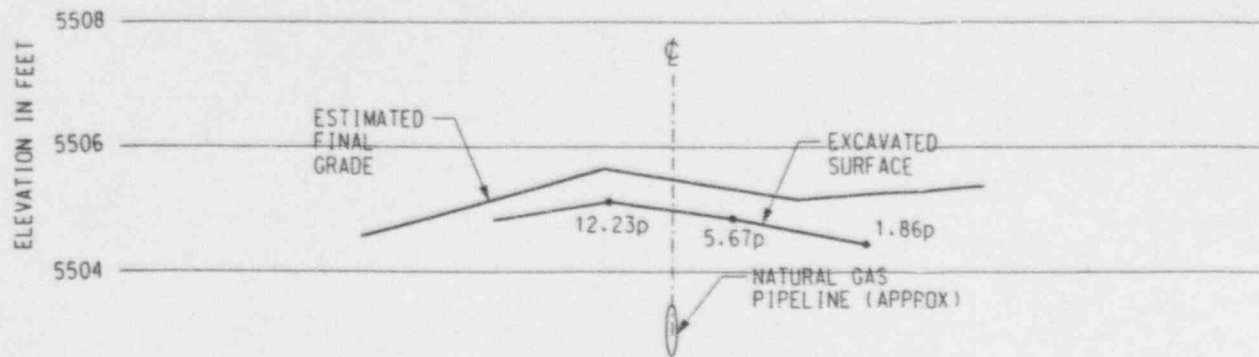
LABORATORY

PROJECT NO. DE-AC04-83AL18796

FIGURE NO.

FIGURE 4



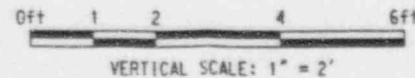
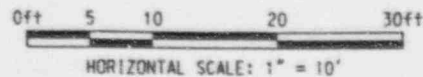
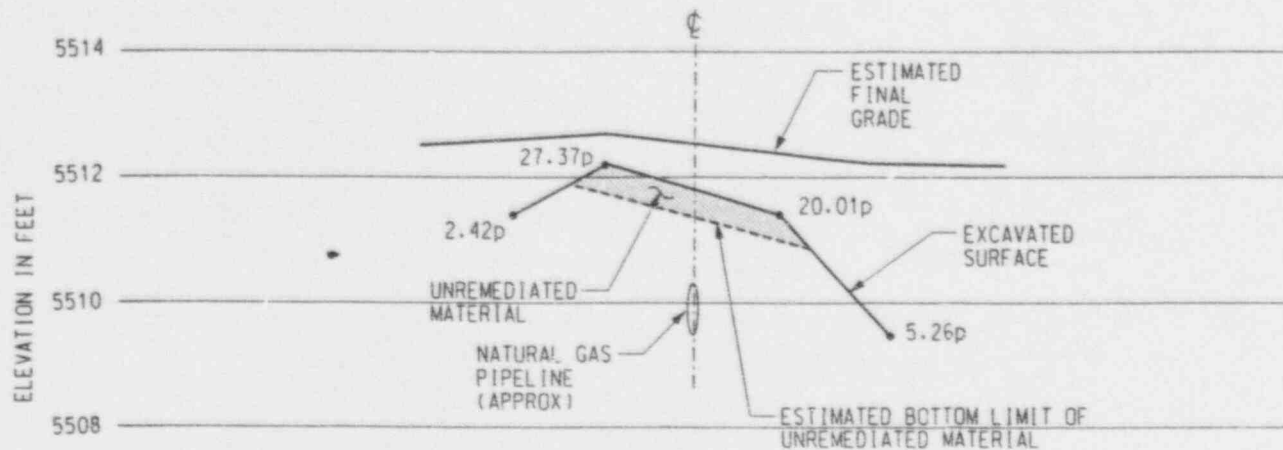


#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

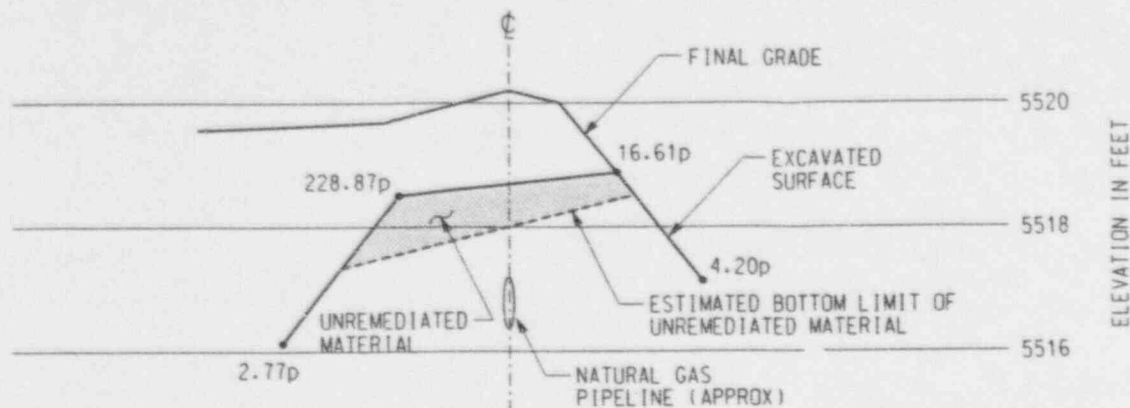
#### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)  
 • = RADIATION READING LOCATION



U. S. DEPARTMENT OF ENERGY	
ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTIONS AT STATION 1+03.41 & STATION 2+00.43	
WORRIED KNUDSEN CORPORATION ENVIRONMENTAL GROUP ULTRA PROJECT <small>4000 JIMMY TERRY TOWER SUITE 400 SAN FRANCISCO, CA 94104</small>	SHEET NO. DE-AC04-83AL8796 DRAWING NO. FIGURE 5





### SECTION 3+00.67

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

#### LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO

SUCK ROCK SITE  
SUCK ROCK, COLORADO

SECTION AT STATION 3+00.67

MORRISON KNUDSEN CORPORATION  
CONTRACT NO. 2000  
ULTRA PROJECT

PROJECT NO.  
DE-AC04-83AL10796

FIGURE 6

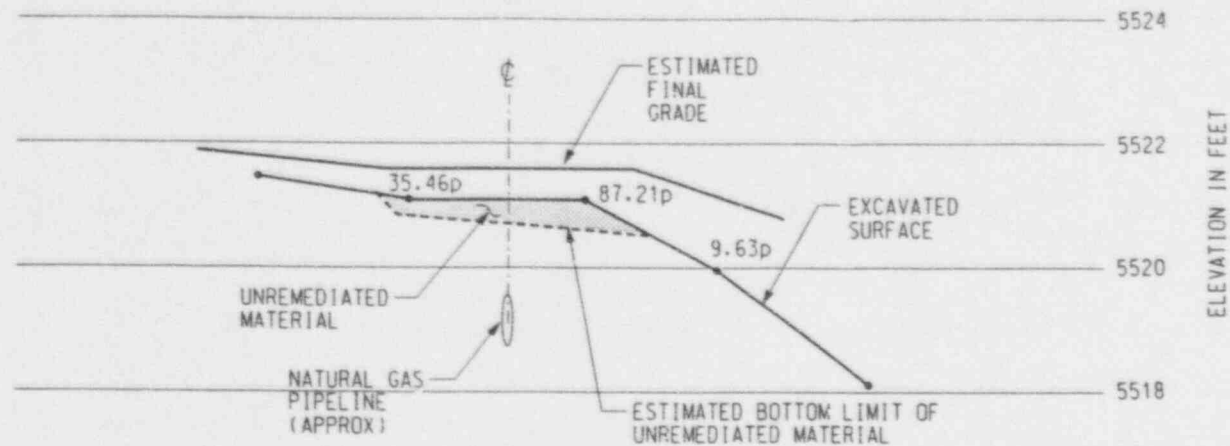
# NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)

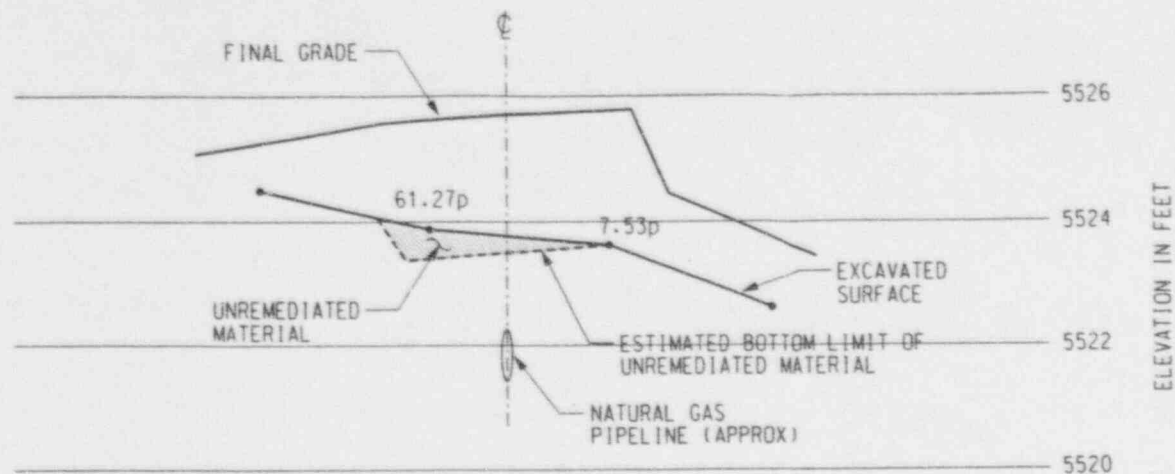
• = RADIATION READING LOCATION



0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

U. S. DEPARTMENT OF ENERGY	
ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION AT STATION 3+93.44	
MORRISON KNOXSEN CORPORATION CONSTRUCTION GROUP ULTRA PROJECT THE ULTIMATE PROJECT: FASTER, BETTER, AND SAFER. PROGRESS IS OURS.	SHEET NO. DE-AC04-83AL18796 FIGURE 7



## SECTION 5+06.69

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND

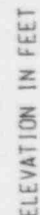
- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 5+06.69

MORRISON KNOXSON CORPORATION  
CORPORATE OFFICE  
ULTRA PROJECT  
ONE WILSON AVENUE, SUITE 100, DENVER, CO 80202

PROJECT NO.  
DE-AC04-83AL18796  
FIGURE 8




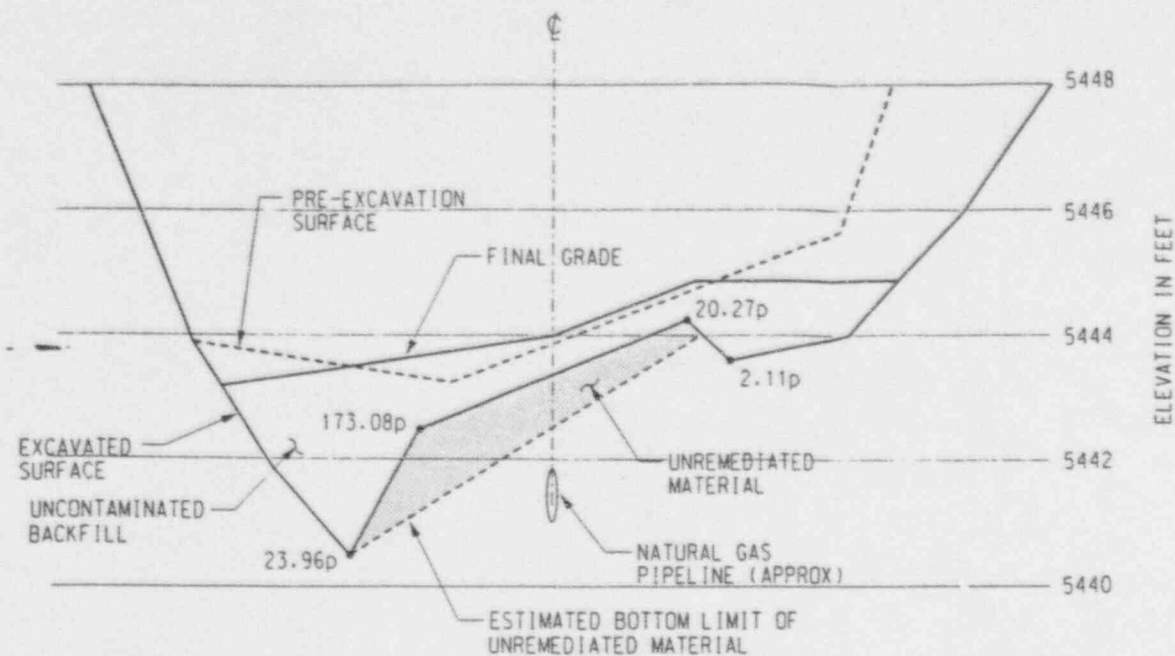
HORIZONTAL SCALE: 1" = 10'

VERTICAL SCALE: 1" = 2'

1. CROSS-SECTION DRAWING LOOKING UP STATION
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

P = pCi/g (PICO CURIES PER GRAM)  
• = RADIATION READING LOCATION

U.S. DEPARTMENT OF ENERGY ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE SLICK ROCK, COLORADO	
SECTION AT STATION 6+38.46	
 MORRISON KNUDSEN CORPORATION <small>INCORPORATED IN U.S.A.</small> UNTRA PROJECT	PROJECT NO. DE-AC04-83AL18796 SECTION NO. FIGURE 9



0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

#### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

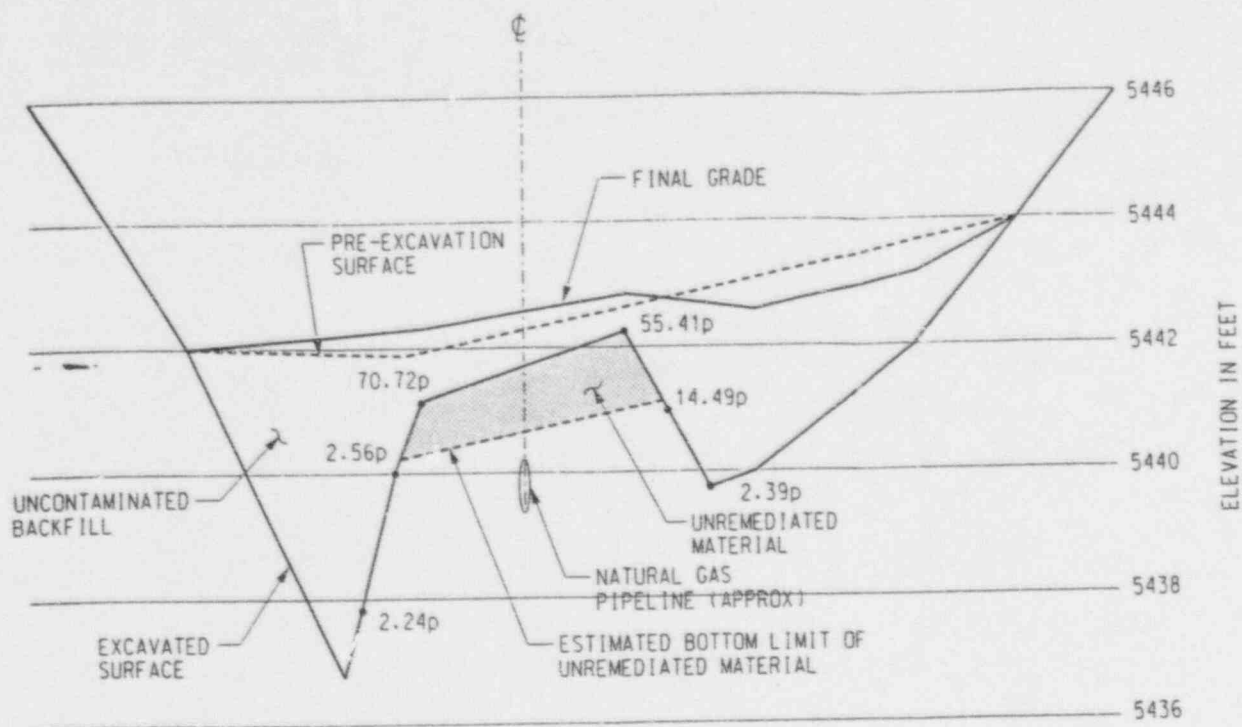
U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 21+79

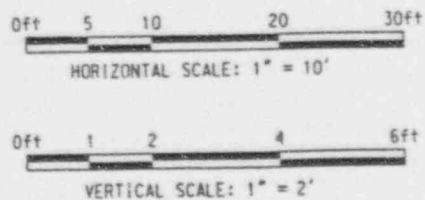
MORRISON-KAIDSEN CORPORATION  
ENVIRONMENTAL SCIENCE & TECHNOLOGY  
UNITRA PROJECT  
NOT REVIEWED BY THE PROJECT MANAGER

PROJECT NO.  
DE-AC04-83AL18796

FIGURE 10



## SECTION 22+07



### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND

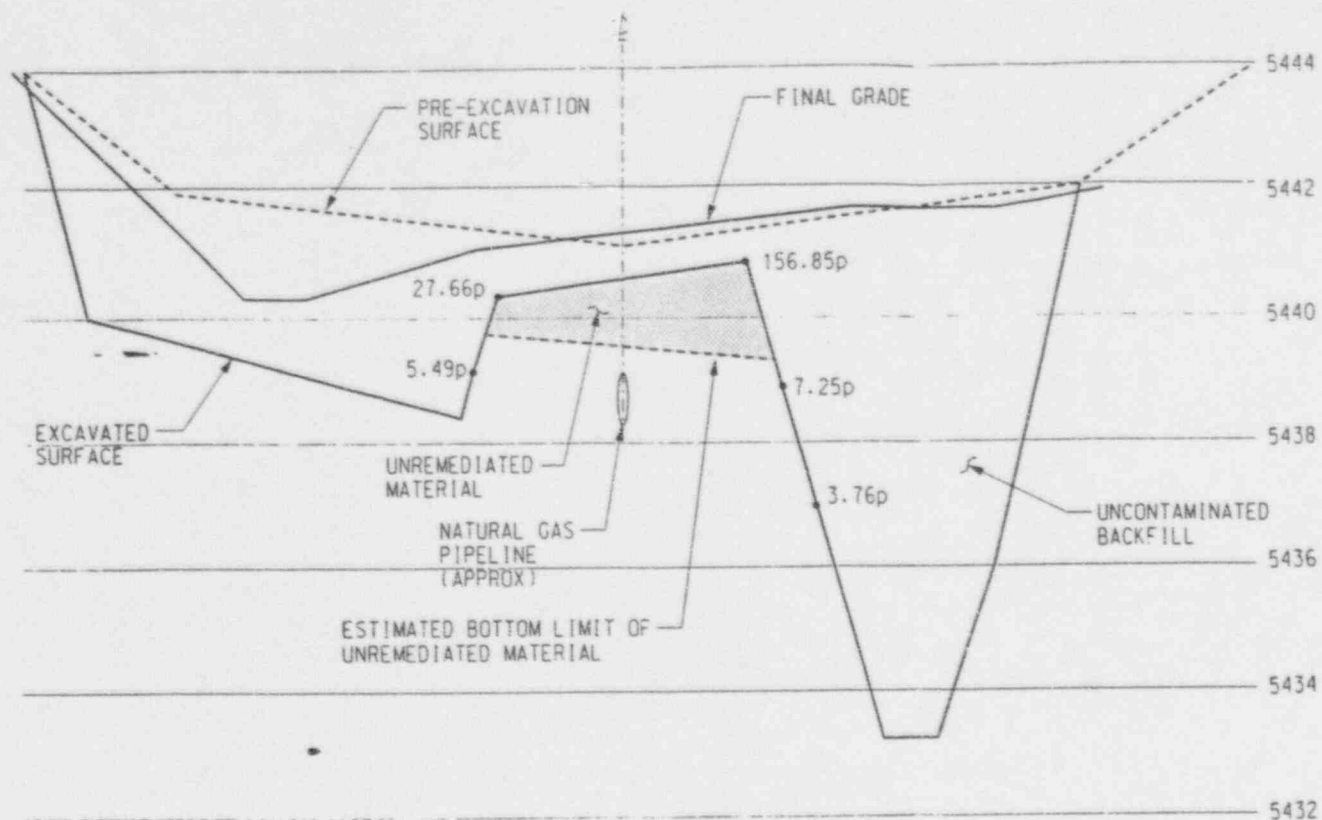
- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

U. S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 22+07

MORRISON KNUDSEN CORPORATION  
UNTRA PROJECT

PROJECT NO.  
DE-AC04-83AL18796  
FIGURE 11



#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

#### LEGEND

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

#### SECTION 22+38

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

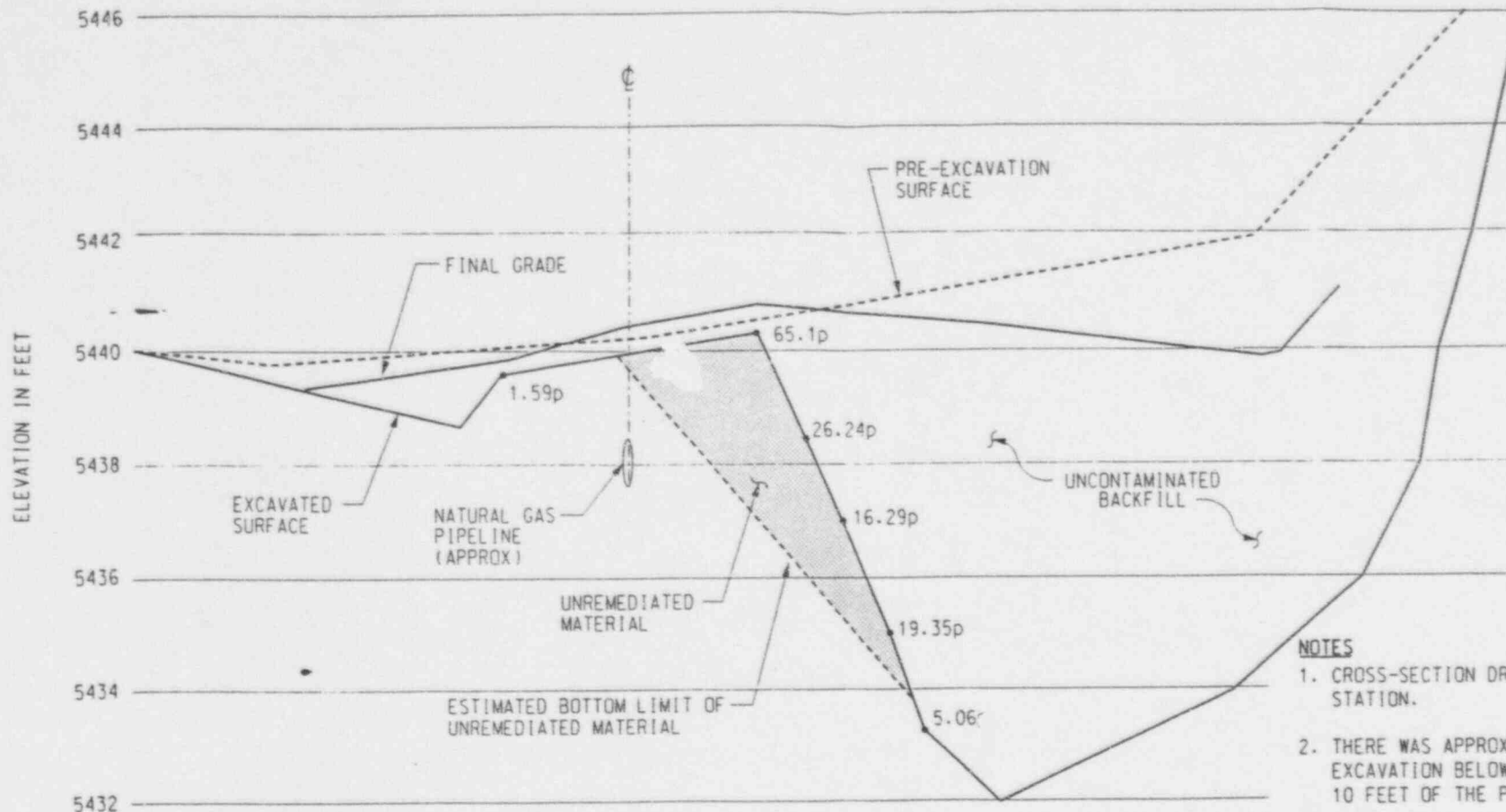
SECTION AT STATION 22+38

MORRISON-KNUDSEN CORPORATION  
ENVIRONMENTAL & RADIOLOGICAL GROUP  
ULTRA PROJECT  
400 10TH AVENUE, SUITE 100, DENVER, CO 80202

PROJECT NO. DE-AC04-83AL18796

FIGURE 12





## SECTION 22+68.5

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)  
• = RADIATION READING LOCATION

U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

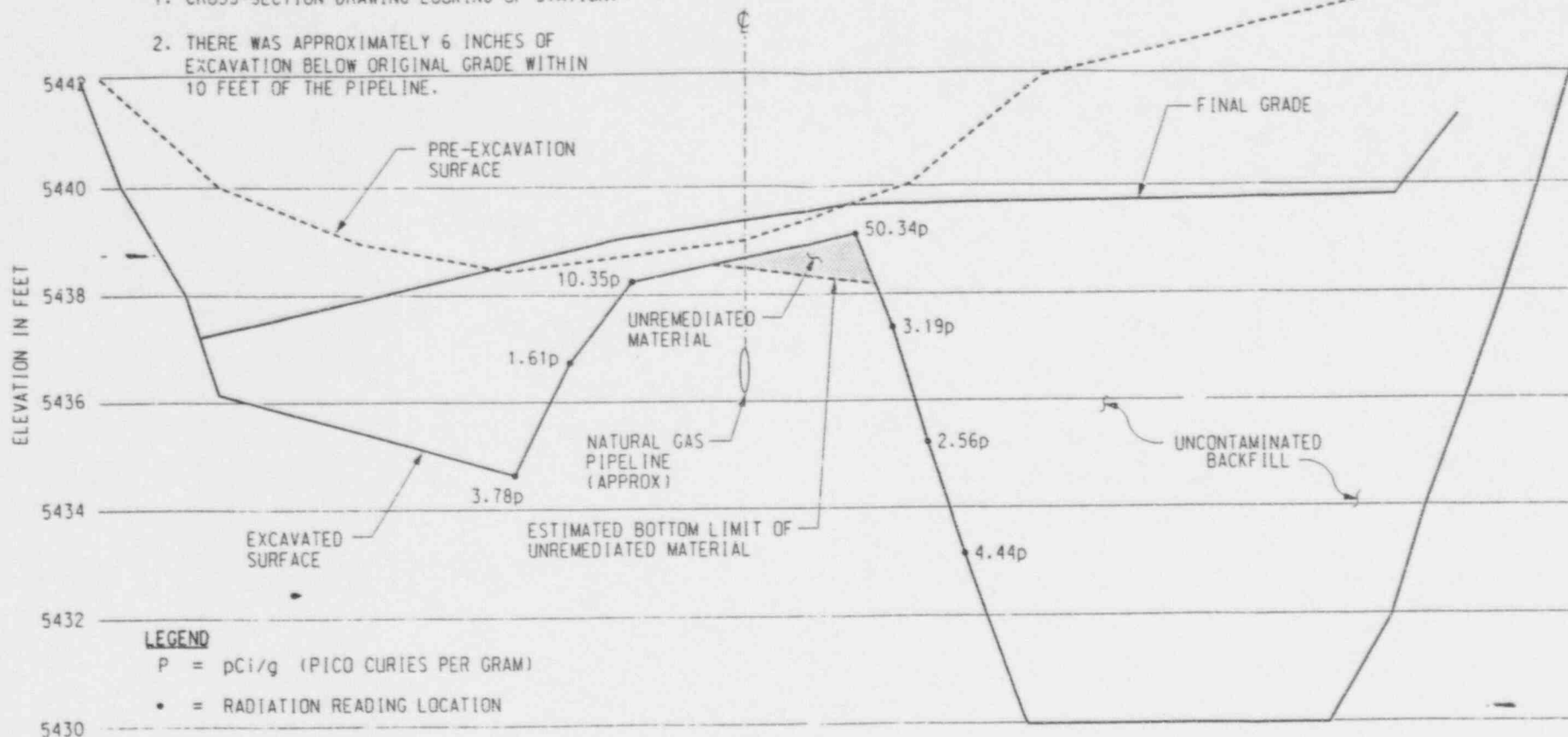
SECTION AT STATION 22+68.5

MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL, ENGINEERING AND ARCHITECTURE  
UNITED PROJECT  
100 HUNTERS HILL DRIVE, FORT COLLINS, CO 80526

PROJECT NO.  
DE-AC04-83AL18796  
FIGURE 13

# NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.



## LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

## SECTION 22+99.5

0ft 5 10 20 30ft  
HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft  
VERTICAL SCALE: 1" = 2'

U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

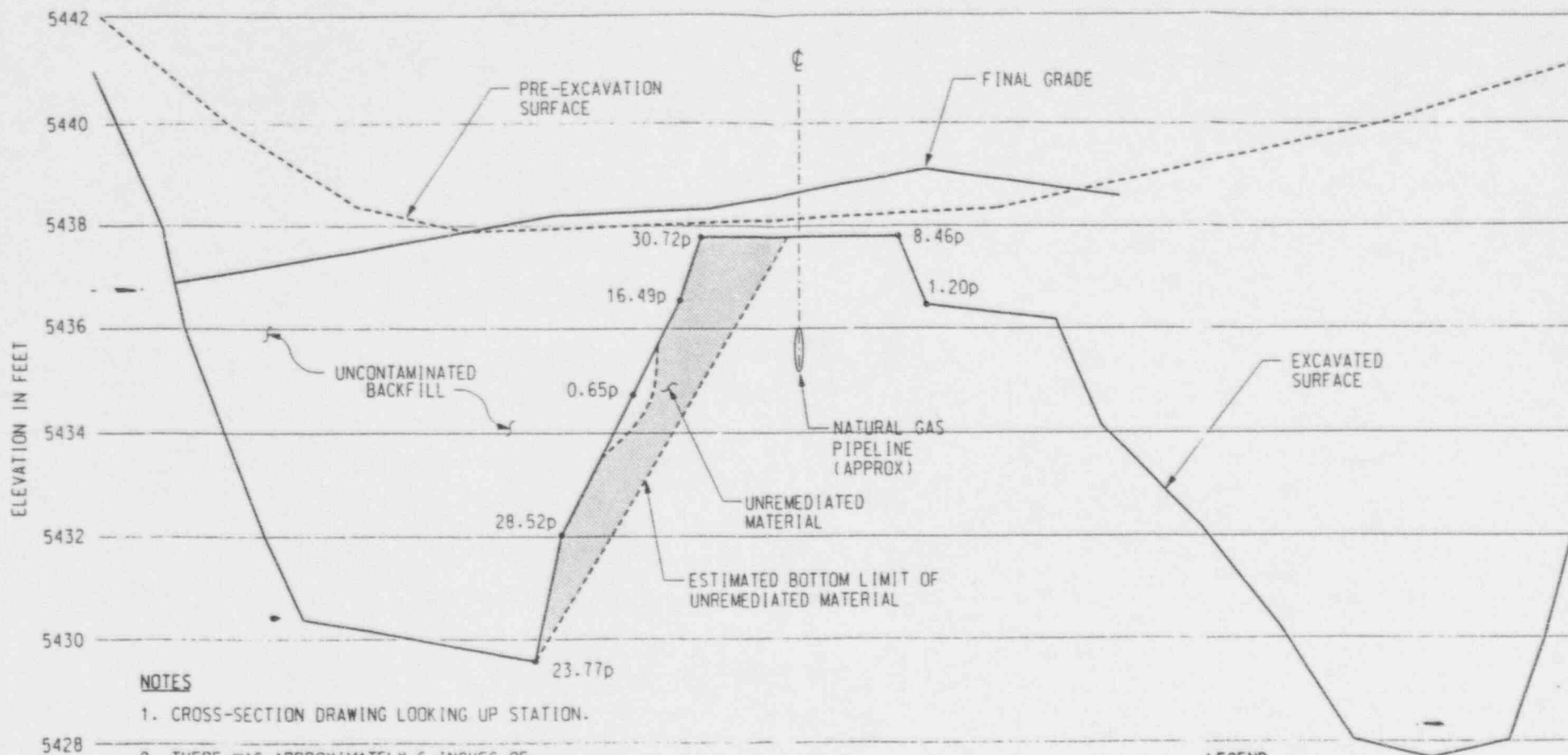
SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 22+99.5

JOHNSON-KRUMHOLTZ CORPORATION  
UNTRA PROJECT

DE-AC04-83AL18796

FIL-RE 14



#### NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

### SECTION 23+26

0ft 10 20 40 60ft  
HORIZONTAL SCALE: 1" = 10'

0ft 2 4 8 12ft  
VERTICAL SCALE: 1" = 2'

#### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION

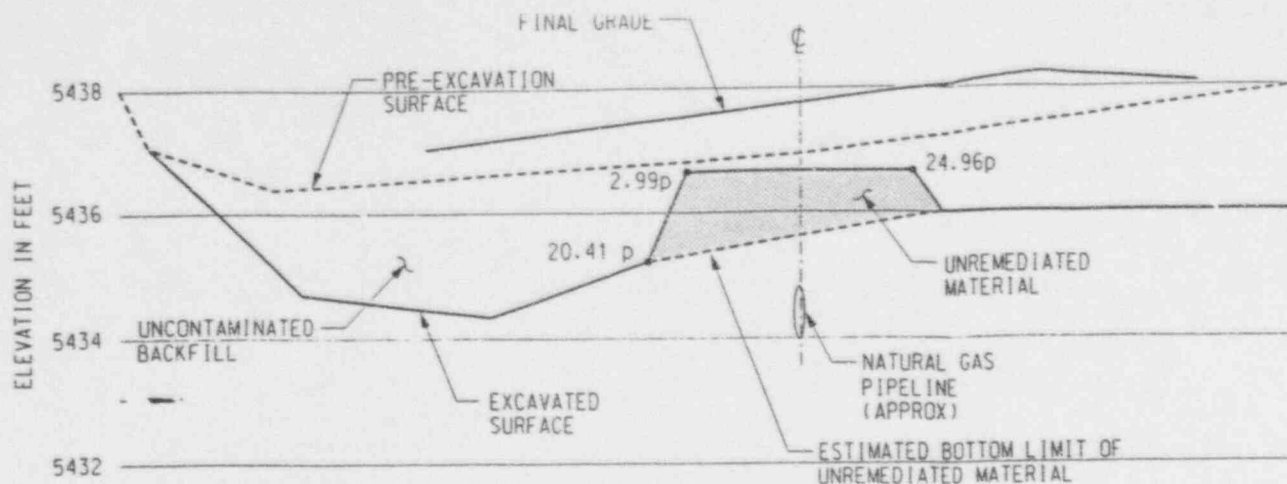
U.S. DEPARTMENT OF ENERGY  
ALBUQUERQUE, NEW MEXICO  
SLICK ROCK SITE  
SLICK ROCK, COLORADO

SECTION AT STATION 23+26

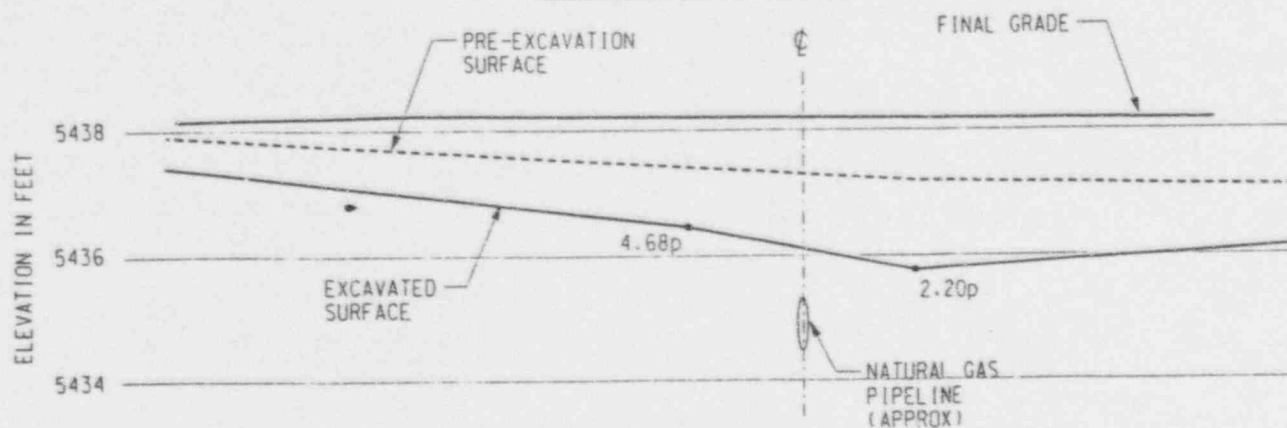
MORRISON KNUDSEN CORPORATION  
ENVIRONMENTAL SERVICES GROUP  
UNITA PROJECT  
1400 W. 10TH ST., SUITE 100, ALBUQUERQUE, NM 87102

DE-AC04-83AL18796

FIGURE 15



### SECTION 23+52



### SECTION 23+85

0ft 5 10 20 30ft

HORIZONTAL SCALE: 1" = 10'

0ft 1 2 4 6ft

VERTICAL SCALE: 1" = 2'

#### NOTES

1. CROSS-SECTIONS DRAWING LOOKING UP STATION.
2. THERE WAS APPROXIMATELY 6 INCHES OF EXCAVATION BELOW ORIGINAL GRADE WITHIN 10 FEET OF THE PIPELINE.

#### LEGEND

- P = pCi/g (PICO CURIES PER GRAM)  
 • = RADIATION READING LOCATION

U. S. DEPARTMENT OF ENERGY  
 ALBUQUERQUE, NEW MEXICO

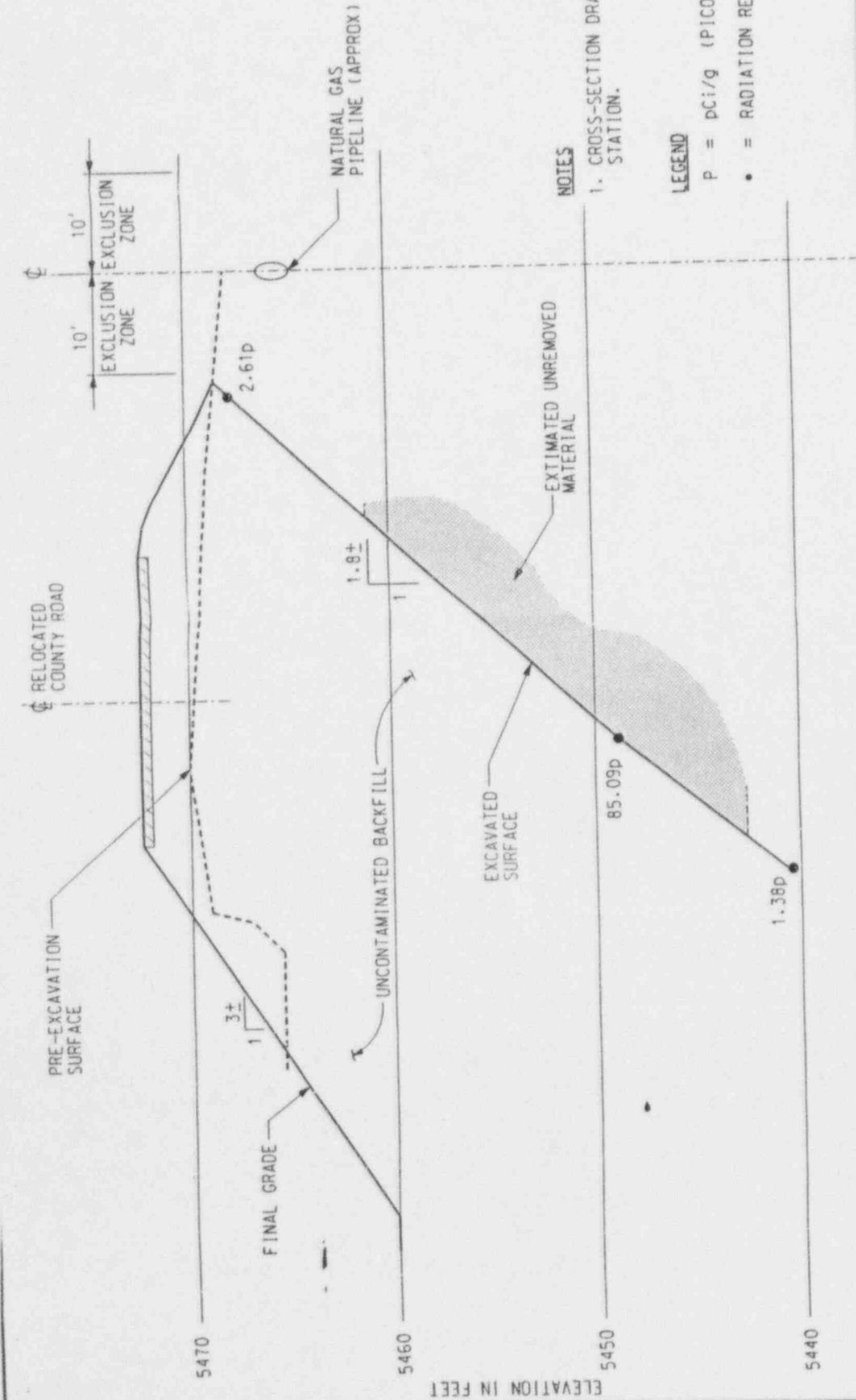
Slick Rock Site  
 Slick Rock, Colorado

SECTIONS AT  
 STATION 23+52 & STATION 23+85

MORRISON KNUDSEN CORPORATION  
 ENVIRONMENTAL SCIENCE GROUP  
 ULTRA PROJECT

DE-ACG-83AL18796

FIGURE 16

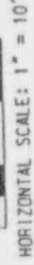


**NOTES**

1. CROSS-SECTION DRAWING LOOKING UP STATION.

**LEGEND**

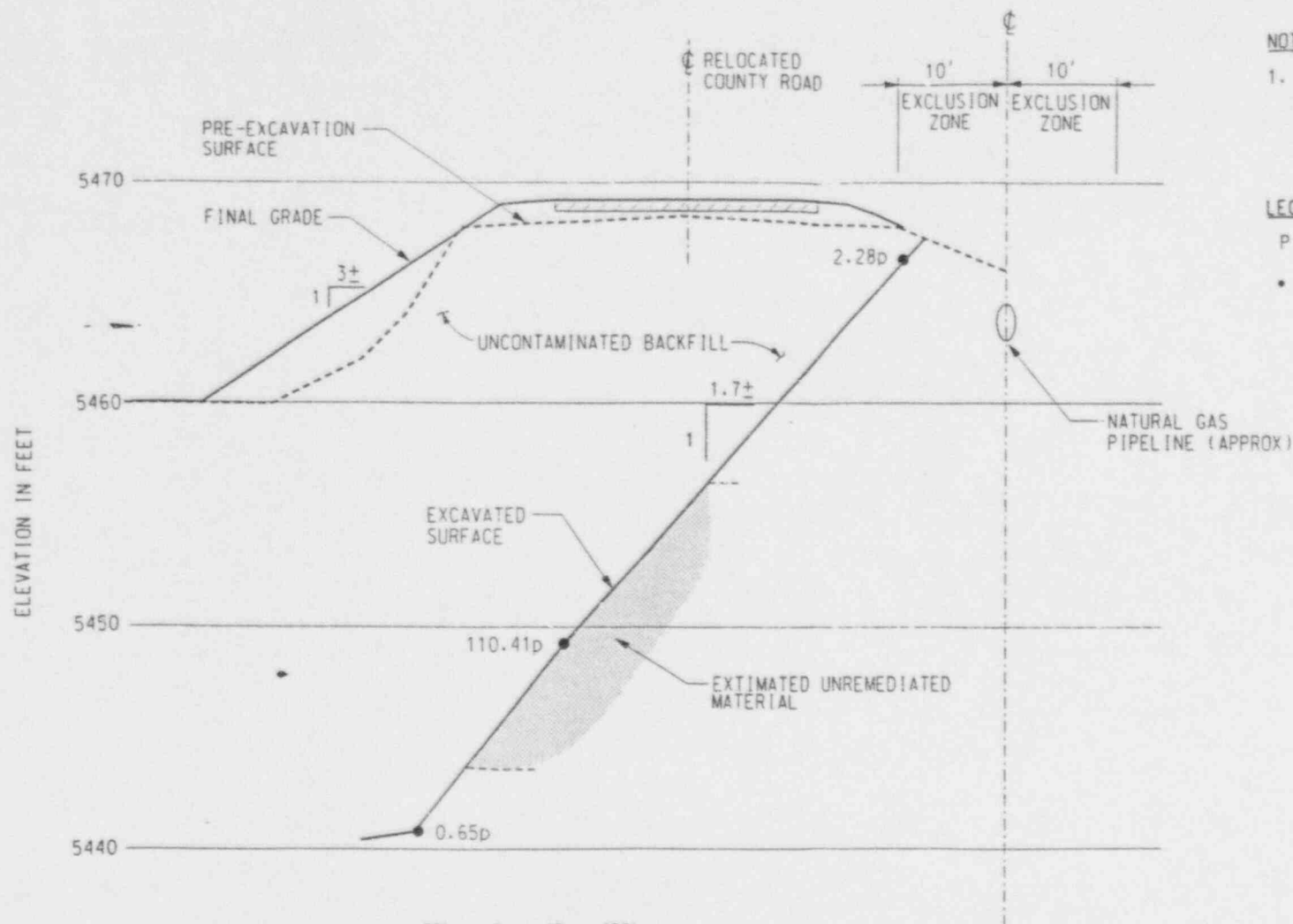
- P = pCi/g (PICO CURIES PER GRAM)
- = RADIATION READING LOCATION



**SECTION A**

U. S. DEPARTMENT OF ENERGY	
ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE	
SLICK ROCK, COLORADO	
SECTION A	
PROJECT NO.	DE-AC04-83AL18796
SHEET NO.	FIGURE 17

MORRISON ENGINEERING CORPORATION	
ULTRA PROJECT	
AS PREPARED BY THE CONTRACTOR FOR THE U.S. DEPARTMENT OF ENERGY	



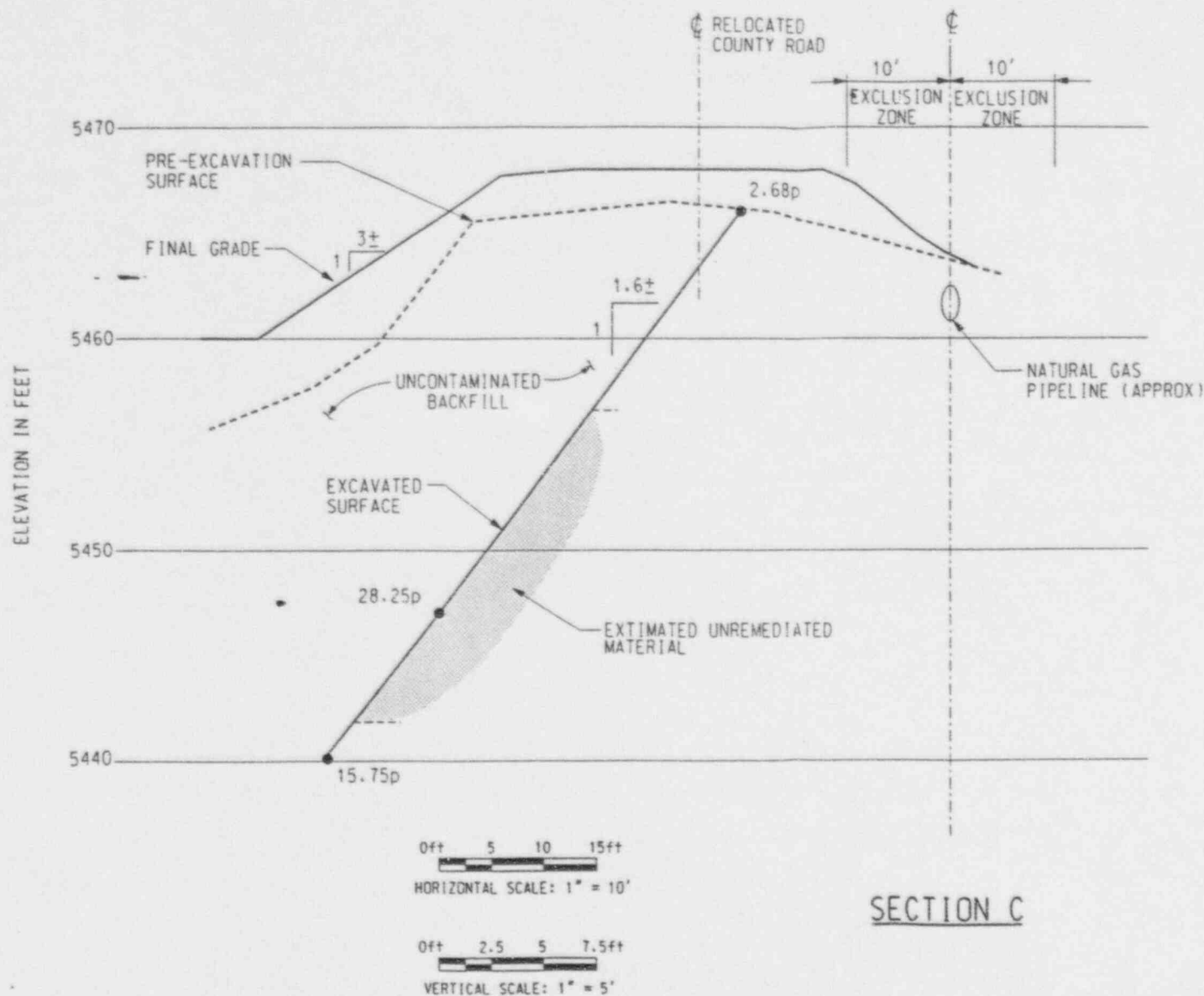
# NOTES

1. CROSS-SECTION DRAWING LOOKING UP STATION.

## LEGEND

P = pCi/g (PICO CURIES PER GRAM)  
• = RADIATION READING LOCATION

U. S. DEPARTMENT OF ENERGY	
ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE	
SLICK ROCK, COLORADO	
SECTION B	
MORRISON KNUDSEN CORPORATION ENVIRONMENTAL SCIENCE GROUP ULTRA PROJECT 400 NORTH 1ST AVENUE, SUITE 1000 DENVER, COLORADO 80202	PROJECT NO. DE-AC04-83AL18796 FIGURE 18



# **NOTES**

1. CROSS-SECTION DRAWING LOOKING UP STATION.

## **LEGEND**

P = pCi/g (PICO CURIES PER GRAM)

• = RADIATION READING LOCATION

▨ = MATERIAL WITH Ra-226 CONCENTRATIONS GREATER THAN 15 pCi/g ABOVE BACKGROUND

U.S. DEPARTMENT OF ENERGY	
ALBUQUERQUE, NEW MEXICO	
SLICK ROCK SITE	
SLICK ROCK, COLORADO	
SECTION C	
MORRISON KNUDSEN CORPORATION	PROJECT NO.
UNTRA PROJECT	DE-AC04-83AL18796
FIGURE 19	





## ATTACHMENTS

RIGHT OF WAY AND EASEMENT

UNION CARBIDE CORPORATION, hereinafter referred to as "Union Carbide", does hereby sell and convey to ROCKY MOUNTAIN NATURAL GAS COMPANY, INC., Denver, Colorado, hereinafter referred to as "Rocky Mountain", for the sum of FIFTY DOLLARS AND OTHER VALUABLE CONSIDERATION, the receipt and adequacy of which is hereby acknowledged, a right of way and easement fifty (50) feet in width for the purposes of laying, constructing, maintaining, operating, repairing, altering, replacing and removing a pipeline (with valves, meters, fittings, appliances, and related facilities) for the transportation of gas through and under the following described real property situate in the County of San Miguel, Colorado, to-wit:

T44N. R19W. N.M.P.M.

Section 25: W $\frac{1}{2}$ E $\frac{1}{2}$ ; NE $\frac{1}{4}$ SE $\frac{1}{4}$ .

T44N. R18W. N.M.P.M.

Section 30: SE $\frac{1}{4}$ SW $\frac{1}{4}$ ; NW $\frac{1}{4}$ SE $\frac{1}{4}$ .

and the parties mutually agree as follows:

1. The right of way and easement has been staked upon the above described real estate by Rocky Mountain and the pipeline shall be within such right of way. The location of said right of way and easement is approximated on the attached Exhibit A. The location of said right of way and easement and a legal description of the centerline thereof shall be shown on a plat or map filed for record by Rocky Mountain with the Clerk and Recorder of San Miguel County, Colorado, within 90 days after completion of construction of such pipeline.

2. Union Carbide is the owner of the surface estate and possessory title to the above described real property. Oil, gas and other minerals and the right of ingress and egress to explore for and develop same is in persons other than Union Carbide. Subject to the foregoing and easements and rights of way of record, Union Carbide warrants and agrees to defend the title to the above described real property. Union Carbide shall have the use of such right of way and easement except for any use which conflicts with purposes for which this right of way and easement is granted; provided, however, Union Carbide shall not build or construct or permit to be built or constructed any building or other improvement over or across said right of way and easement unless Union Carbide, at its sole expense, shall provide a right of way and easement adjoining the right of way and easement granted herein and shall pay all expenses of moving the pipeline referred to herein within such new right of way and easement. In the event Union Carbide provides such new right of way and easement, Rocky Mountain shall quitclaim to Union Carbide that portion of the right of

way and easement granted herein taken by Union Carbide for its purposes.

3. Rocky Mountain shall have all rights necessary or convenient for the full enjoyment and use of the rights herein granted, including, but without limiting the same, the free and full right of ingress and egress over and across the right of way and easement granted herein and over and across all roads upon the above described real property and other real property of Union Carbide adjoining or giving access to said right of way and easement.

4. Rocky Mountain agrees to indemnify and save harmless Union Carbide from any and all claims, demands and liabilities which may arise by the exercise of the rights herein granted, including, but not by way of limitation, injury or death to persons and damage to property, whether or not such persons are employees of Union Carbide, Rocky Mountain, or any of its contractors or agents, and whether or not such property damaged is owned by Union Carbide, Rocky Mountain or any of its contractors or agents.

5. Rocky Mountain agrees to comply with all applicable local, state and federal laws, rules and regulations in performance of any work on such parcels of land.

6. Rocky Mountain agrees to restore all fences, pipelines, ditches, roads and any other improvements disturbed by it to a condition at least equal to that which existed prior to the commencement of the exercise of any rights hereunder.

7. Rocky Mountain, by accepting this right of way and easement, acknowledges advice by Union Carbide that a uranium mill was formerly located upon one or more of the above described parcels of real property and certain portions of such real property contain residue from effluents from such uranium mill that could be hazardous to persons exposed thereto. Rocky Mountain assumes the risk of any harm to any person so exposed as a result of the exercise of rights granted herein and agrees to indemnify and save harmless Union Carbide from all claims and demands of any persons so injured and from any liability of Union Carbide as a result of any such injury.

8. Rocky Mountain agrees to bury all pipelines so that they will not interfere with the cultivation of the land, and also to pay for any damage to fences, improvements, and growing crops which may arise from its operation hereunder; said damage, if not mutually agreed upon, to be ascertained by three disinterested persons; one to be appointed by Union Carbide, one by Rocky Mountain, and the third by the two persons aforesaid, and the written award of said three persons, or any two of them, shall be final and conclusive.

9. There is included in this grant the right, from time to time, to lay, construct, maintain, operate, alter,

repair, remove, change the size of, and replace one or more additional lines of pipe within the right of way and easement granted herein; but for any such additional lines Rocky Mountain shall pay an additional sum, to be agreed upon between the parties, to Union Carbide.

10. This grant covers all of the agreements between the parties and no representations or statements, verbal or written, have been made modifying, adding to, or changing the terms of this agreement.

11. This right of way and easement and all provisions hereof shall be applicable to and binding upon the parties and their respective successors and assigns.

12. Upon the cessation of the use of the said pipeline, the rights and easement herein granted shall cease and terminate.

IN WITNESS WHEREOF, Union Carbide has executed this Right of Way and Easement this 3rd day of May, 1971.

UNION CARBIDE CORPORATION.

ATTEST:

Herman Levin  
Assistant Secretary

By John F. Shanklin <sup>4447</sup>  
Vice President

STATE OF NEW YORK    )  
                              ) ss.  
COUNTY OF NEW YORK    )

On the 3rd day of May, 1971, personally appeared before me John F. Shanklin, who, being by me duly sworn, did say that he is the Vice President of Union Carbide Corporation, and that said instrument was signed on behalf of said corporation by authority of its by-laws or by resolution of its board of directors and said John F. Shanklin acknowledged to me that said corporation executed the same.

Helen W. Richards  
Notary Public

HELEN W. RICHARDS  
Notary Public, State of New York  
No. 60-3271400  
Qualified in Westchester County  
Certificate Filed in New York County  
Commission Expires March 30, 1973

My Commission expires:

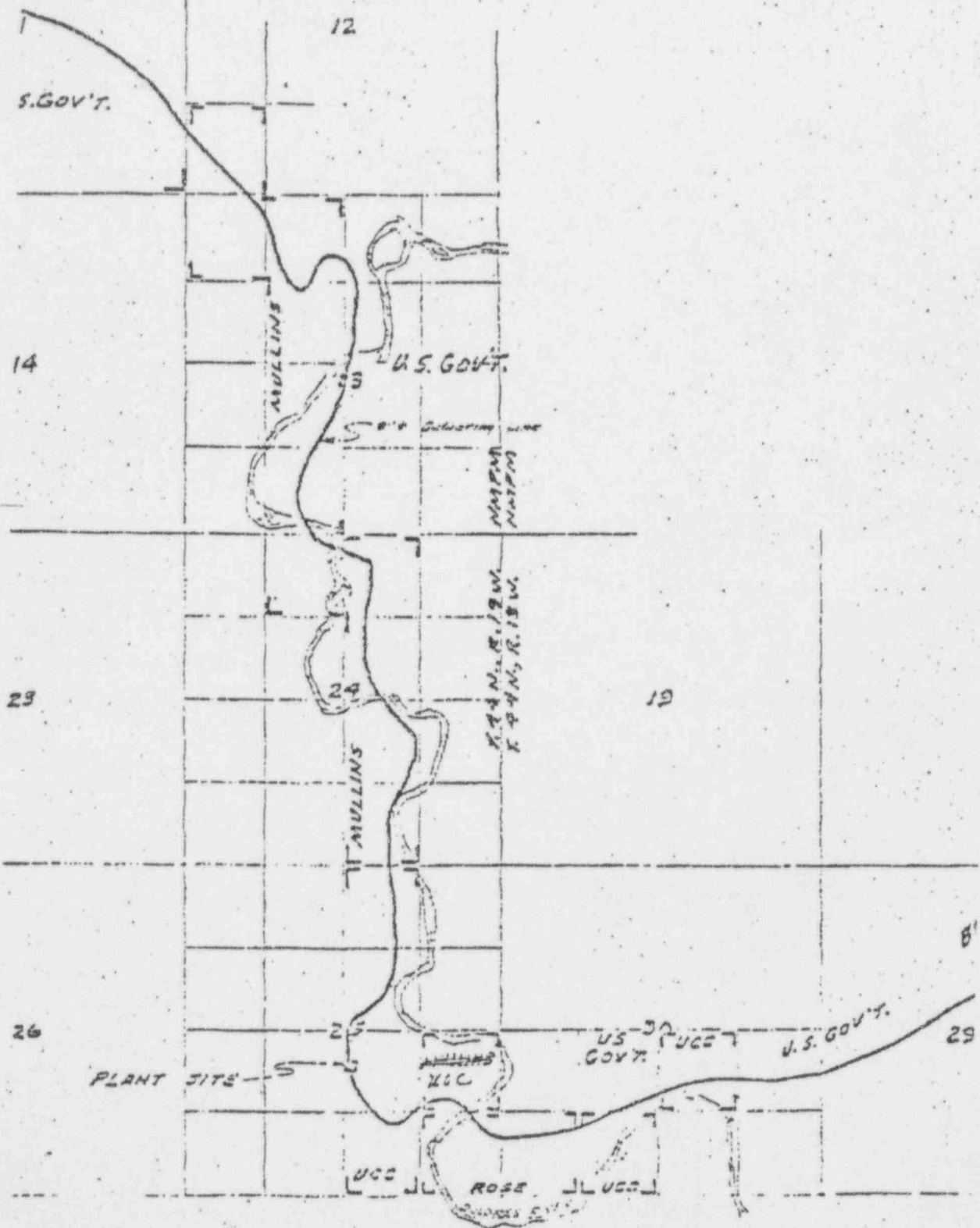


EXHIBIT A





K N Energy, Inc.  
370 Van Gordon Street  
P.O. Box 291304  
Lakewood, CO 80229-8304  
(303) 989-1740

March 20, 1996

Mr. Robert D'Arazzo  
MK-Ferguson Company  
Remedial Actions  
Contractor - UMTRA Project  
P. O. Box 9136  
Albuquerque, New Mexico 87119

Re: K N Energy, Inc. Pipeline adjacent to but located beyond  
the boundary of remedial activities under UMTRA Contract DE-  
R004-95AL97445.

Dear Mr. D'Arazzo:

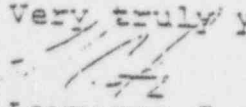
As we discussed today, K N Energy, Inc. requests that the  
above described UMTRA remedial actions be conducted so as to  
neither encroach upon our existing right of way or to  
otherwise pose any risk of damage or obstruction to our  
pipeline and related equipment.

Should there be any UMTRA remediation required in the vicinity  
of this pipeline so as to require the use of excavating  
equipment or other methods of soil removal, such activity must  
be conducted at least ten feet from our pipeline. Should  
there be any need for access to our right of way for the  
purpose of this excavation, such activity will only be  
approved in advance of commencement of such excavation on a  
case by case basis by a K N Energy, Inc. representative.

It is understood and agreed that by entering upon K N Energy's  
Right of Way to perform this activity, MK-Ferguson Company  
accepts full responsibility for its actions thereon, and  
shall release, defend, indemnify and save harmless the K N  
Energy, Inc. from and against any and all loss, damage,  
injury, liability, and claims thereof for injury to or death  
of person, and for loss of or damage to property, including  
employees and property of MK-Ferguson Company and its agents,  
resulting directly or indirectly from MK-Ferguson Company's  
and/or its subcontractors' activity upon this Right of Way.

Should you have any questions regarding this matter, please  
contact me at (303) 763 - 3316.

Very truly yours,

  
Lawrence J. Corte  
Assistant General Counsel



ENGINEERS  
AND  
CONSTRUCTORS



**MK-FERGUSON COMPANY**  
A MORRISON KNUDSEN COMPANY

HEADQUARTERS OFFICE  
1500 WEST 3RD STREET  
CLEVELAND, OHIO U.S.A. 44113-1406  
PHONE: (216) 523-5600/TELEX: 982542

Mr. Lawrence Corte  
Assistant General Counsel  
KN Energy, Inc.  
379 Van Gordon Street  
Lakewood, CO 80228-8304

REPLY TO: MK-FERGUSON COMPANY  
REMEDIAL ACTIONS  
CONTRACTOR-UMTRA PROJECT  
P.O. BOX 9136  
ALBUQUERQUE, NEW MEXICO U.S.A. 87119

March 29, 1996

SUBJECT: Remediation Within the Gas Line Right of Way At the Union Carbide  
Processing Site - Slick Rock, Colorado UMTRA Site

REFERENCE: KN Energy Letter To Mr. Robert D'Arezzo Dated March 20, 1996

---Dear Mr Corte:

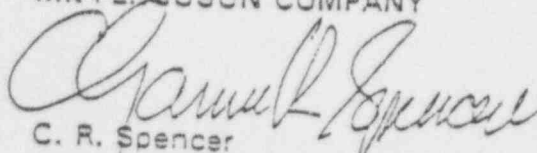
This letter is to confirm MK-Ferguson's understanding of the referenced letter attached regarding work within KN Energy's 50 foot wide gas line right of way.

MK-Ferguson understands that remediation within the right of way may only be conducted up to ten feet from either side of the pipeline. It is further understood, based on previous conversations between yourself, Mr. Loyd Knuckles (KN Energy's Field Supervisor), and Mr. Robert D'Arezzo and Mr. Tim Swisse of MK-Ferguson, that excavation of up to six inches deep within the remaining 20 feet (directly above the pipeline) would be acceptable provided Mr. Knuckles was on site when this work was done. Further, Mr. Knuckles informed Mr. Swisse and Mr. D'Arezzo that he considers the "ten feet and six inch" limitation to be the safe working distance from the pipe.

MK-Ferguson will proceed with remediation within the gas line right of way, complying with the stipulations as identified above and in the referenced letter. Should you have any questions or require additional information, please contact Mr. D'Arezzo of my staff at (800) 443-4379.

Sincerely,

MK-FERGUSON COMPANY

  
C. R. Spencer  
Construction Engineering Manager

Attachment

CRS\RDALdmm

cc: w/: J. Fape, DOE  
P. Oliver, CDPHE

bcc: R. E. Cooney  
M. D. Thomson  
T. E. Swisse, SRK  
R. D'Arezzo  
T. N. Langlois  
File

## TELECON REPORT

Date: 3/20/96

Time: 8:45 a.m.

☒ To ☐ From: Milt Derrick Location: UMETCO Phone: (970) 245-3700, ext: 251

Recorded By: Robert D'Arezzo Location: APC Phone: (505) 246-2557

Reference: SRK-95-05 Gas Line ROW Work

I called Milt to ask him if he had discussed the gas line ROW issue with Curt Sealy. He said he hadn't, but would go get him right now.

When Curt arrived, I explained that MK was letting UMETCO know of the situation regarding the gas line cleanup and the possibility of applying Supplemental Standards to material left in the gas line ROW. Curt confirmed that KN energy had an easement and, therefore, a voice in what went on within their ROW. UMETCO still had legal title to the land. I told Curt I had talked to KN Energy, and their preference was that we only excavate up to 10 feet either side of the pipe. Curt agreed that he couldn't see any benefit of us getting closer than that. He also said that if we wanted to get within the gas line ROW, all three parties (UMETCO, KN Energy, MK-F) would have to enter into some agreement, such as an RAA.

## EXHIBITS

November 4, 1996

Mr. Lawrence Corte  
Assistant General Counsel  
KN Energy, Inc.  
379 Van Gordon Street  
Lakewood, Co. 80228-8304

**SUBJECT: Application For Supplemental Standards, Slick Rock Gas Pipeline Right of Way**

Dear Mr. Corte:

In accordance with the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, Public Law 95-604, the Department of Energy (DOE) designated the Slick Rock Union Carbide(UC) Site for remedial action. As you know KN Energy owns the Right of Way to the natural gas pipeline that crosses the UC Site. Three areas along the pipeline contain mill tailings material in excess of Environmental Protection Agency (EPA) Guidelines. The "Gas Plant Area" starts approximately 100 feet south of the gas plant fence line and continues south approximately 600 feet until the pipeline turns east. The "S8 Road Area" is on the east side of the site where the pipeline Right of Way runs adjacent to County Road S8 where the road turns southeast toward the county road bridge. The "Madame Curie Area" is on the east side of the UC Site running along the west side of the road until the pipeline reaches the river (See Figure 1, attached).

The pipeline is pressurized and as you requested the excavation was halted ten feet from either side. This created a strip of contaminated material 20 feet wide along the gas pipeline. As agreed, contaminated material was removed from the top six inches of soil within the 20 feet. Contaminated material is still present between the 6 inch excavation depth and the pipeline. Leaving contamination in place is permitted under the Code of Federal Regulations 40 C.F.R. 192.21 and .22, Supplemental Standards.

The stated C.F.R. says that Supplemental Standards may be applied if any of the following criteria is met:

- a) Remedial action would pose a clear and present risk of injury to workers or to members of the public
- b) Remedial action would directly cause excessive environmental harm
- c) The cost of remedial action at the vicinity site is unreasonably high relative to long-term benefits
- d) The cost of remedial action for cleanup of a building is unreasonably high relative to benefits
- e) There is no known remedial action
- f) Radionuclides other than Radium-226 and its decay products are present

We are basing this recommendation on the criteria A and C.

KN Energy  
ATTN: Lawrence Corte  
November 4, 1996  
Page 2

Criteria A pertains to risk of injury to workers or members of the general public. The risk of injury to workers while excavating a pressurized pipeline is too great to warrant remediation. Criteria C pertains to cost versus benefits of remediation. The pressure could be removed from the pipeline but the cost of doing so would be unreasonably high relative to long-term benefits.

If all of the contamination is removed from around the pipeline, the areas above EPA Guidelines would be removed along with the exposure from mill tailings. If some of the material is left in place the areas above EPA Guidelines and the exposure from mill tailings will remain, however, due to the remote locations of the areas of contamination exposure in excess of the limits to a member of the general public is unlikely.

A member of the general public is allowed 100 millirem per year of long-term exposure. Long-term exposure is expected exposure due to natural and man-made radiation sources. With the contaminated material left in place general area radiation levels range from 5.0 to 14.0 micro R/hr. Background for the Slick Rock locale is 10.0 micro R/hr. If a person spent 8 hours a day, 5 days a week, for 50 weeks in a 14.0 micro R/hr radiations field, he would receive about 28 millirem of gamma exposure in one year. However, 20 millirem of this exposure is attributable to natural background. Therefore, a person may receive 8 millirem of gamma exposure from tailings in one year, or about 8% of the amount allowed the general public (10 C.F.R. 20.1301).

The remote location of the areas limits the amount of exposure to a member of the general public. The location also makes it unlikely that the land will used by a member of the public for any particular reason in the future. The material is above and around a pipeline, so construction of a building in the areas of contamination in the future is unlikely.

In compliance with the EPA regulations found in the Code of Federal Regulations 40 192.21, we solicit your comments concerning this action. We are attaching a copy of the applicable section of the Code of Federal Regulations for your convenience in responding to this proposed action. To comply with EPA regulations, we must receive a written response with your comments. We request your response by November 18, 1996. If you have any questions, please feel free to contact Mr. Dave Charlton at 1-800-443-4379.

Sincerely,

MK-FERGUSON COMPANY

Robert D'Arezzo  
Vicinity Property Manager

Enclosures

