

CASE NUMBER 8224
POST HEARING DOCUMENTS
REQUESTED BY
NMEID AND NMOCD

May 1985

Prepared for:

Tenneco Oil Company
6162 South Willow
Englewood, Colorado 80111

Prepared by:

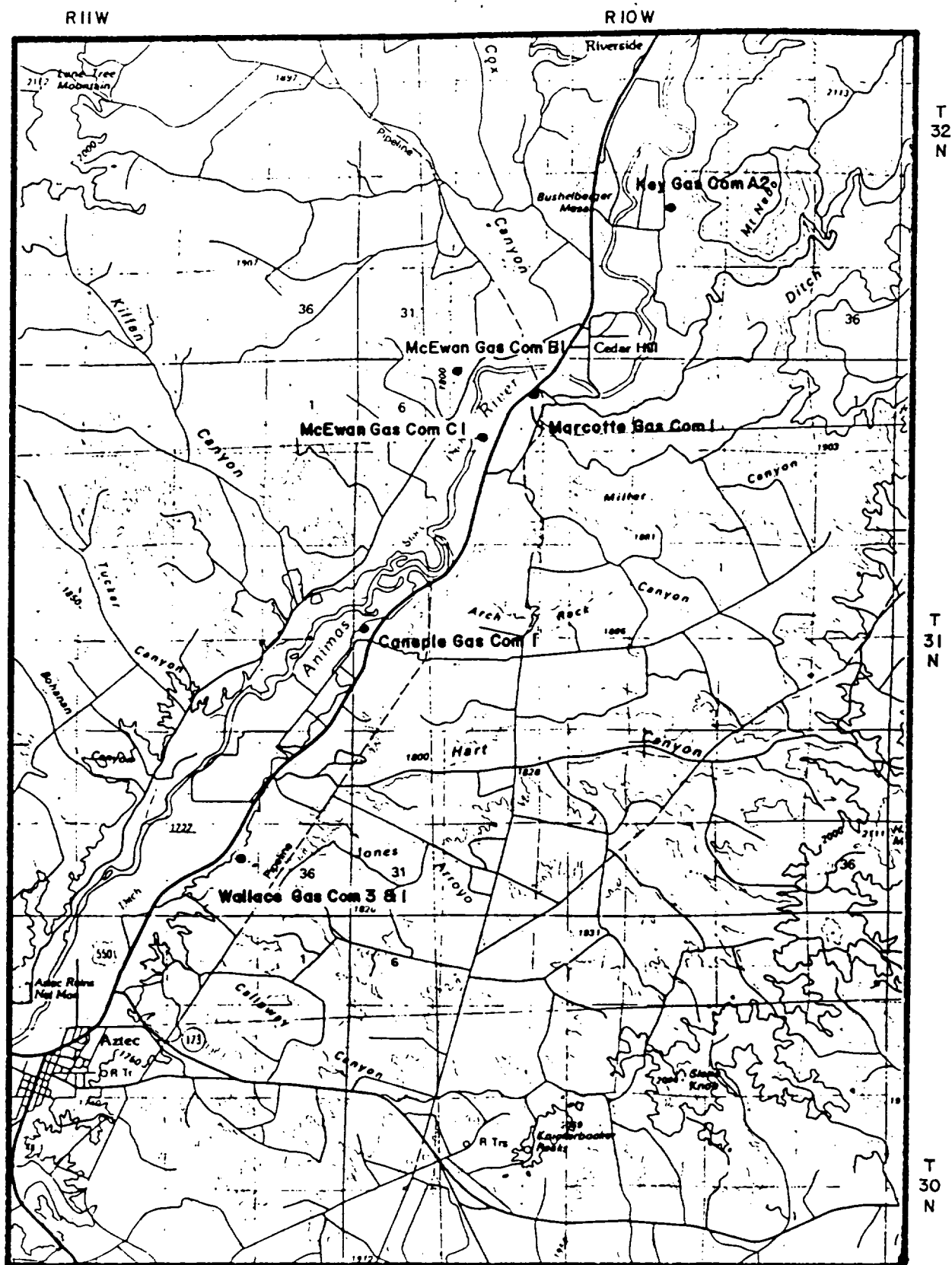
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Albuquerque, New Mexico 87102

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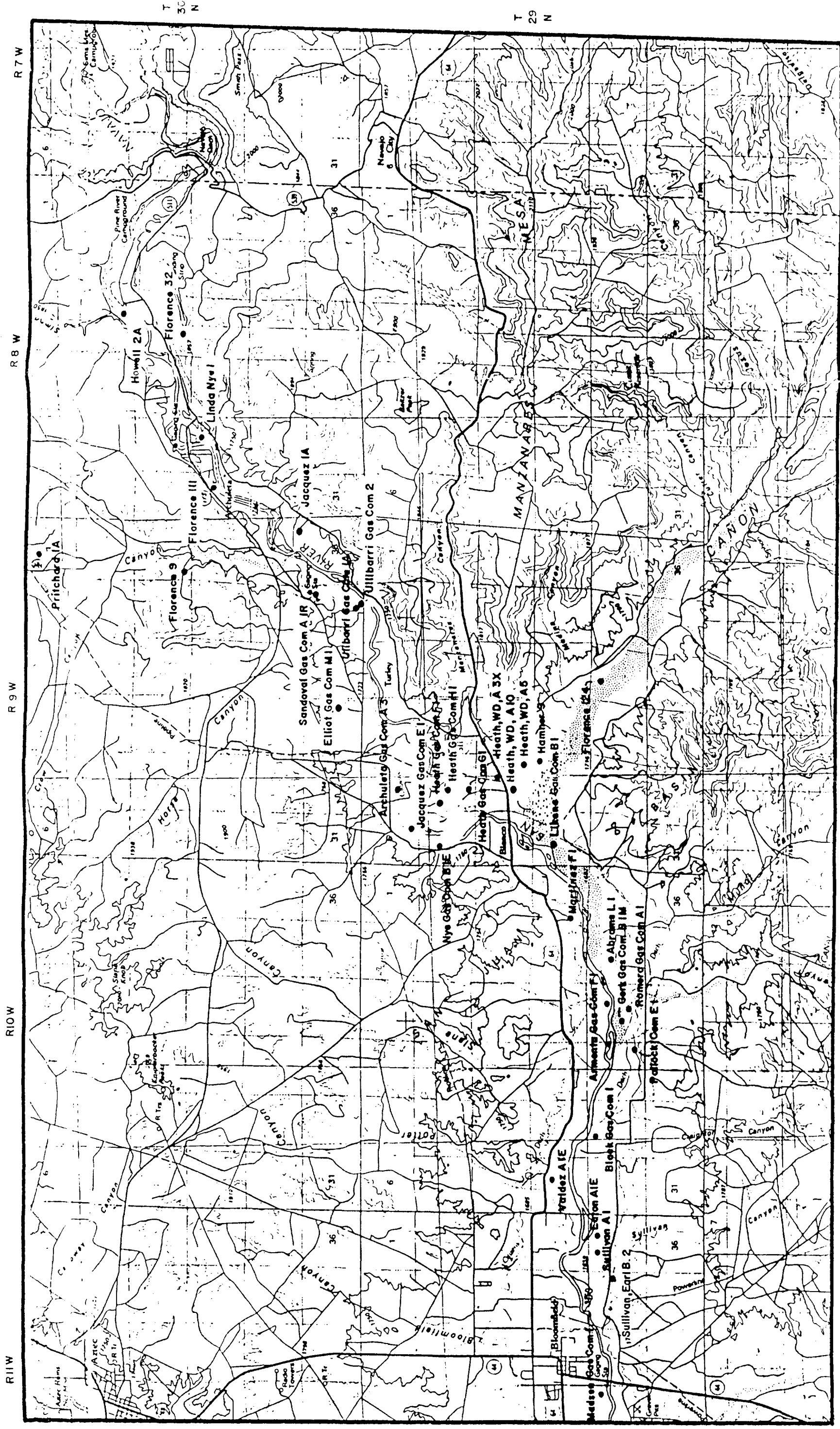
- 1.0 FIELD DATA FORMS AND PHOTOGRAPHS
- 2.0 ANALYTICAL REPORTS
- 3.0 SPECIFIC CONDUCTANCE MEASUREMENTS FROM FIELD SITES
- 4.0 VOLUME RECORDS FOR PRODUCED WATER
- 5.0 DILUTION OF BENZENE IN PRODUCED WATER PITS DUE TO
RAINFALL AND SNOWFALL
- 6.0 STATISTICAL ANALYSIS OF SAMPLING (TO BE SUPPLIED)
- 7.0 COMPUTER PROGRAM, INPUT AND OUTPUT

1.0 FIELD DATA FORMS, PHOTOGRAPHS AND HYDROGEOLOGIC NOTES

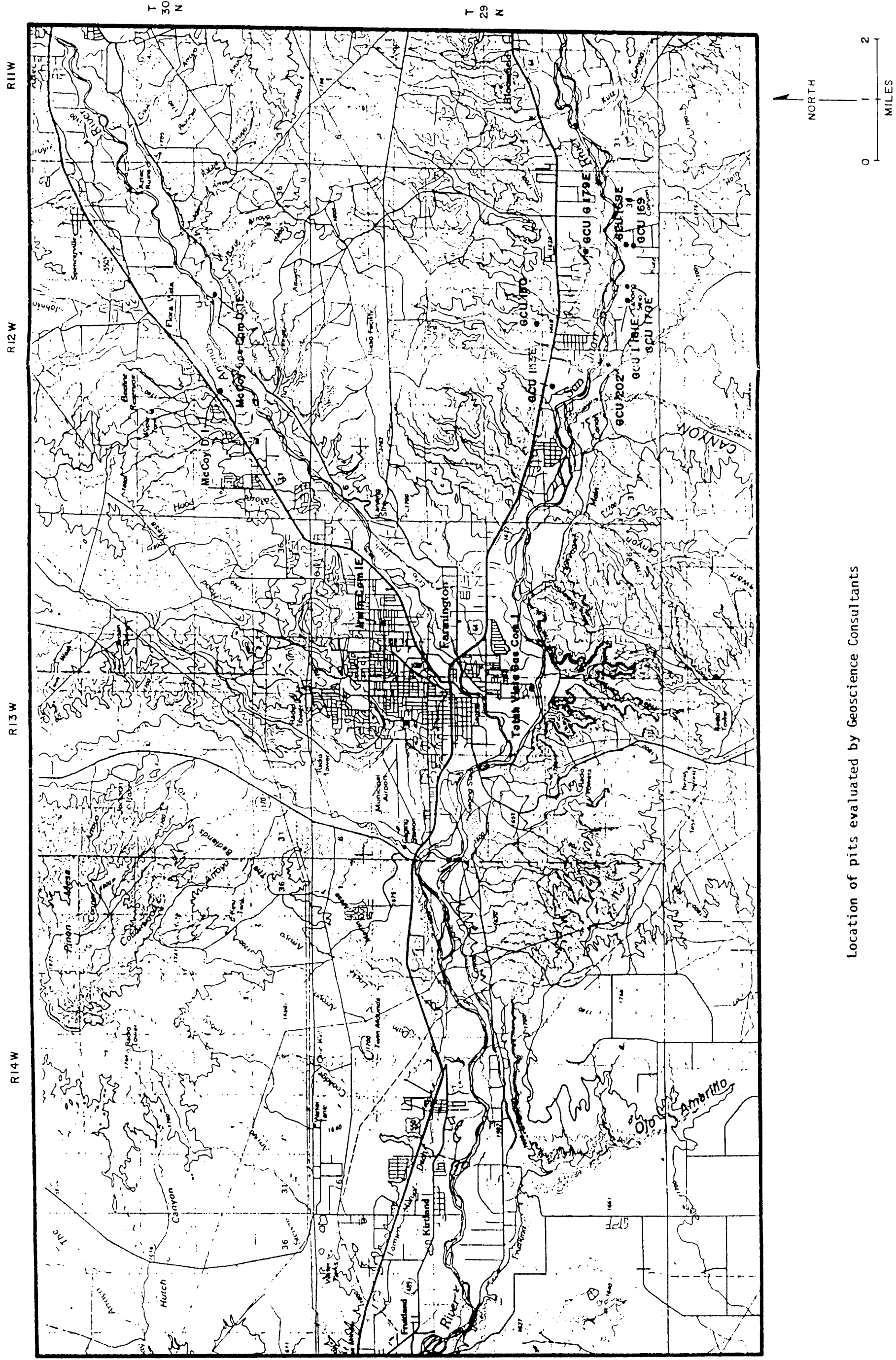
All field forms and accompanying photographs for the well sites visited in the random study of the vulnerable area are enclosed. The visual inspection employed the grain-sized versus hydraulic conductivity graph from Freeze and Cherry, 1979 Table 1-1. This section enclosed all of the field notes from the random study of well sites in the vulnerable area.



Location of pits evaluated by Geoscience Consultants



Location of pits evaluated by Geoscience Consultants



Location of pits evaluated by Geoscience Consultants

		k (darcy)	k (cm ²)	K (cm/s)	K (m/s)	K (gal/day/ft ²)
Rocks						
Unconsolidated deposits						
Karst limestone Permeable basalt Fractured igneous and metamorphic rocks Limestone and dolomite Sandstone		10 ⁵	10 ⁻³	10 ²	1	10 ⁶
		10 ⁴	10 ⁻⁴	10	10 ⁻¹	10 ⁵
		10 ³	10 ⁻⁵	1	10 ⁻²	10 ⁴
		10 ²	10 ⁻⁶	10 ⁻¹	10 ⁻³	10 ³
		10	10 ⁻⁷	10 ⁻²	10 ⁻⁴	10 ²
		1	10 ⁻⁸	10 ⁻³	10 ⁻⁵	10
		10 ⁻¹	10 ⁻⁹	10 ⁻⁴	10 ⁻⁶	1
		10 ⁻²	10 ⁻¹⁰	10 ⁻⁵	10 ⁻⁷	10 ⁻¹
		10 ⁻³	10 ⁻¹¹	10 ⁻⁶	10 ⁻⁸	10 ⁻²
		10 ⁻⁴	10 ⁻¹²	10 ⁻⁷	10 ⁻⁹	10 ⁻³
Unfractured metamorphic and igneous rocks Shale Unweathered marine clay Glacial till Silt, loess Silty sand Clean sand Gravel		10 ⁻⁵	10 ⁻¹³	10 ⁻⁸	10 ⁻¹⁰	10 ⁻⁴
		10 ⁻⁶	10 ⁻¹⁴	10 ⁻⁹	10 ⁻¹¹	10 ⁻⁵
		10 ⁻⁷	10 ⁻¹⁵	10 ⁻¹⁰	10 ⁻¹²	10 ⁻⁶
		10 ⁻⁸	10 ⁻¹⁶	10 ⁻¹¹	10 ⁻¹³	10 ⁻⁷

McMahon #1

TABLE 1-1
 RANGE OF VALUES OF HYDRAULIC CONDUCTIVITY
 AND PERMEABILITY (Freeze and Cherry, 1979)

WELL SITES INVESTIGATED IN
GEOSCIENCE CONSULTANTS, LTD FIELD STUDY

DETAILED FIELD STUDY SITES

McCoy "D" 1
Eaton A-1E
Payne 1

RANDOM SAMPLING FIELD INVESTIGATION OF PRODUCED WATER PITS

1.1 SAN JUAN RIVER

$dh/dl = 0.002 - 0.003$

HIGH HYDRAULIC CONDUCTIVITY CASES (10,000 gpd/ft²)

- GCU 202 Roll 1 - Frame # 1, 3, 4
- Totah Vista 1 Roll 2 - Frame # 1, 2
- GCU 170 E Roll 3 - Frame # 17, 18
- GCU "I" 181 E Roll 3 - Frame # 15, 16

MEDIUM HYDRAULIC CONDUCTIVITY CASES (1,000 - 5,000 gpd/ft²)

- Gerk B 1 M Roll 4 - Frame # 1, 2
- Archuleta A3 No Photo Available
- Madsen 1 Roll 1 - # 8, 9
- Armenta F1 Roll 4 - Frame 6, 7, 8
- Abrams L1 Roll 4 - Frame 5
- Sullivan A1 Roll 4 - Frame # 13, 14, 15
- GCU 153 E Roll 3 - Frame # 10, 11
- GCU 179 E Roll 1 - Frame # 5, 6, 7

LOW HYDRAULIC CONDUCTIVITY CASES (10 - 100 gpd/ft²)

- GCU 169 E Roll 3 - Frame # 19, 20
- Romero A1 Roll 4 - # 9
- Ulibarri 1A Roll 5 - # 1, 2

1.2 ANIMAS RIVER $dh/dl = 0.004$

HIGH HYDRAULIC CONDUCTIVITY CASES (10,000 gpd/ft²)

- Marcotte 1 Roll 2 - Frame # 17

MEDIUM HYDRAULIC CONDUCTIVITY CASES (1,000 - 5,000 gpd/ft²)

No cases observed

LOW HYDRAULIC CONDUCTIVITY CASES (10 - 100 gpd/ft²)

No cases observed

1.3 VALLEY SIDE SLOPES AND TRIBUTARIES $dh/dl = 0.01$

HIGH HYDRAULIC CONDUCTIVITY CASES

- McCoy D 1 E Roll 2 - Frame # 5, 6, 7

MEDIUM HYDRAULIC CONDUCTIVITY CASES

- Key A2 Roll 2 - Frame # 18, 19, 21
 - o Florence 124 (630 days) No photo available
 - o Florence 124 (1080 days) No photo available
- Florence 9 Roll 6 - Frame # 16, 17
- GCU 169 Roll 3 - Frame # 20
- Canepie 1 Roll 2 - Frame # 9, 10, 11, 12

LOW HYDRAULIC CONDUCTIVITY CASES

- GCU 150 Roll 3 - Frame # 13, 14
- Martinez F1 Roll 1 - Frame # 10, 11
 - o Valdez AIE No photo available
- Pollock E1 Roll 4 - Frame # 10
- Black 1 Roll 4 - Frame # 12
- Irwin 1E Roll 2 - Frame # 3
- Heath G 1 Roll 5 - Frame # 15

1.4 BEDROCK MESAS CASES - Produced water can not enter ground water

- Howell 2A Roll 3 - Frame # 5, 6
- McEwen B1 No Photo Available
- Heath WD A 3X Roll 5 - Frame # 17
- Linda Nye 1 Roll 5 - Frame # 7, 8
- Heath Gas COM H 1 Roll 5 - Frame # 14
- Nye Gas COM B 1E Roll 1 - Frame # 12, 13, 14
- Heath WD A 10 Roll 5 - Frame # 16
- Heath WD A5 Roll 5 - Frame # 18, 19
- Florence 32 Roll 3 - Frame # 7, 8, 9
- Florence 111 Roll 3 - Frame 2, 3, 4
- Jacquez 1A Roll 5 - Frame # 9, 10
- Sandoval A 1 R Roll 5 - Frame # 5, 6
- Pritchard 1A Roll 3 - Frame # 1

1.5 PICTURED CLIFFS CASES - No water produced, no production equipment

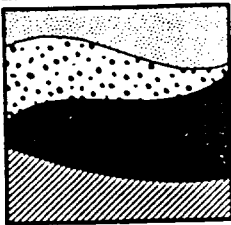
- McEwen Gas COM C 1 Roll 2 - Frame # 14, 15, 16
- Wallace Gas COM 3 and 1 Roll 2 - Frame # 8
- o Hamner 9 No photo available
- o Sullivan, Bruce 1 No photo available
- o Sullivan, Earl B, 2 No photo available
- o Ulibarri Gas COM 2
- Likins Gas COM B 1 Roll 4 - Frame # 3
- o Heath Gas COM F 1 No photo available
- Elliott Gas COM N 1
- Jacquez Gas COM C 1 Roll 1 - Frame # 15

WELL SITES VISITED WHICH WERE NOT PART OF
RANDOM SAMPLE

Sullivan Frame A1
Linda Nye 1
Sullivan Frame A1E
Jacquez 2A
Sullivan B1
Valdez B1

Linda Nye 1A
Archuleta 1
Jacquez 2
Jacquez 1M
Jacquez 3

SAN JUAN RIVER
HIGH HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location NWNE 33 29N 12W

WELL NAME GCU #202

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.1

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10³ - 10⁴

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 6-10

Pit Description

Dry

Standing Water

Estimated Depth: 0.25

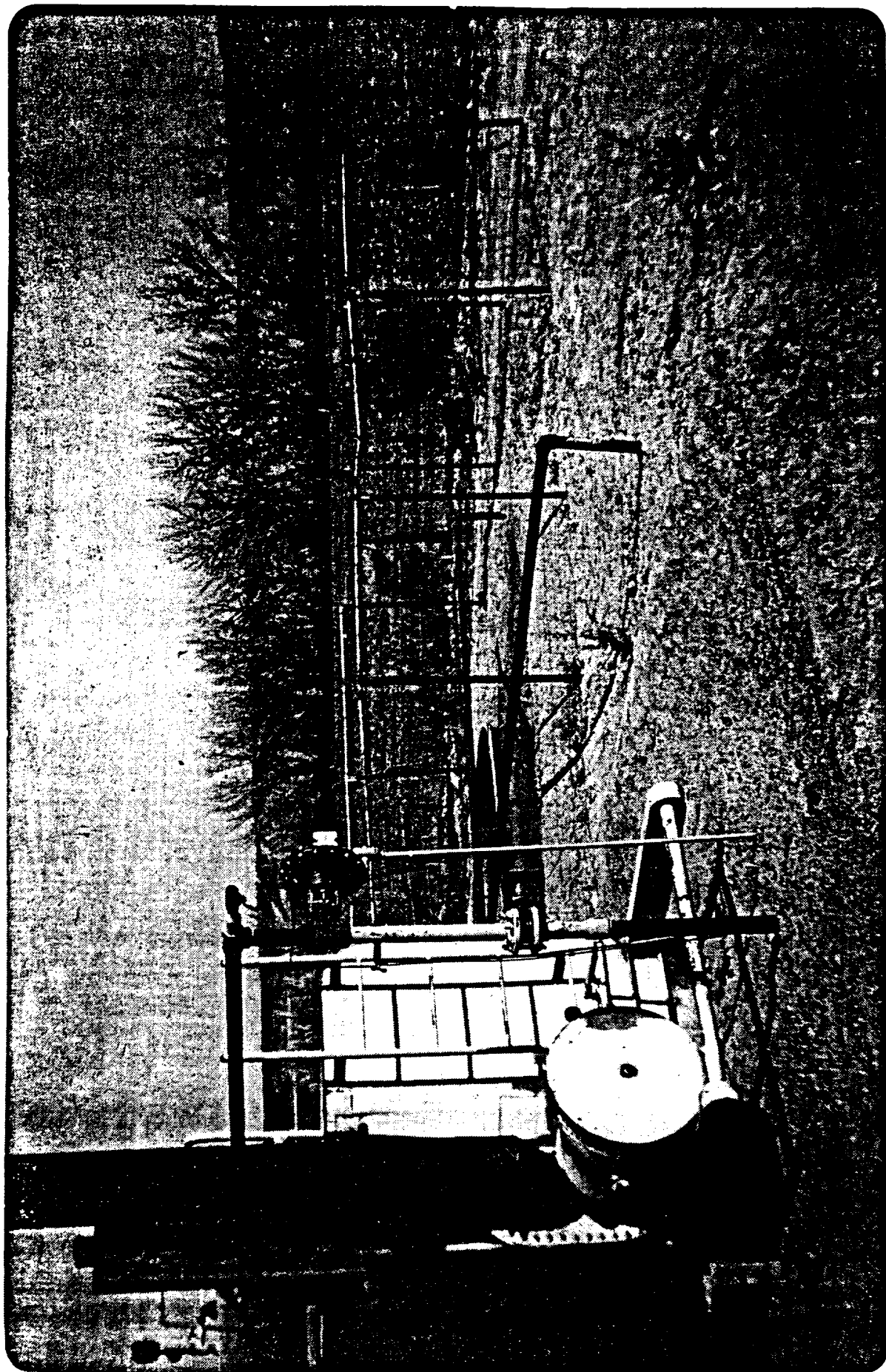
Photographs of Site: 0-4 EPNE EARTH PIT SHOWING FORMATION, LINED PIT

Producing Formation: BASIN DAKOTA

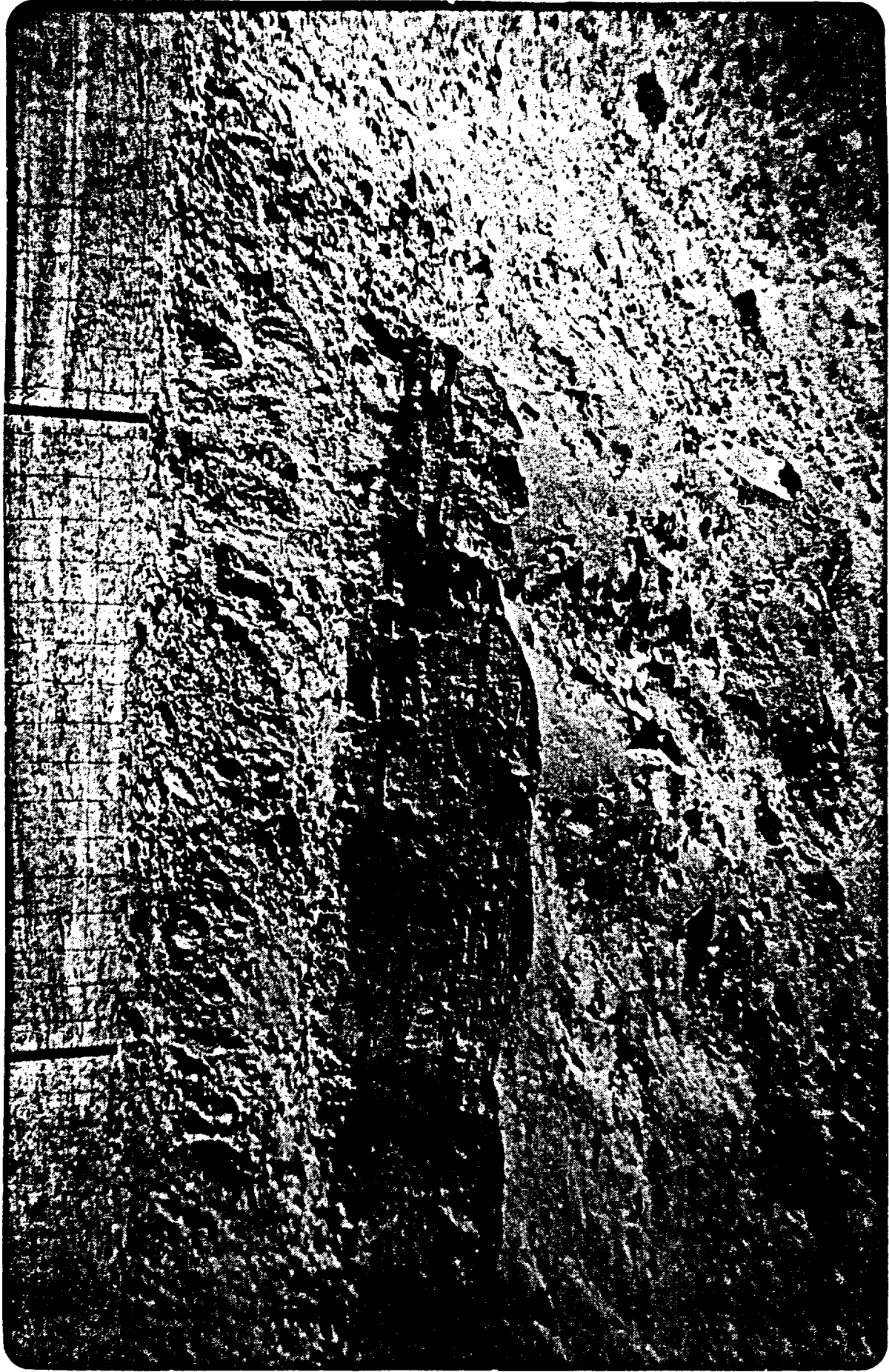
Comments: LINED PIT NITE RIVER

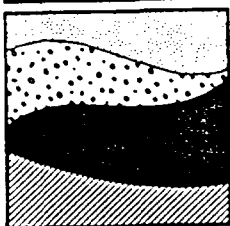


GCU 202 Roll #1 Slide 1



GCU 202 Roll #1 Slide 3





Section TWP RNG
Location SW SW 22 29N R13W

WELL NAME TOTAH VISTA GAS COM #1 ✓

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: — — PIT IS FULL OF GROUND WATER 0.02

Estimated Hydraulic Gradient: RIVER GRADIENT 0.003

Estimated Hydraulic Conductivity: 10⁴ GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 1 1/2'

Pit Description

Dry

Standing Water

Estimated Depth: 1'

Photographs of Site: #1 PIT #2 EDGE OF PIT WELL SITE & RIVER IN BACK

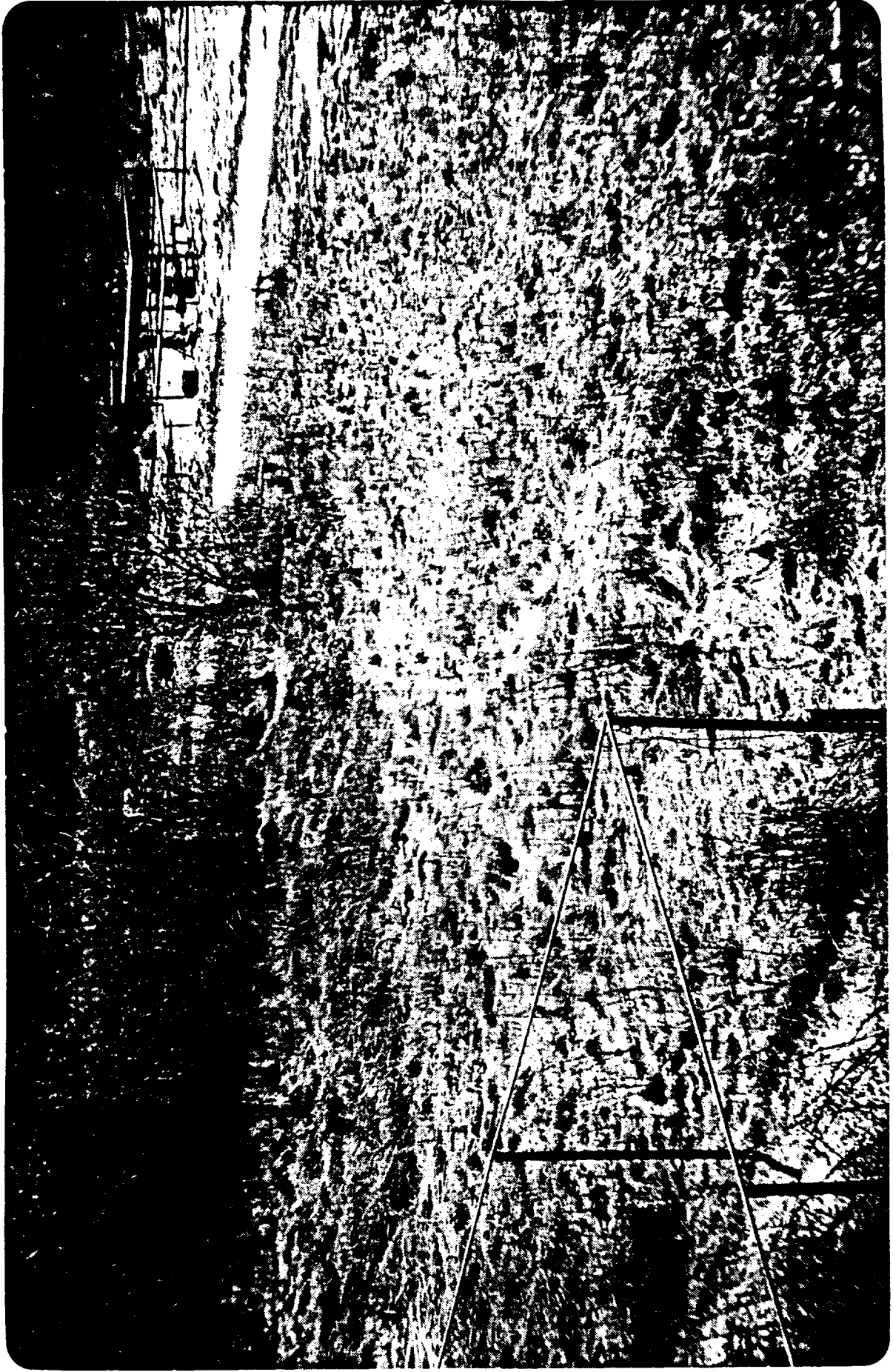
Producing Formation: BASIN DAKOTA

Comments: GRAVEL QUARRY 100' AWAY. BLOW SAND/OVERBANK SANDS
AND VERY COARSE 3/4' GRAVEL AQUIFER.

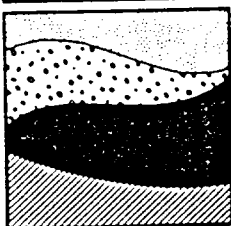
4/10/95 PM



TOTAH VISTA 1 Roll #2 Slide 1



TOTAH VISTA 1 Roll #2 Slide 2



Section TWP RNG
Location SWNN 35 29N 12W

WELL NAME GCU #170E ✓

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.13

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10⁴ GPD/FT

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 10'

Pit Description Dry

Standing Water

Estimated Depth:

0.25'

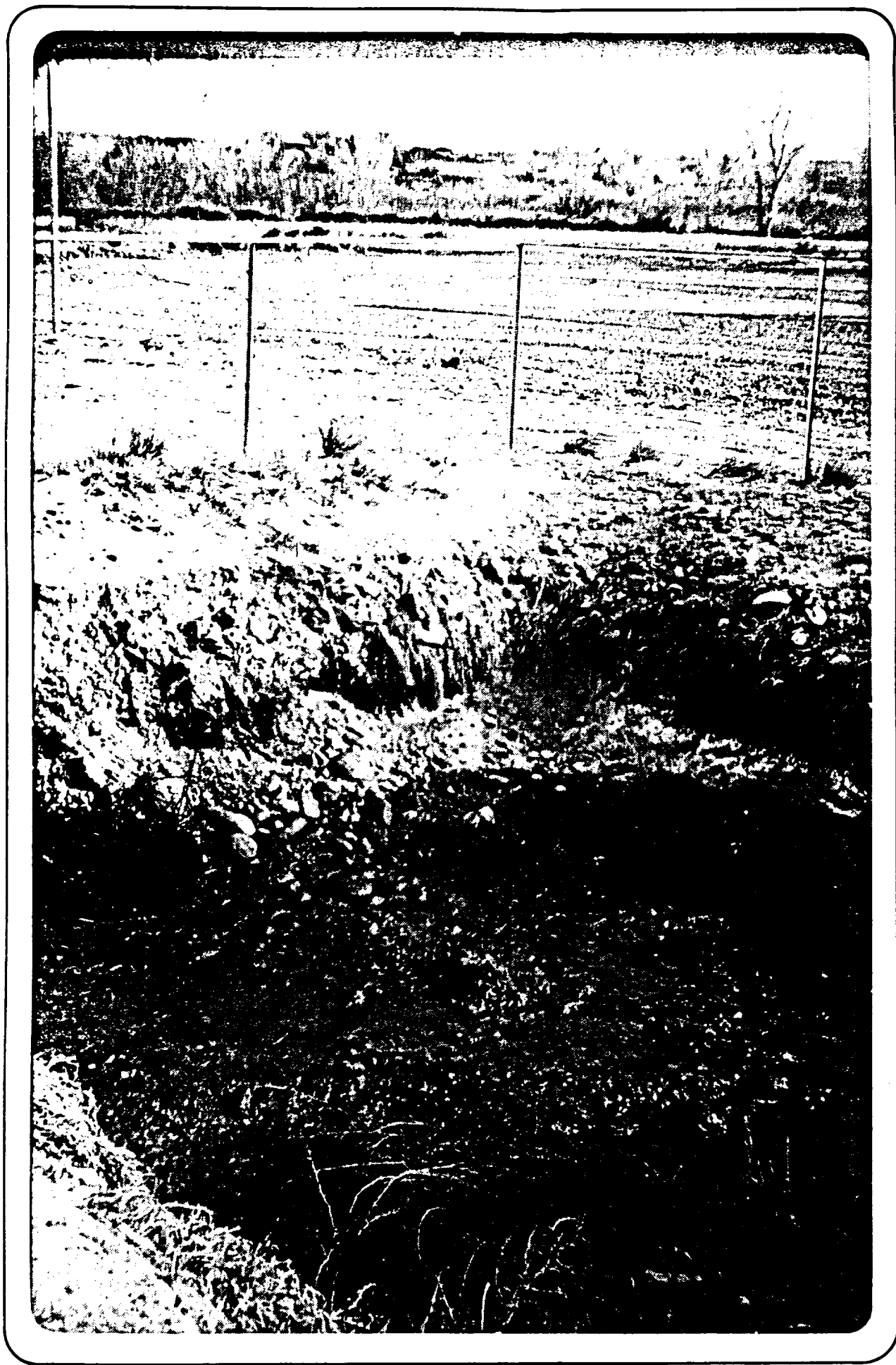
Photographs of Site: 17 18 NOTE RIVER IN BKGRND

Producing Formation: BASIN DAKOTA

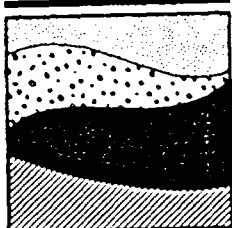
Comments: GOOD SOIL OVER COARSE GRAVEL



GCU 170E Roll #3 Slide 17



GCU 170E Roll #3 Slide 18



Section TWP RNG
Location SENE 34 29N 12W

WELL NAME GCU "I" #181E

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.07

Estimated Hydraulic Gradient: 0.002

Estimated Hydraulic Conductivity: 10⁴ GPD/FT

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 4'

Pit Description Dry

Standing Water Estimated Depth: 0.2'

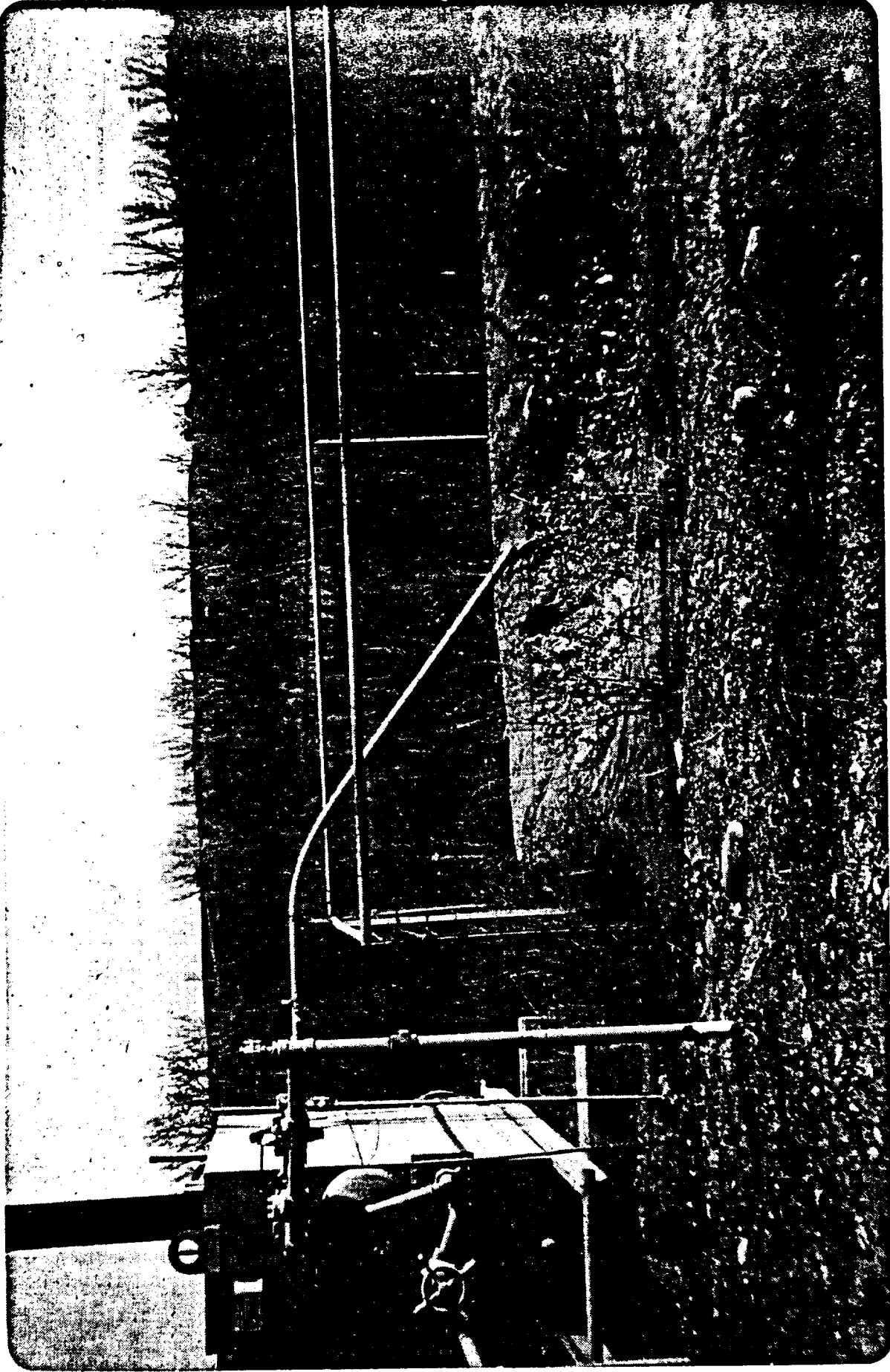
Photographs of Site: #15 #16 PIT w/ RIVER IN BACK

Producing Formation: BASIN DAKOTA

Comments: SOME BLOW SAND AND PACKING FORM LINER

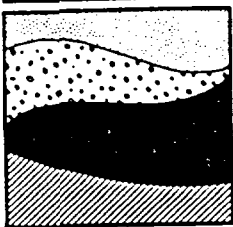


GCU "I" 181E Roll #3 Slide 15



GCU "I" 181E Roll #3 Slide 16

SAN JUAN RIVER
MEDIUM HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location 27 29N 10W

WELL NAME GERK GAS COM B #1M

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.13

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10^3 gpd/ft²

Formation/Grain Size of Unsaturated Zone: River Alluvium

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 10-15 ft

Pit Description

Dry

Standing Water

Estimated Depth:

0.75

Photographs of Site:

1, 2-X PIT

Producing Formation: BASIN DAKOTA

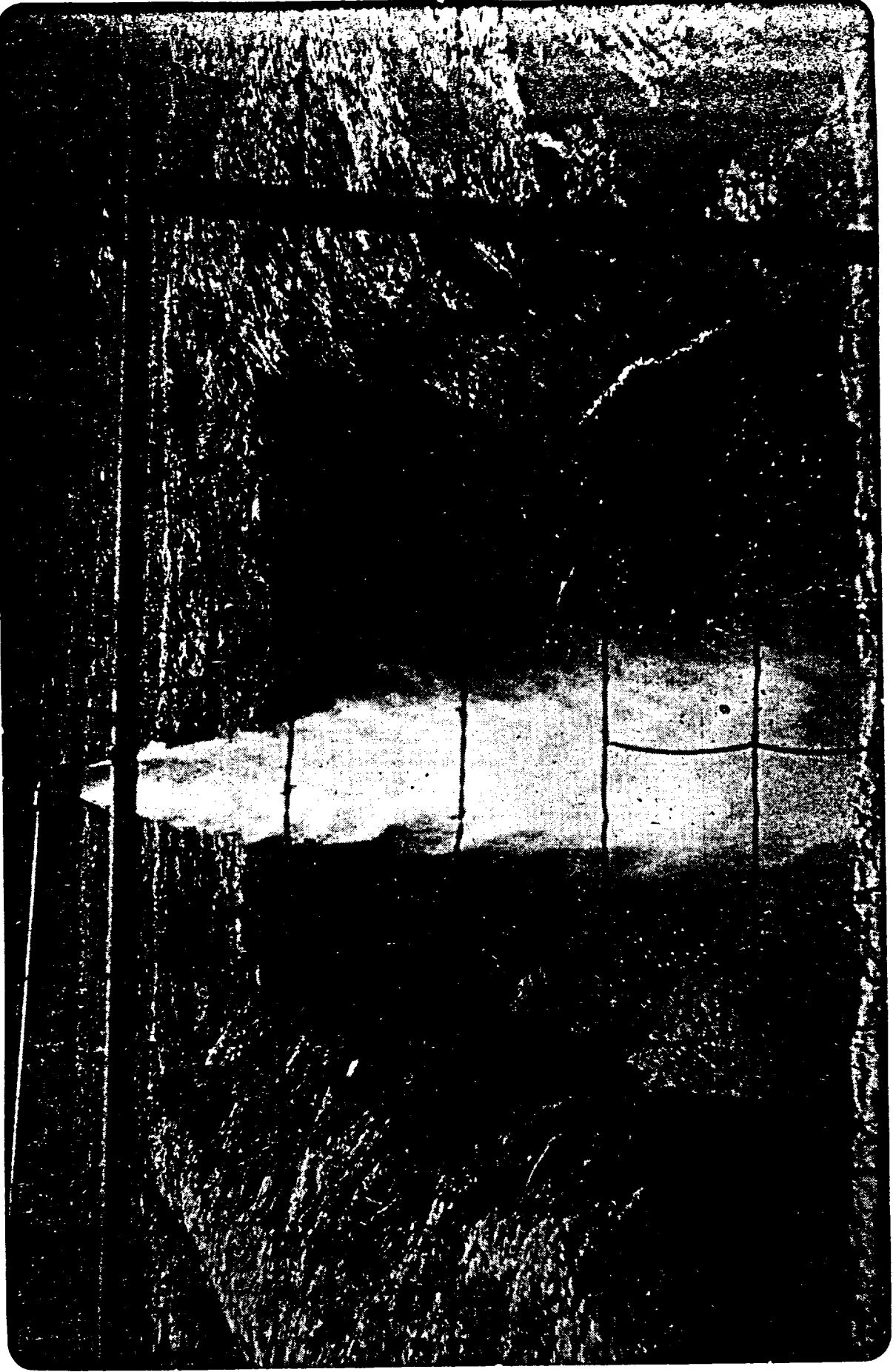
Comments:

SOME MAT/LINER

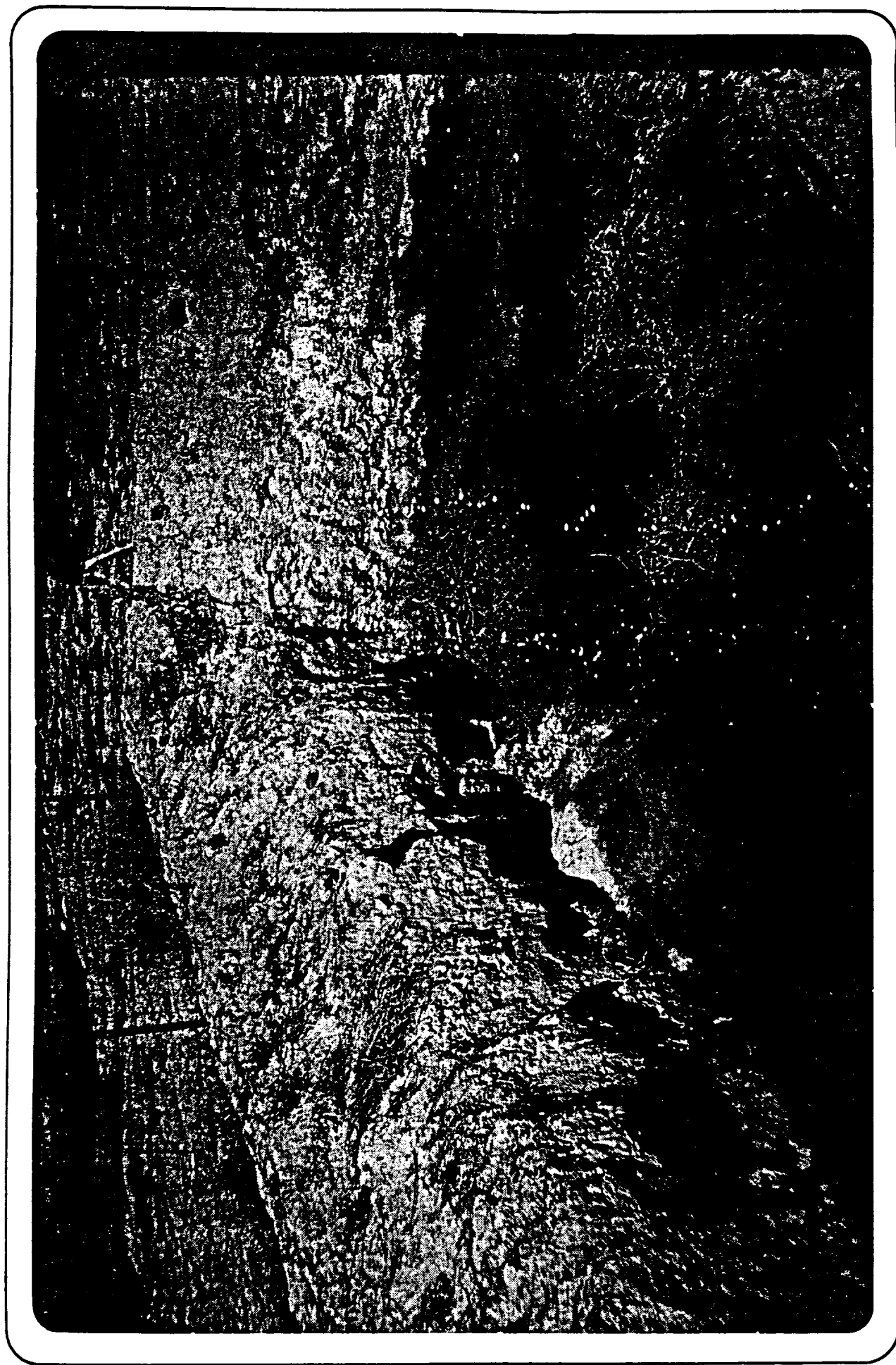
CONSTANT DRIP OF

CONDENSATE

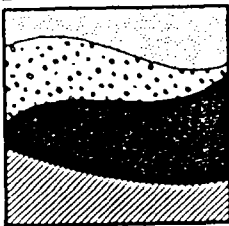
4/11/85 BSA



GERK B 1 M Roll #4 Slide 1



GERK B 1 M Roll #4 Slide 2



Section TWP RNG
Location NESW5 29N 9W

WELL NAME ARCHULETA GAS COM A #3

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: — — 0.02

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: $10^2 - 10^3$ GPD/FT

Formation/Grain Size of Unsaturated Zone: SOIL/SAND

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 6'

Pit Description Dry

Standing Water

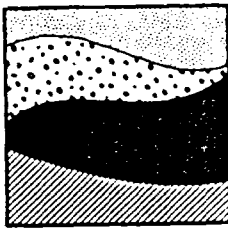
Estimated Depth: 1'

Photographs of Site: 15 DISCHARGE OF A #3 PIT RIVER BKGRND

Producing Formation: BASIN DAKOTA

Comments: FINE SAND H-C LINER

NO PHOTOGRAPHS AVAILABLE



Section TWP RNG
Location NENE 28 29N 11W

WELL NAME MASDEN GAS COM #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.23

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10³ GPD / FT

Formation/Grain Size of Unsaturated Zone: SOIL AND ALLUVIUM

Very Fine Fine ~~Coarse~~ Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 2'

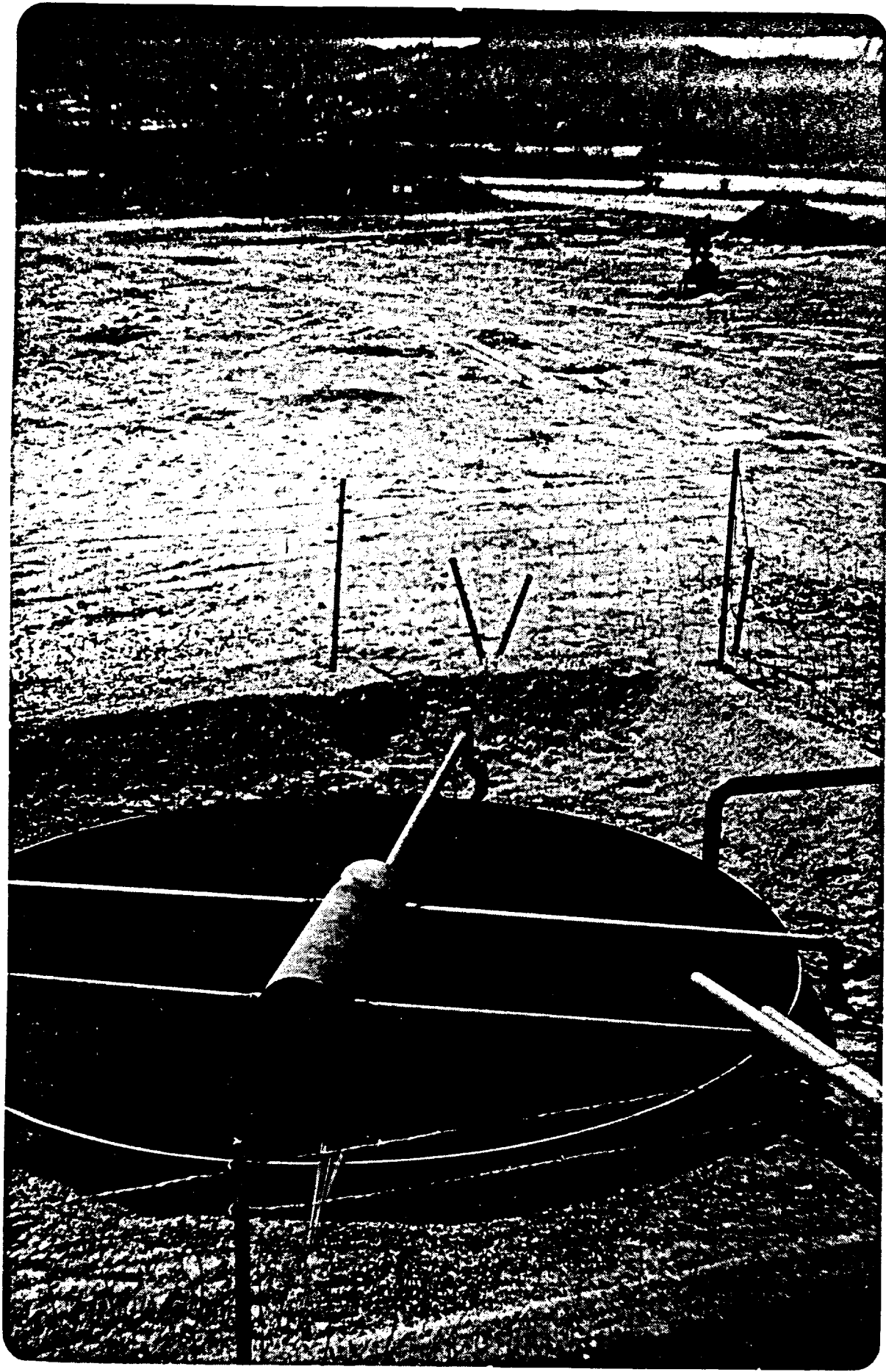
Pit Description Dry

Standing Water Estimated Depth: 0.1'

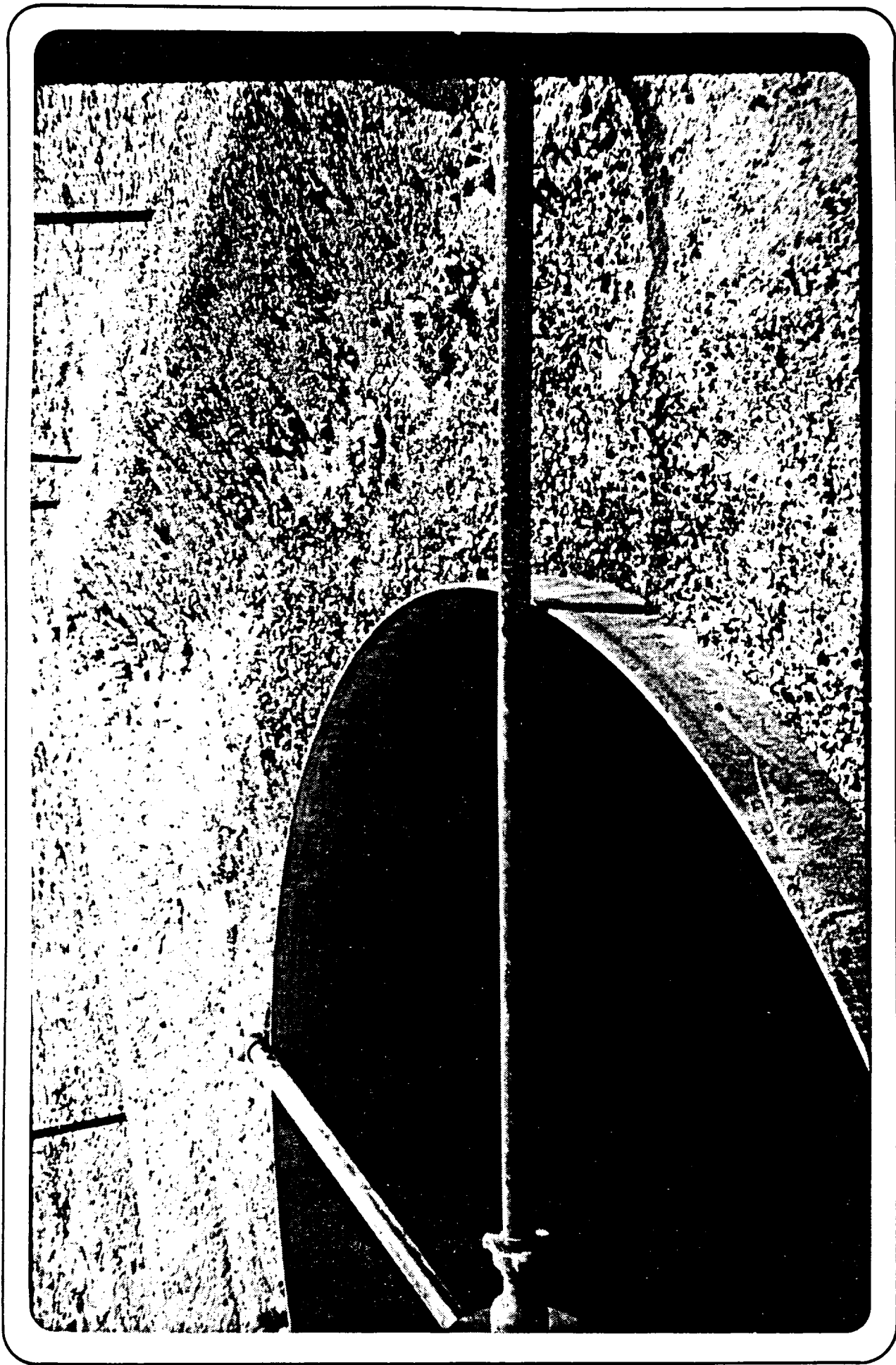
Photographs of Site: #9 #8 LINED PIT w/ RIVER BACKGROUND

Producing Formation: BASIN DAKOTA

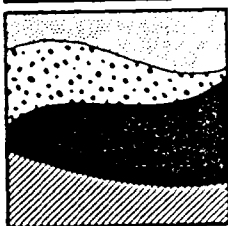
Comments: NEXT TO STP



MADSEN 1 Roll #1 Slide 8



MADSEN 1 Roll #1 Slide 9



	Section	TWP	RNG
Location	<u>SENE 27</u>	<u>25 N</u>	<u>10 W</u>

WELL NAME ARMENTA GAS COM F #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — — 0.02

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: $10^3 / 10^2$ bpd/ft²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: COULD BE LOOKING AT IT ~ 5-10'

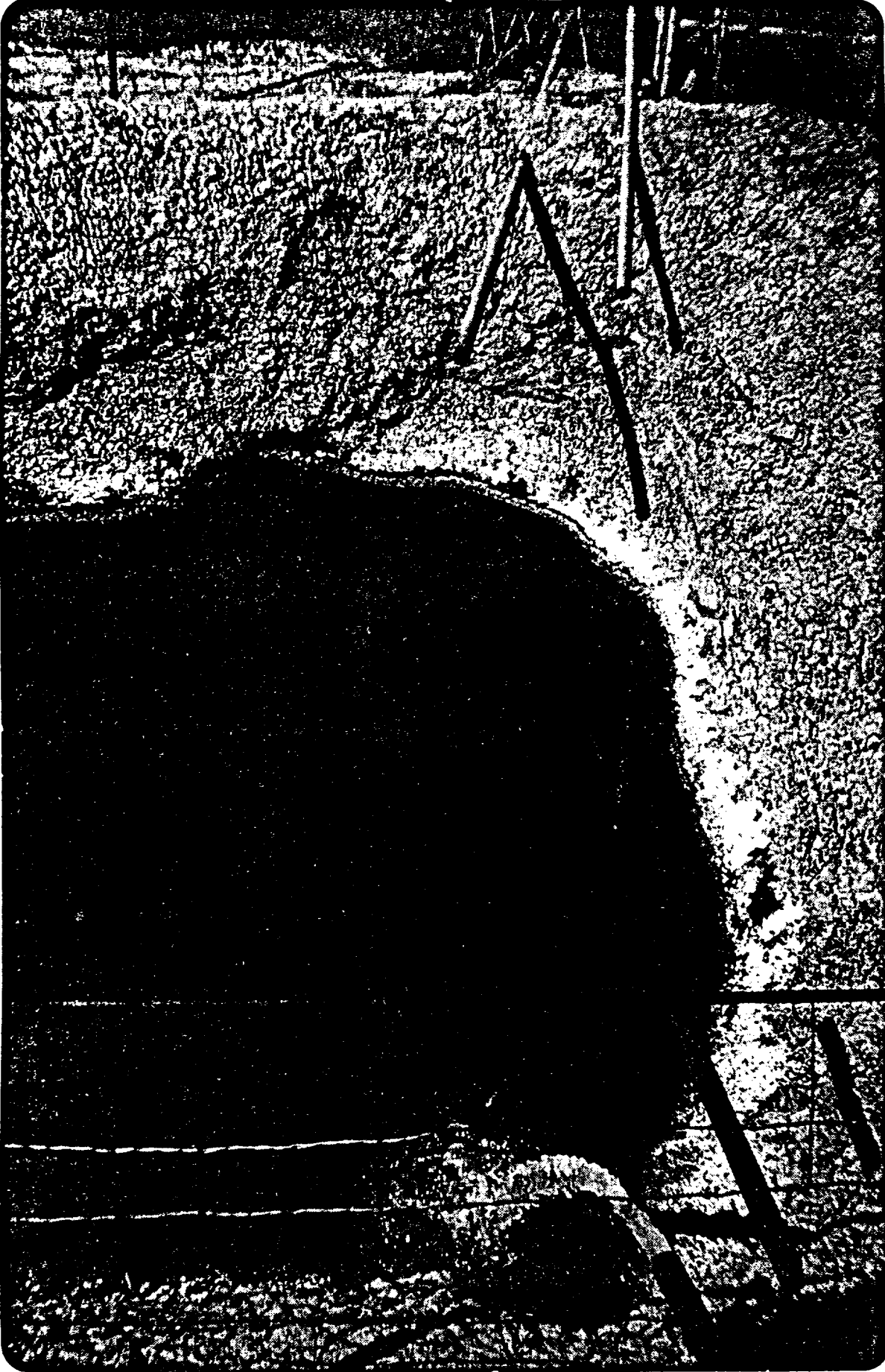
Pit Description Dry

Standing Water Estimated Depth: 1' a

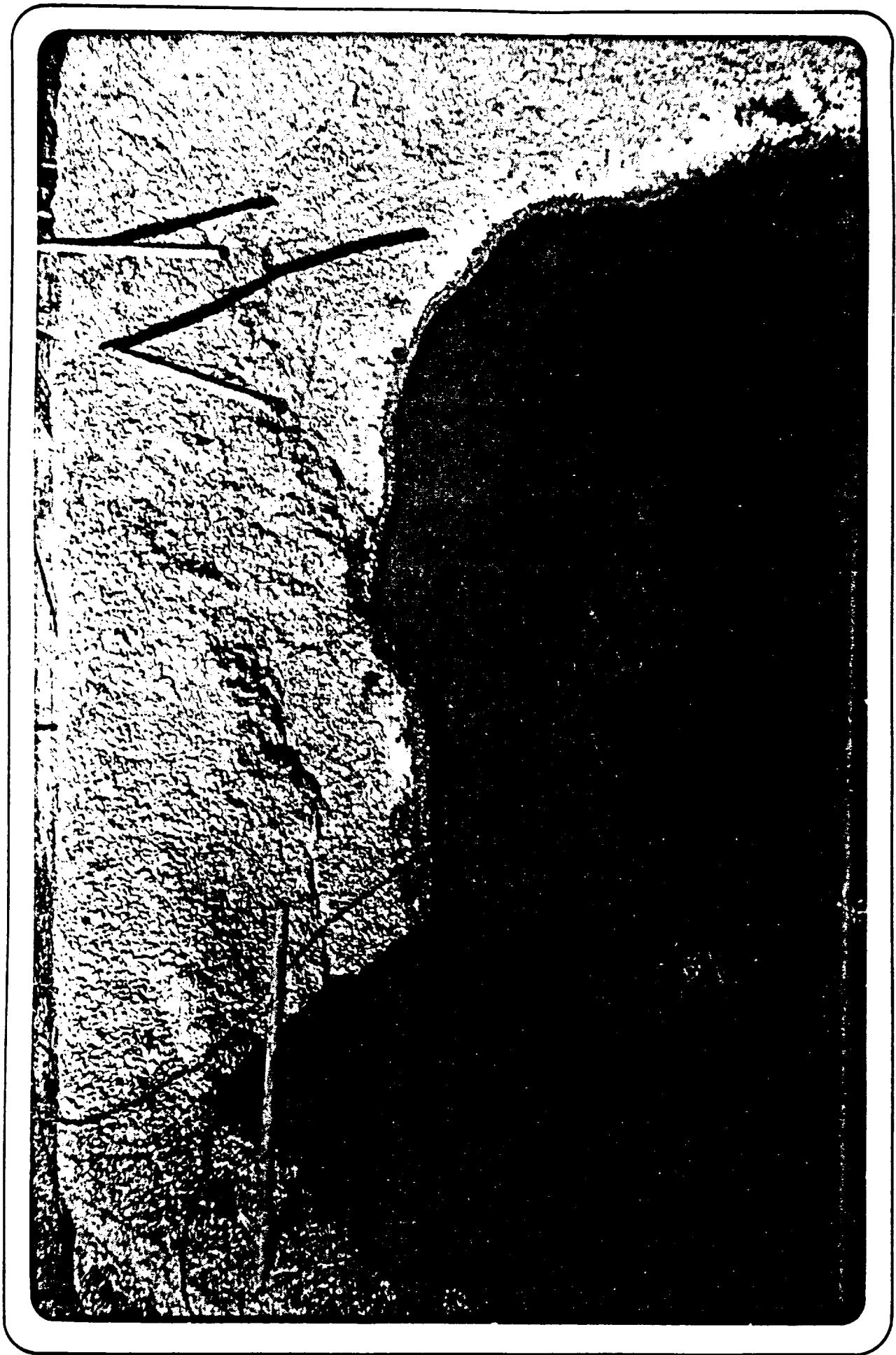
Photographs of Site: X-6-7-8 PIT DISCHARGE RIVER FINE SEDS

Producing Formation: ARMENTA GALLUP

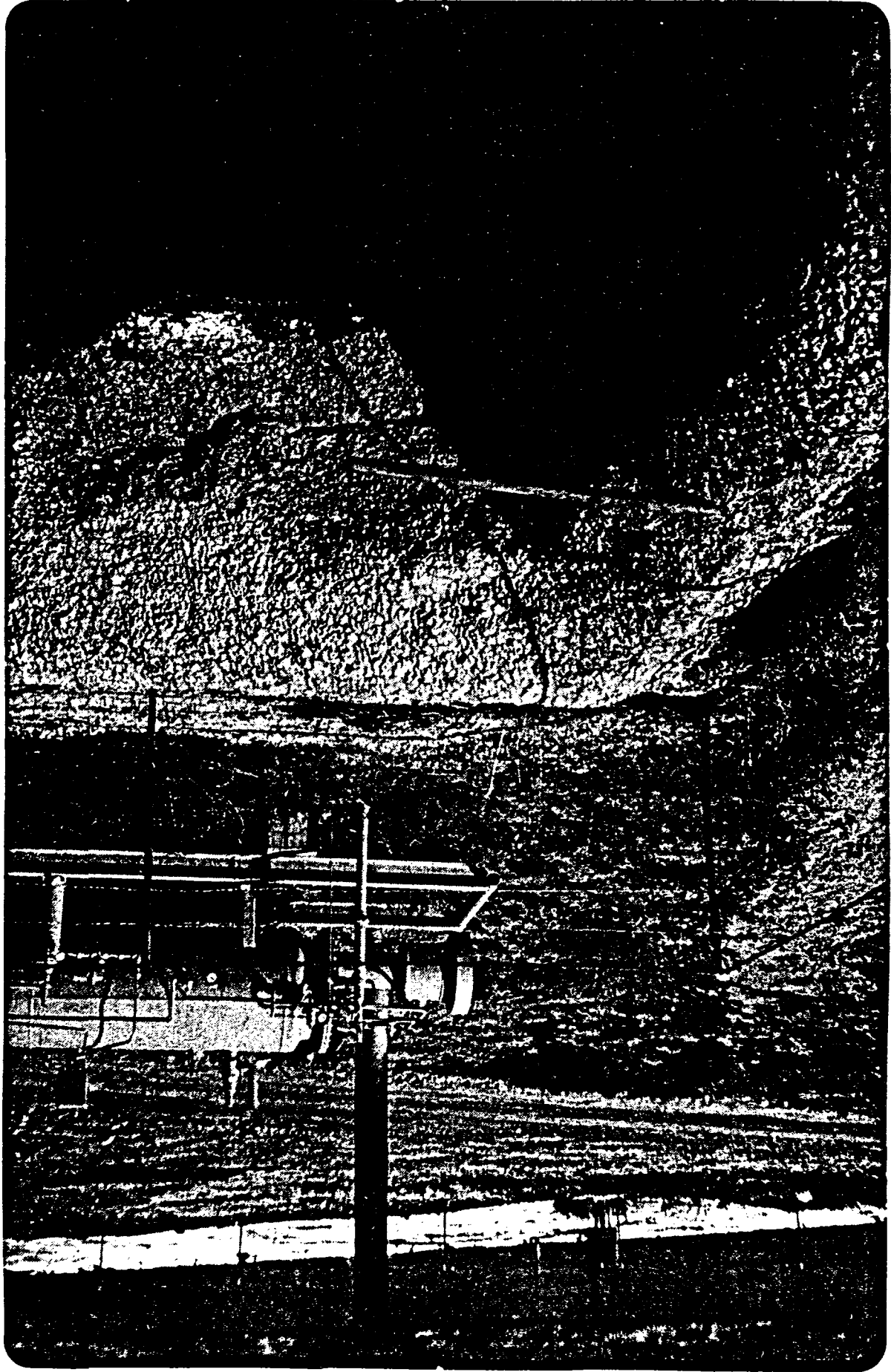
Comments: SEVERAL WELLS NTO ONE PIT



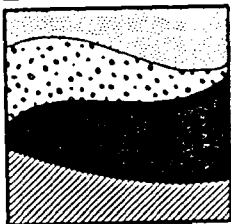
ARMENTA F1 Roll #4 Slide 6



ARMENTA F1 Roll #4 Slide 7



ARMENTA F1 Roll #4 Slide 8



Section TWP RNG
Location 26 29 N 10W

WELL NAME ABRAMS L #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — — 0.02

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10^3 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: 10-15'

Pit Description

Dry

Standing Water Estimated Depth: _____

Photographs of Site: #5 PIT

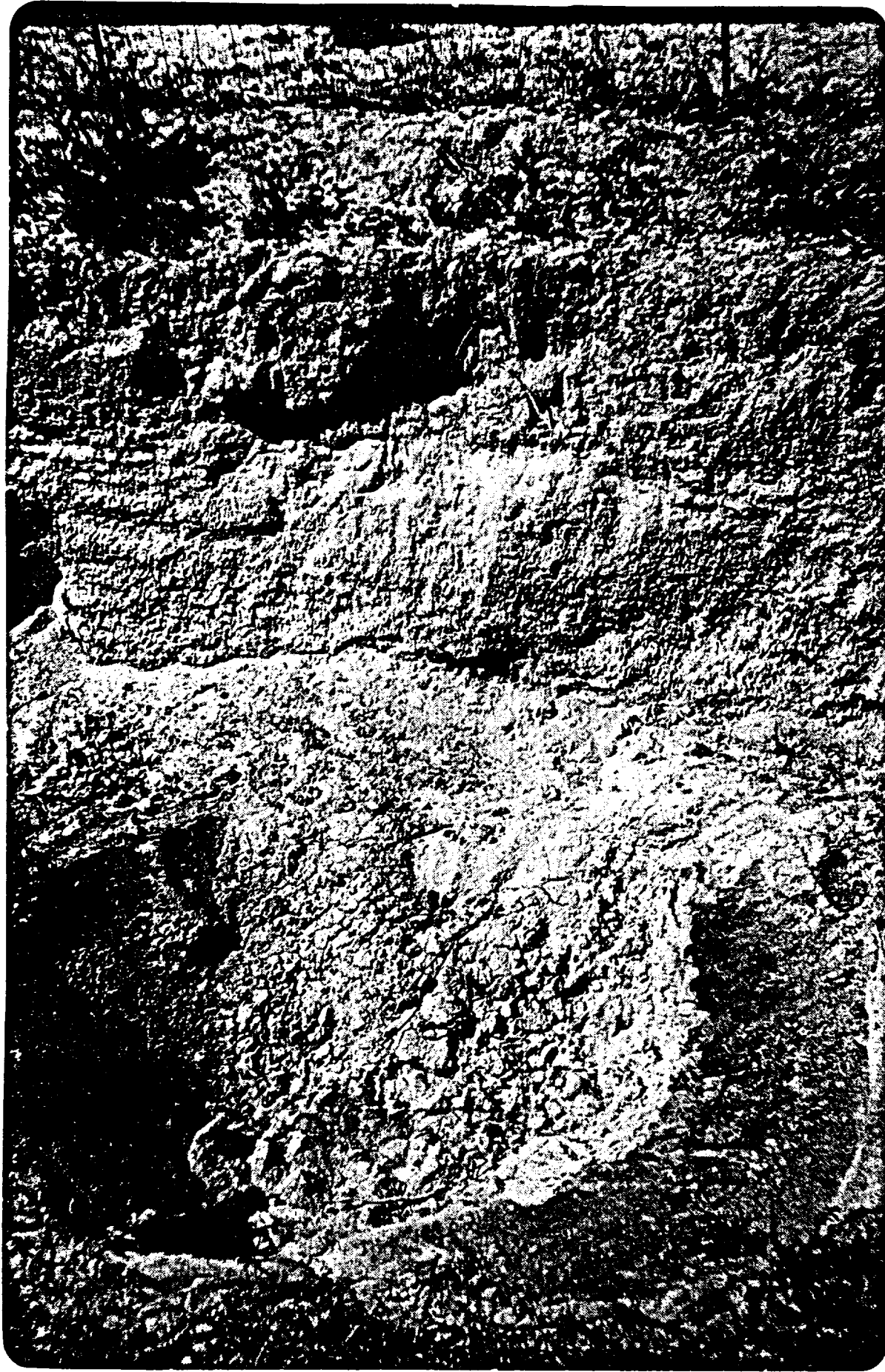
Producing Formation: ARMENTA GALLUR NOW MV?

Comments: SHUT IN - NEVER PRODUCED?

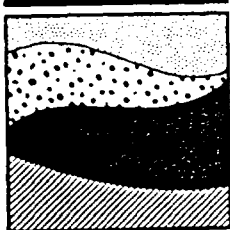
$$\frac{0.02 \text{ bbls}}{\text{day}} \times \frac{42 \text{ gal}}{\text{bbl}} \times \frac{3.785 \text{ l}}{\text{gal}} \times \frac{3.5 \text{ mg}}{\text{l}} = \frac{11.1 \text{ mg}}{\text{day}} \times \frac{25 \text{ days}}{10 \text{ perc}} \times \frac{1}{111000 \text{ l}} = \frac{0.00025 \text{ mg}}{\text{part}}$$

10 PARTS
25 DAYS

3
1
2



ABRAMS L1 Roll #4 Slide 5



	Section <i>NE/NW</i>	TWP	RNG
Location	<u><i>25</i></u>	<u><i>29N</i></u>	<u><i>11W</i></u>

WELL NAME *SULLIVAN A1*

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: *0.02*

Estimated Hydraulic Gradient: *0.003*

Estimated Hydraulic Conductivity: *10³*

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: *10*

Pit Description Dry

Standing Water

Estimated Depth: *0.25*

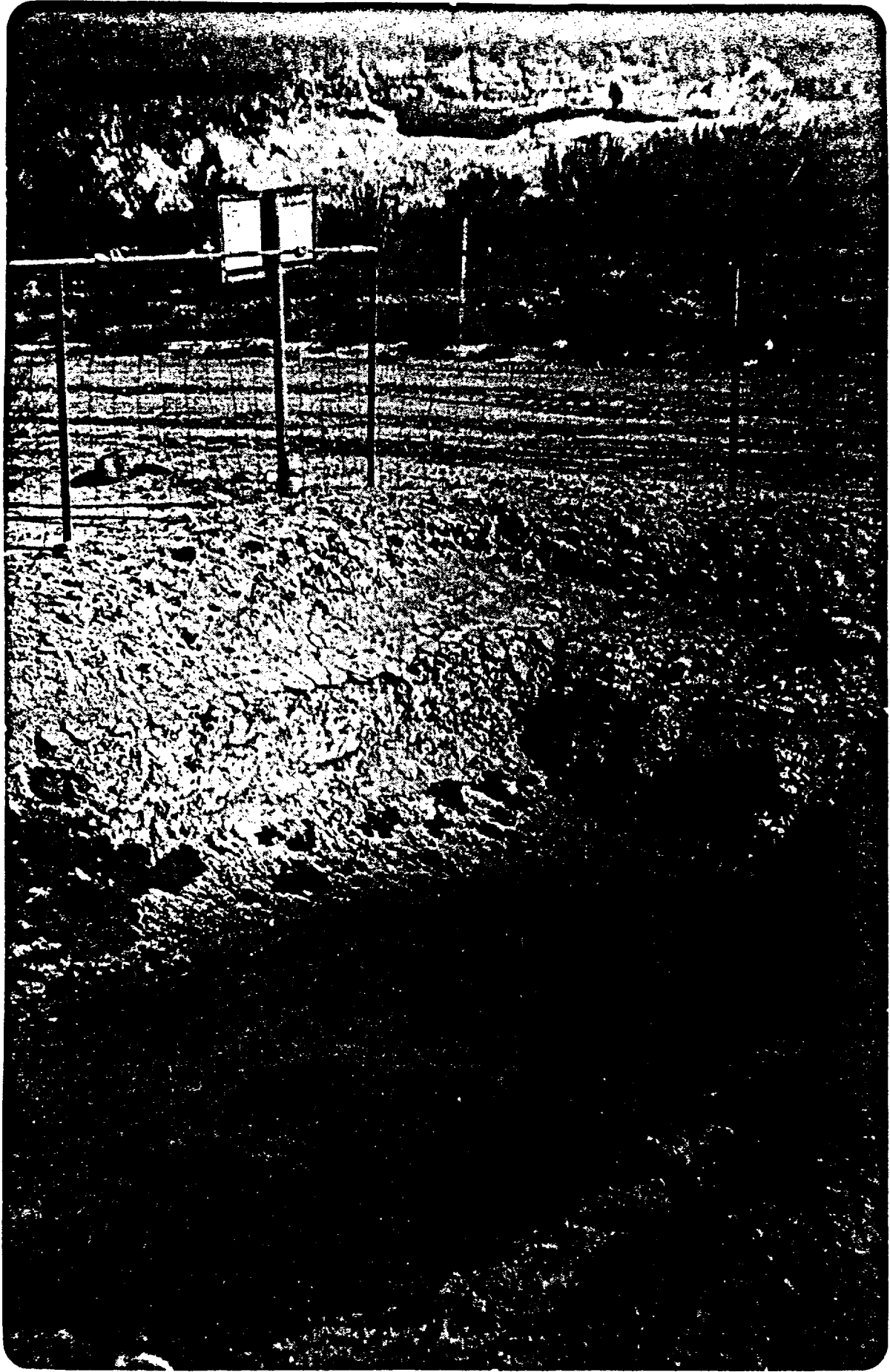
Photographs of Site: *13, 14, 15*

Producing Formation: *DK*

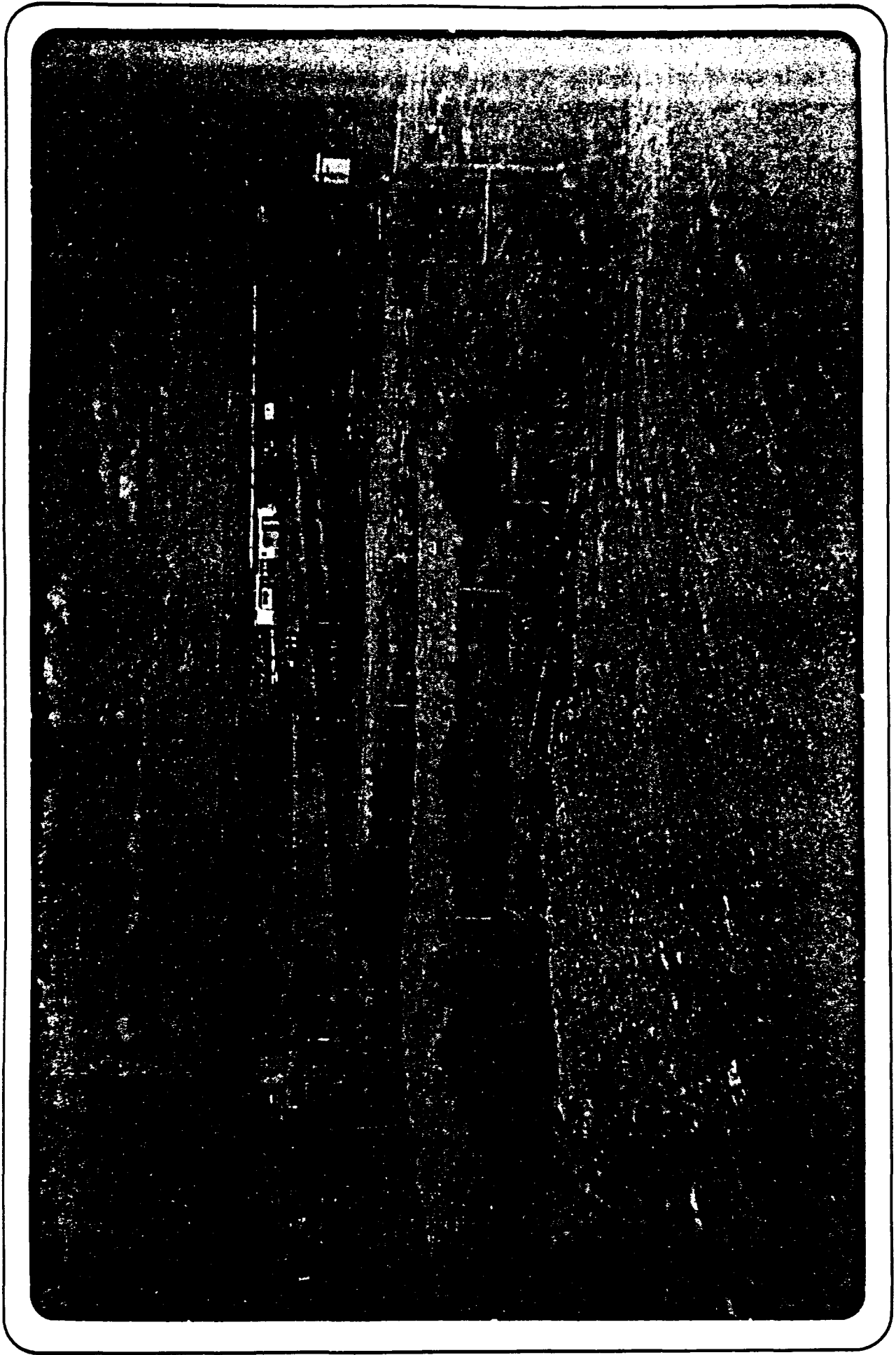
Comments: _____



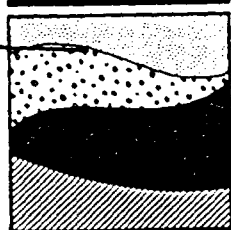
SULLIVAN A1 Roll #4 Slide 13



SULLIVAN A1 Roll #4 Slide 14



SULLIVAN A1 Roll #4 Slide 15



Section TWP RNG
Location NENW 23 29N 12W

WELL NAME GCU #153E

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom * Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.33

Estimated Hydraulic Gradient: .003

Estimated Hydraulic Conductivity: 10^3 - 10^4 GPD/FT

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: BASED UPON POND 20'

Pit Description Dry

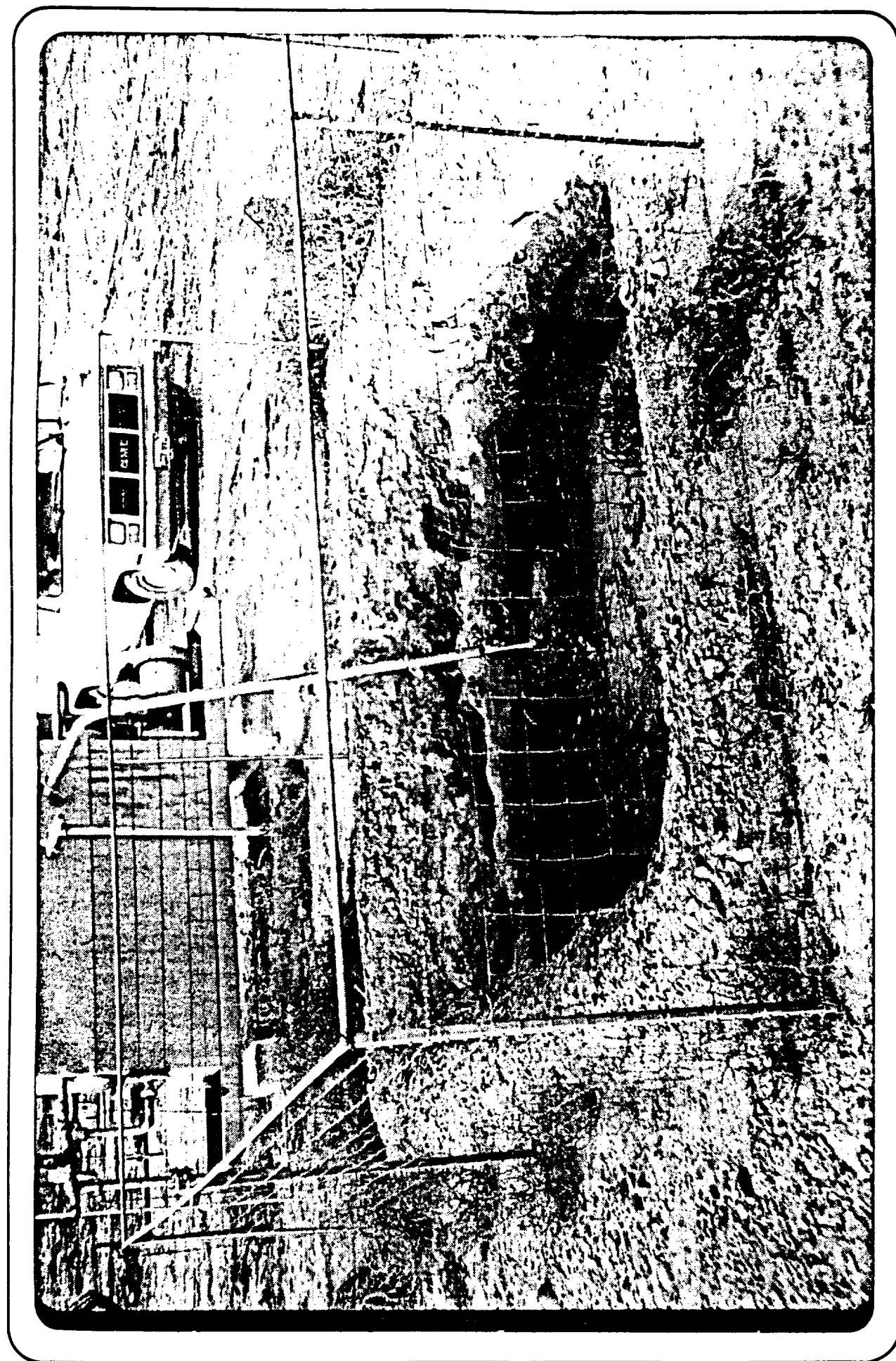
Standing Water Estimated Depth: 2'

Photographs of Site: #10 #11 Pit #12 SANDSTONE BASIN BEHIND WELL SITE

Producing Formation: BASIN DAKOTA

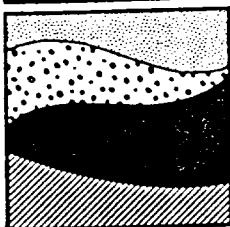
Comments: RIVER 200' * 1ST RIVER TERRACE

LOTS OF PARAFIN





GCU 153E Roll #3 Slide 11



Section TWP RNG
Location NWSE 26 29N 12W

WELL NAME GCU G #179E ✓

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: --- 0.02 0.016 ✓

Estimated Hydraulic Gradient: 0.002

Estimated Hydraulic Conductivity: 10³

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 51'

Pit Description Dry

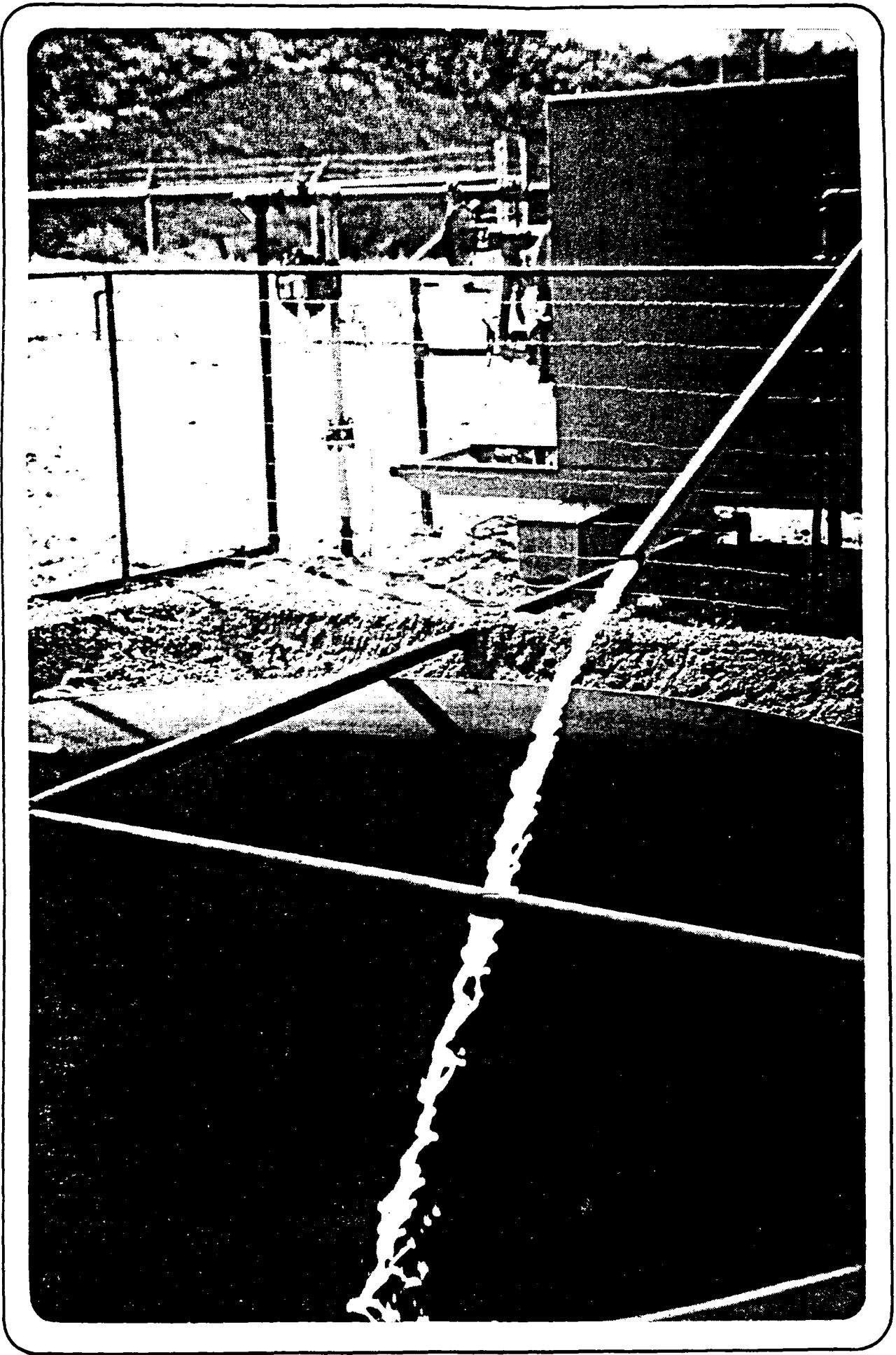
Standing Water Estimated Depth: 0.75'

Photographs of Site: #4, #5 Lined Pit + Blowdown Shows Lith

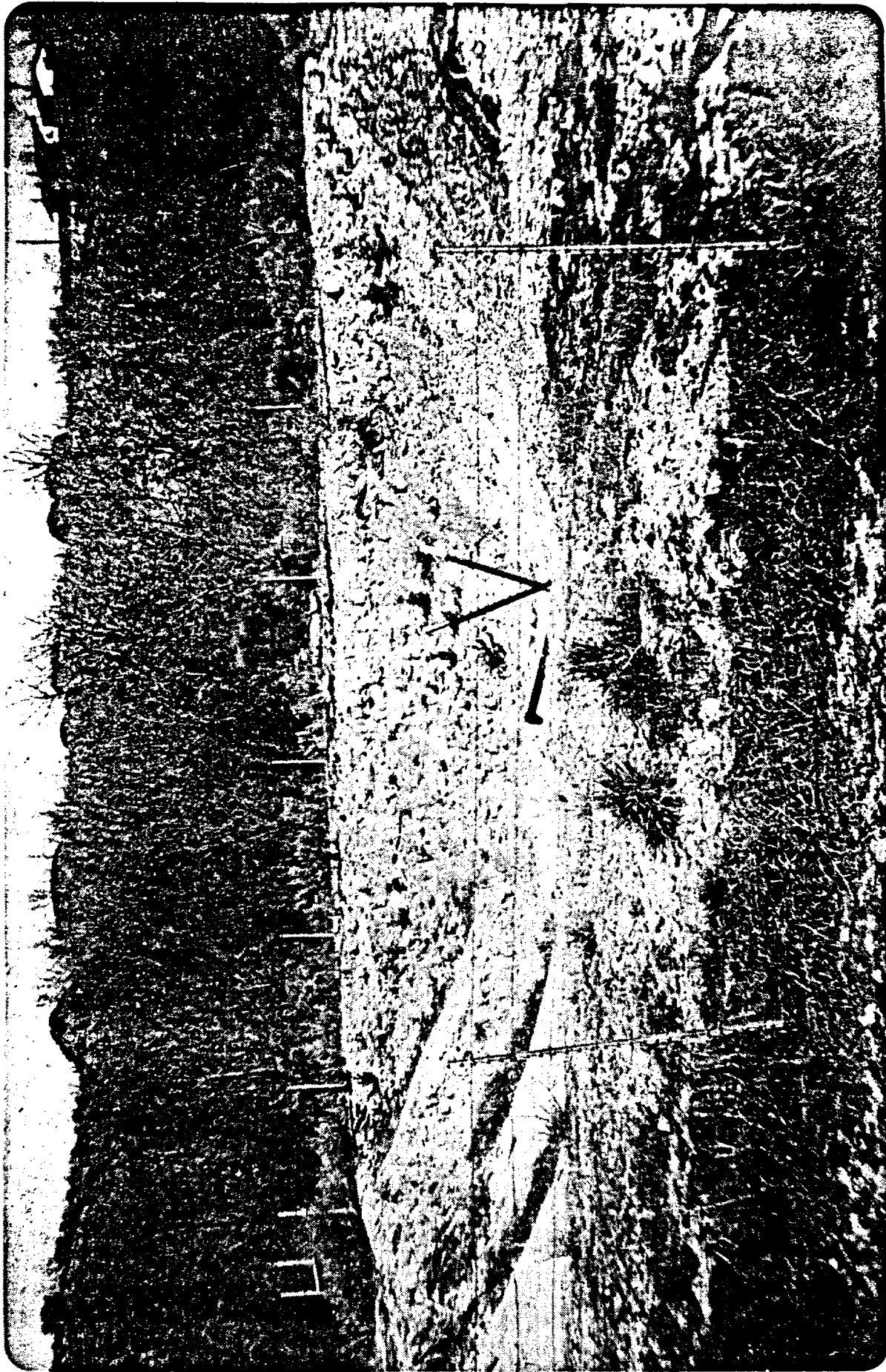
Producing Formation: BASIN DAKOTA

Comments: PIT LINED LOTS OF PARAFIN

#6 SANDSTONE AT EDGE OF SITE SEEP AT
BASE OF SS.



GCU 179E Roll #1 Slide 5

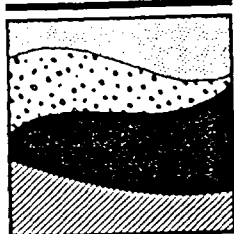


GCU 179E Roll #1 Slide 6



GCU 179E Roll #1 Slide 7

SAN JUAN RIVER
LOW HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location SENE 35 29N 12W

WELL NAME GCU #169E✓

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.06

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10^{-2} *

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 6-10'

Pit Description Dry

Standing Water Estimated Depth: 0.25

Photographs of Site: PIT BUILT IN FILL GRAVEL 19, 20

Producing Formation: BASIN DAKOTA

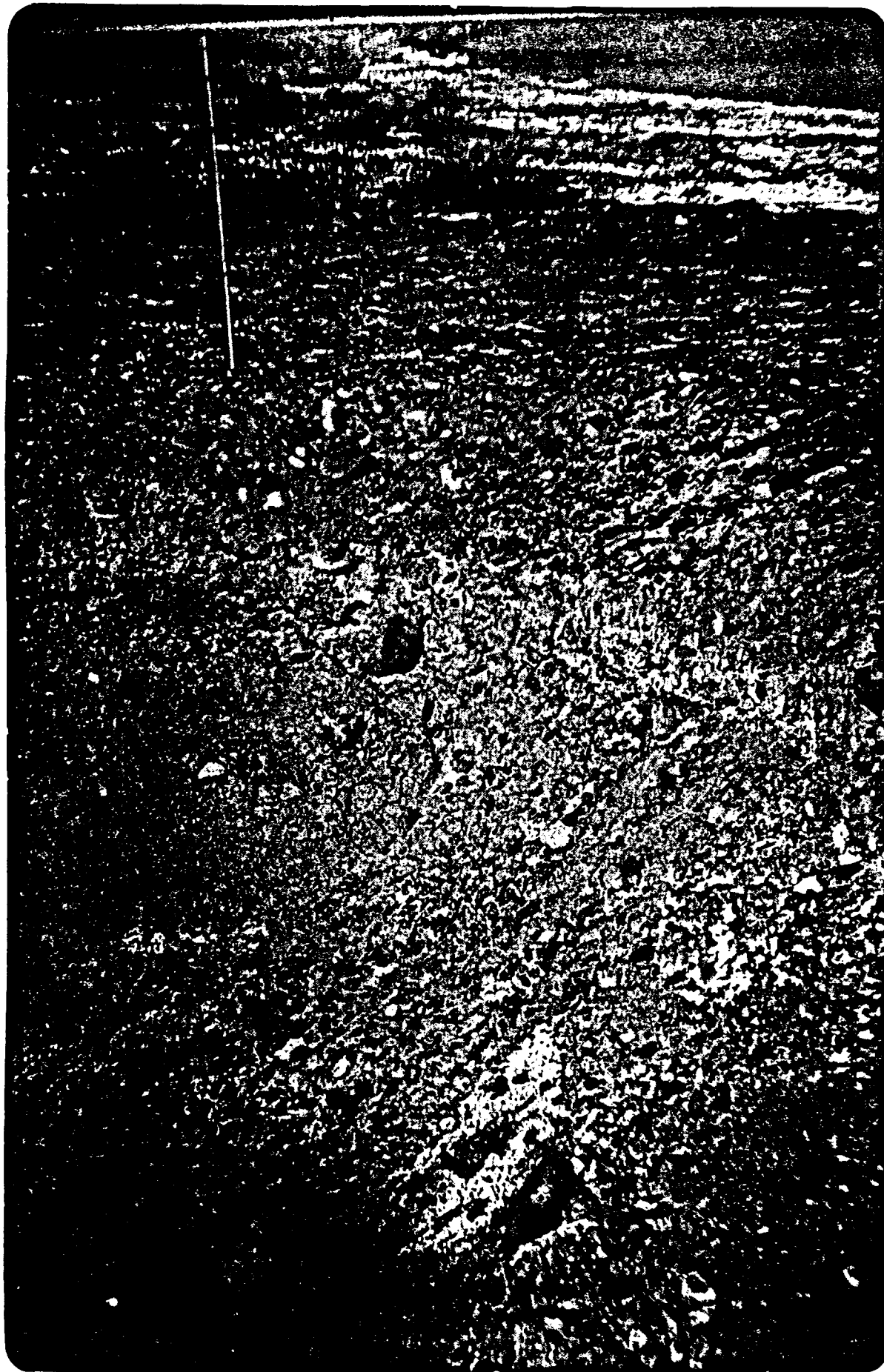
Comments: BUILT ON FILL

NOTE SALT CRUST ON GROUND

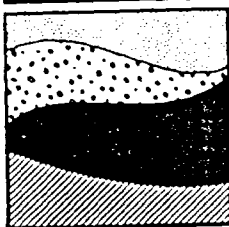
* 10^3 MAYBE UNDER SOIL - RIVER SEDS FROM SANDSTONE HERE



GCU 169E Roll #3 Slide 19



GCU 169E Roll #3 Slide 20



Section TWP RNG
Location NESW 27 29N 10W

WELL NAME ROMERO GAS COM A #1

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: — — 0.02

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10 GPD/FT

Formation/Grain Size of Unsaturated Zone: SiH

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 2' ±

Pit Description Dry FIBREGLASS

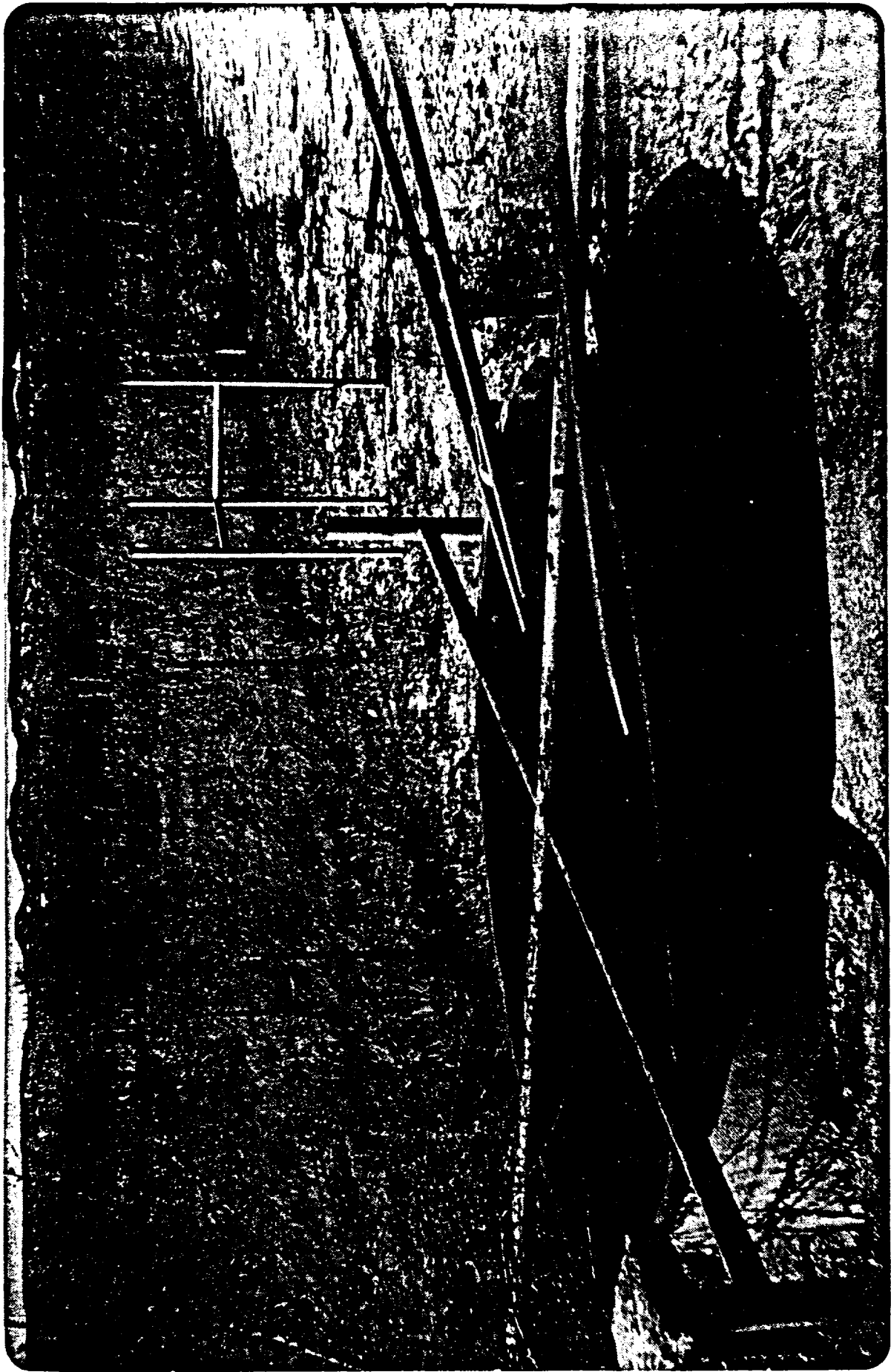
Standing Water

Estimated Depth: 0.1'

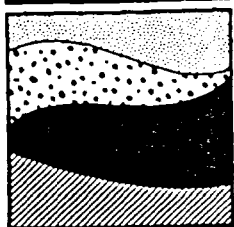
Photographs of Site: 9 - FIBREGLASS PIT

Producing Formation: BLANCO MESA VERDE

Comments: _____



ROMERO A1 Roll #4 Slide 9



Section TWP RNG
Location SWSE 35 30N 9W

WELL NAME ULIBARRI GAS COM #1A

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.03

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 @ SURFACE 10² SATURATED ZONE

Formation/Grain Size of Unsaturated Zone: Soil

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 4'

Pit Description

Dry

Standing Water

Estimated Depth: 0.2 ft

Photographs of Site:

2, 3

DISCHARGE

RIVER IN BGND

Producing Formation:

BLANCO - MESAVERDE

Comments:

ALL AROUND HERE

POOR

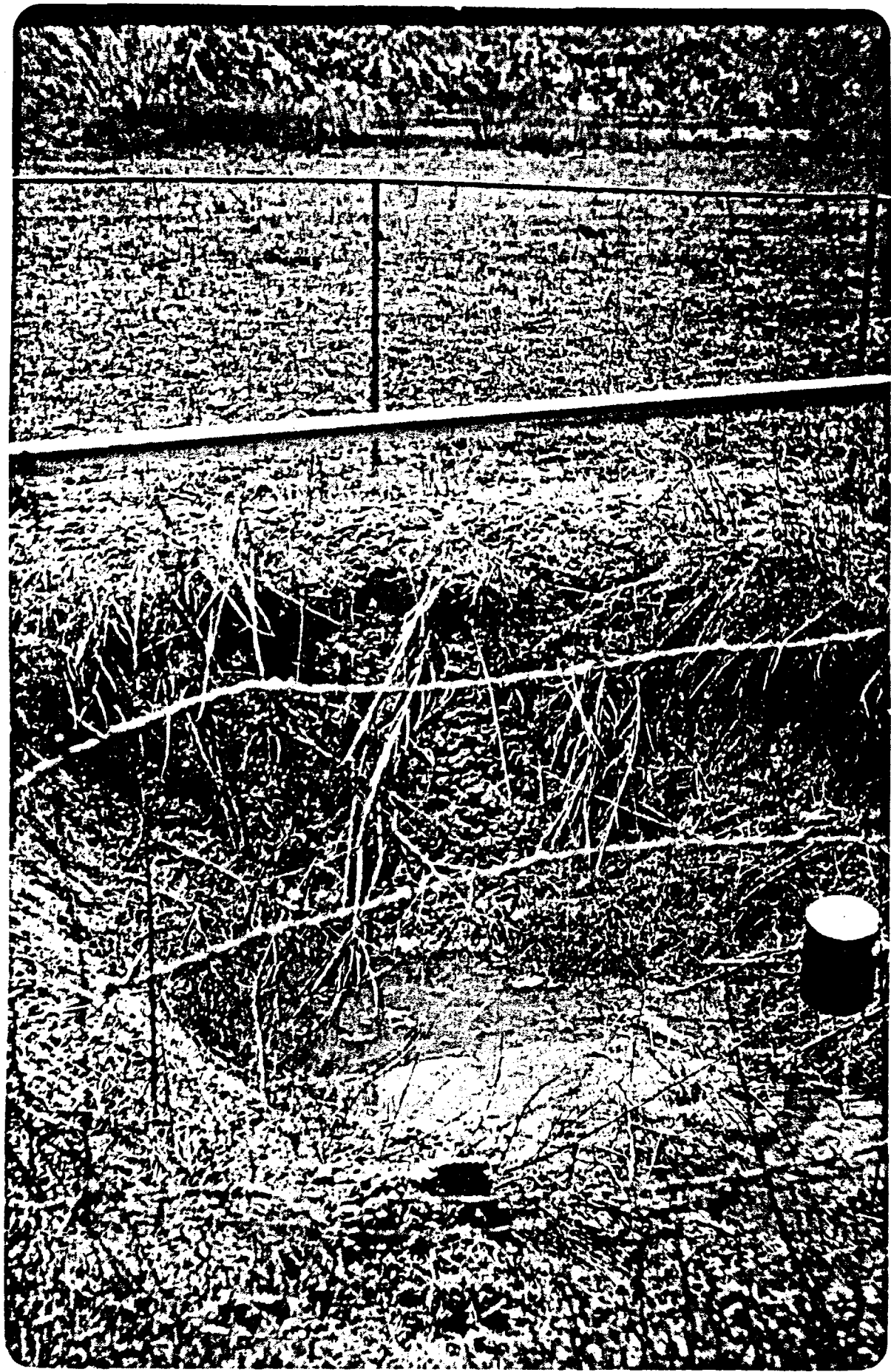
SORTING

FINE/COARSE

ALLUVIUM

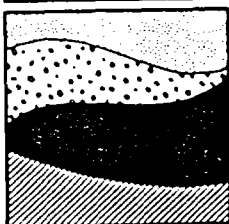


ULIBARRI 1A Roll #5 Slide 1



ULIBARRI 1A Roll #5 Slide 2

ANIMAS RIVER
HIGH HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location SENE5 31N 10W

WELL NAME MARCOTTE GAS COM #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom * Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.33

Estimated Hydraulic Gradient: .004

Estimated Hydraulic Conductivity: 104 GPD/FT²

Formation/Grain Size of Unsaturated Zone: SOME BLOW SAND AT SURFACE

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 2"

Photographs of Site: #17 PIT SHOWING MAT/LINER

Producing Formation: BLANCO MESAVERDE

Comments: * TERACE 20-40 ABOVE RIVER

ASPHALTIC MAT PRECLUDES EXCESS POLL.

4/10/95
BTH



MARCOTTE 1 Roll #2 Slide 17

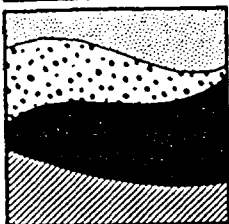
ANIMAS RIVER
MEDIUM HYDRAULIC CONDUCTIVITY CASES

NO CASES OBSERVED

ANIMAS RIVER
LOW HYDRAULIC CONDUCTIVITY CASES

NO CASES OBSERVED

VALLEY SIDE SLOPES AND TRIBUTARIES
HIGH HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location SWNW 25 30N 12W

WELL NAME MCCOY GAS COM D #1E

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

-Barrels Water/Day Produced: 0.2

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10^4 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

SOME FINES
MATRIX

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water

Estimated Depth: 1.5'

Photographs of Site: #5 TANK IN GRAVEL #6 TOWARD ANIMAS #7 Road cut AT SITE

Producing Formation: BASIN DAKOTA

Comments: FIBERGLASS TANK FILLED W OIL CARRIED OVER

FROM SEPARATOR IN PHOTO 7 NOTE BEDROCK AT BASE

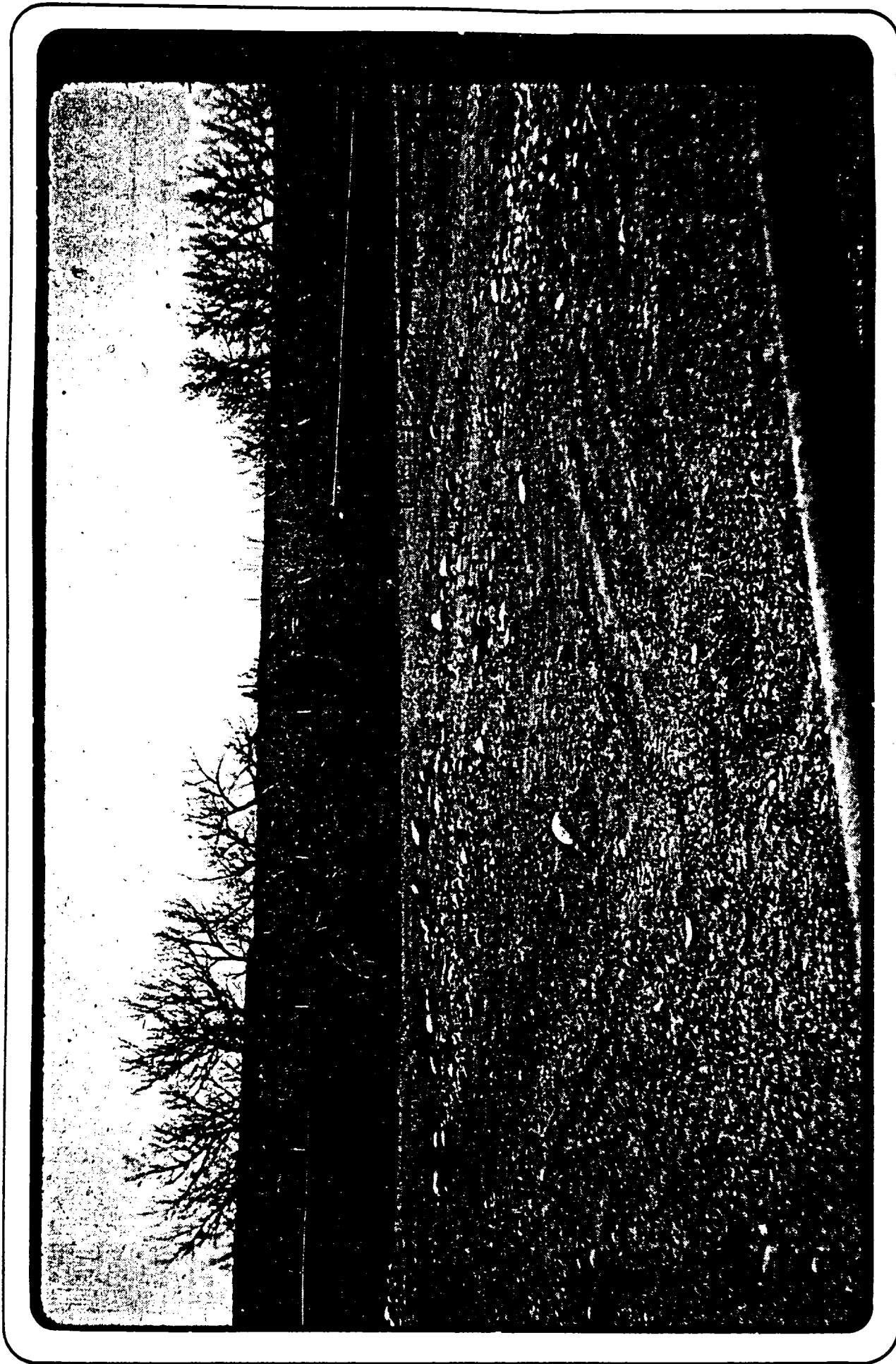
OF CUT - SANDSTONE

4/10/85 RTH

$$\frac{0.01 \text{ m/s}}{2} \times \frac{30 \text{ DAYS}}{10 \text{ PART}} \times$$



McCOY DIE Roll #2 Slide 5

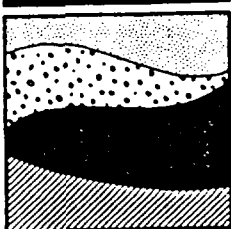


McCOY D1E Roll #2 Slide 6



McCOY DIE Roll #2 Slide 7

VALLEY SIDE SLOPES AND TRIBUTARIES
MEDIUM HYDRAULIC CONDUCTIVITY CASES



	Section	TWP	RNG
Location	<u>SENN 27</u>	<u>32N</u>	<u>10W</u>

WELL NAME KEYS GAS COM A #2

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — 0.02

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10² → 10³ → 10⁴ BROOK

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 0.3 ft

Photographs of Site: #18 PIT PUMP, #19 BOTTOM OF PIT, #20 FROM PIT TO RIVER

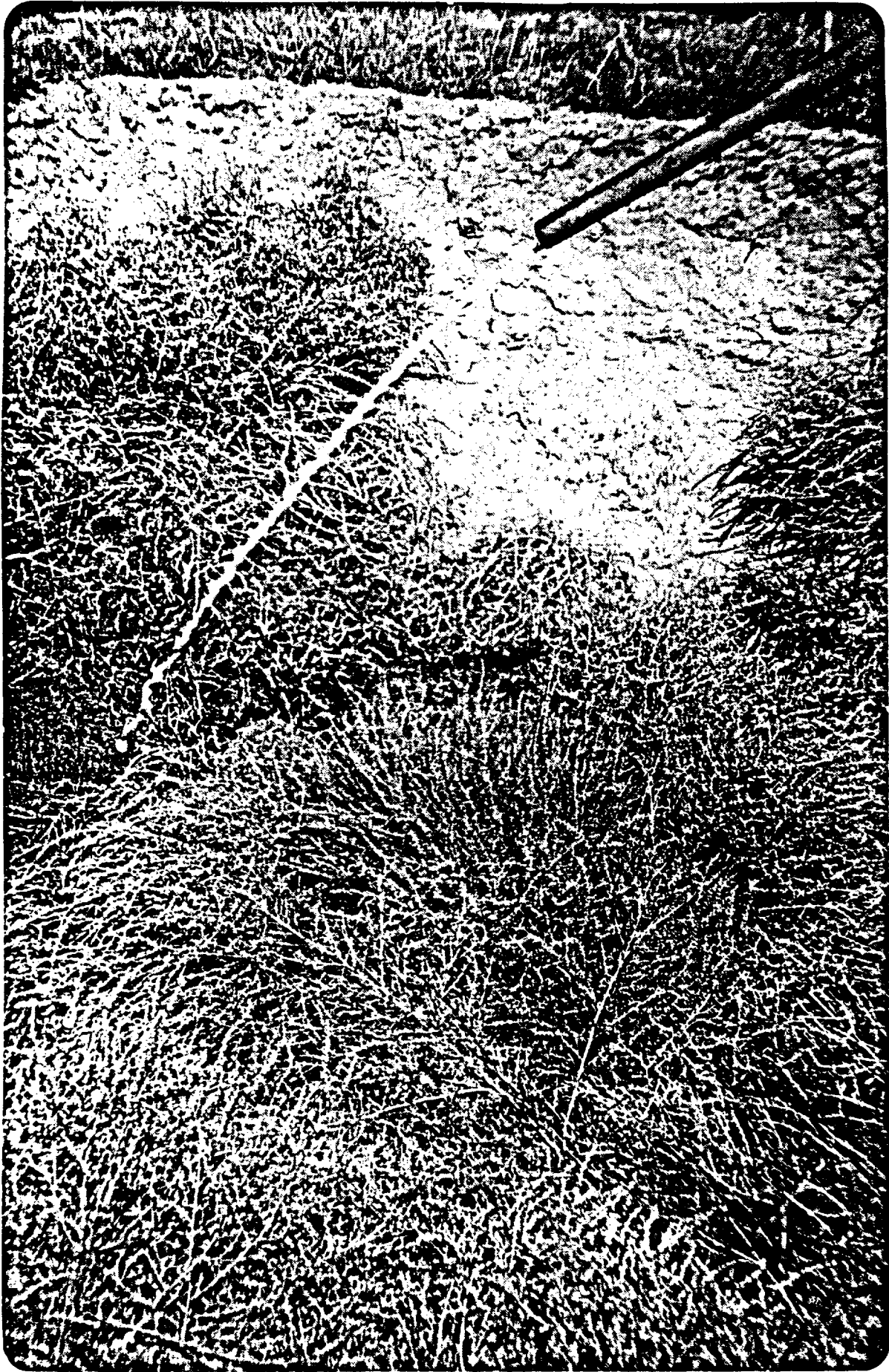
Producing Formation: BASIN DAKOTA

Comments: ABSOLUTE EDGE OF VALLEY FLOOR

* AREA 16 NEAR PIT SHOWS LARGE BOULDERS
AND MED SAND

4/10/85
ETH

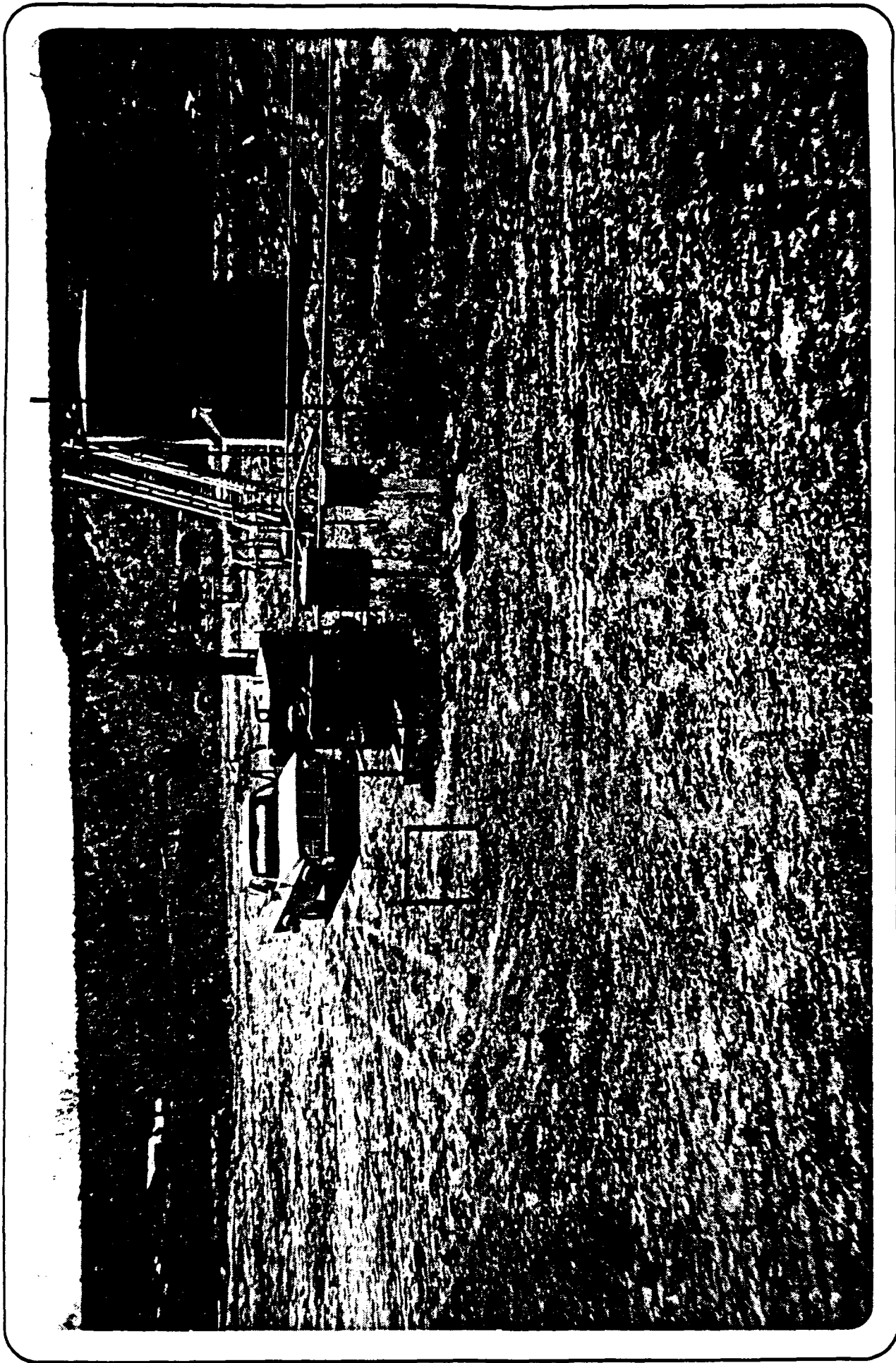
5
V



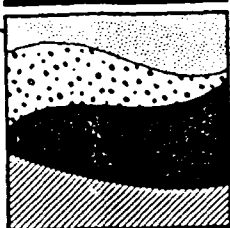
KEY A2 Roll #2 Slide 18



KEY A2 Ro11 #2 Slide 19



KEY A2 Roll #2 Slide 21



Section NE/NW
Location 27 TWP 29N RNG 9W

WELL NAME FLORANCE 124

Drainage Basin:

San Juan La Plata Animas other: LARGO

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 1000

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: _____

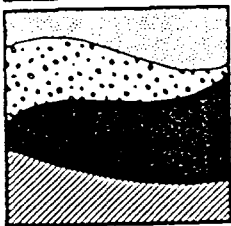
Photographs of Site: _____

Producing Formation: DK/MV

Comments: LARGO

FLORANCE 42 SHOT # 20

NO PHOTOGRAPHS AVAILABLE



Section TWP RNG
Location SWSW 13 30N 9W

WELL NAME FLORANCE 9

Drainage Basin:

San Juan La Plata Animas other: PUMP WASH

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.5

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10^3 10^2 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine ~~Med~~ Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 0.5 ft

Photographs of Site: 16, 17 ~~18~~ PIT NOTE HC FILM AND MESA IN BACK

Producing Formation: MESA VERDE

Comments: WATER LOOKS PRETTY BAD

IT HAS BEEN SIGNAL - VERY LITTLE ASPHALT THAT

SHUT IN PUMP WASH IS RUNNING TODAY

4/10/95

10TH



FLORENCE 9 Roll #6 Slide 16



FLORENCE 9 Roll #6 Slide 17



Section TWP RNG
Location NESE 35 29N 12W

WELL NAME GCU #169 ✓

Drainage Basin:

(San Juan) La Plata Animas other: _____

Description of Location:

(River Bottom) * (Valley Slope) Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: -- 0.02

Estimated Hydraulic Gradient: ~~0.003~~ 0.01

Estimated Hydraulic Conductivity: 10^3

Formation/Grain Size of Unsaturated Zone: SOIL

Very Fine (Fine) Med Coarse Very Coarse

Sorting: Poor Fair (Good)

Estimated Depth to Ground Water: ~22'

Pit Description (Dry)

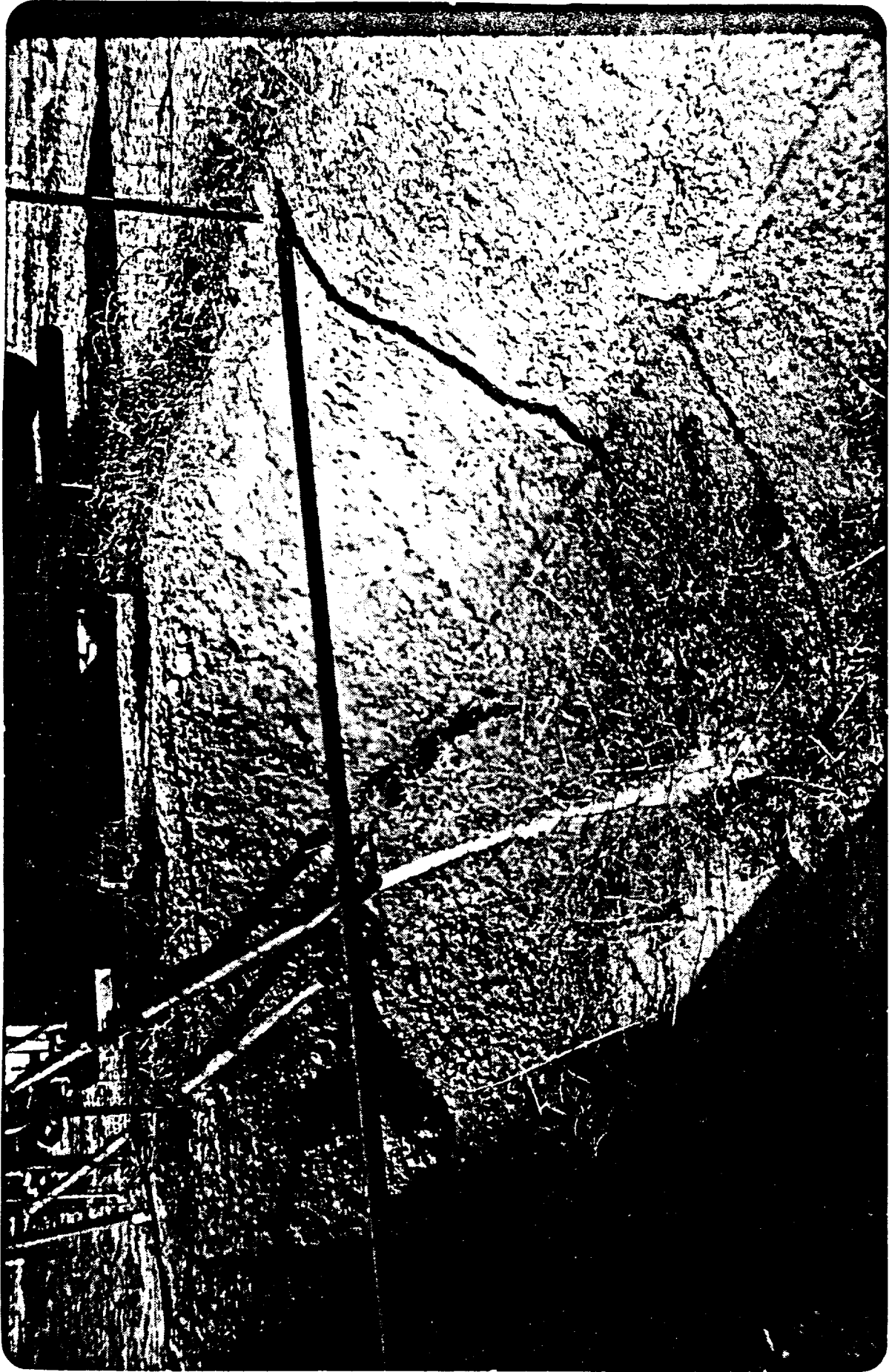
Standing Water Estimated Depth: _____

Photographs of Site: 20²¹ - PIT

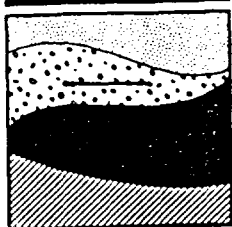
Producing Formation: BASIN DAKOTA

Comments: * 1ST RIVER TERRACE CANALS ETC NEAR

RAPID INFILTRATION



GCU 169 Roll #3 Slide 20



Section TWP RNG
Location SWSW 18 31N 10W

WELL NAME CANEPLA GAS COM #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope* Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.16 SMALL DRIP

Estimated Hydraulic Gradient: ~~0.001~~ .004

Estimated Hydraulic Conductivity: (10²) or 10' GPD/FT² OVER THE GRAVEL

Formation/Grain Size of Unsaturated Zone: SOIL V. FEN COBBLES

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: WET DIRT - 2-6' SMA'

Photographs of Site: 9" 10 TWO SHOTS OF PW PIT FOR DITCH TREES BACK

Producing Formation: BLANCO MESAVERDE

Comments: SHAELY SANDSTONE CROPS OUT ~~BEHIND~~ ON HILL SIDE
OF ROAD. WELL SITS ON OLD RIVER TERRACE
DRIPS INTO PIT

4/10/85 JAH



CANEPL 1 Roll #2 Slide 9



CANEPL 1 Roll #2 Slide 10

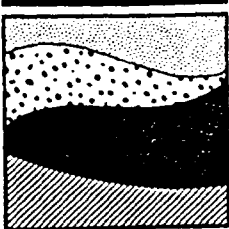


CANEPLAIN 1 Roll #2 Slide 11



CANEPLAINS 1 Roll #2 Slide 12

VALLEY SIDE SLOPES AND TRIBUTARIES
LOW HYDRAULIC CONDUCTIVITY CASES



Section TWP RNG
Location SW SW 22 29N 12W

WELL NAME GCU #150

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.86

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10^2 10^3

Formation/Grain Size of Unsaturated Zone: BEDROCK SANDSTONE

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 0.2'

Photographs of Site: #73 14 Pit NOTE SS AND REFUGERY

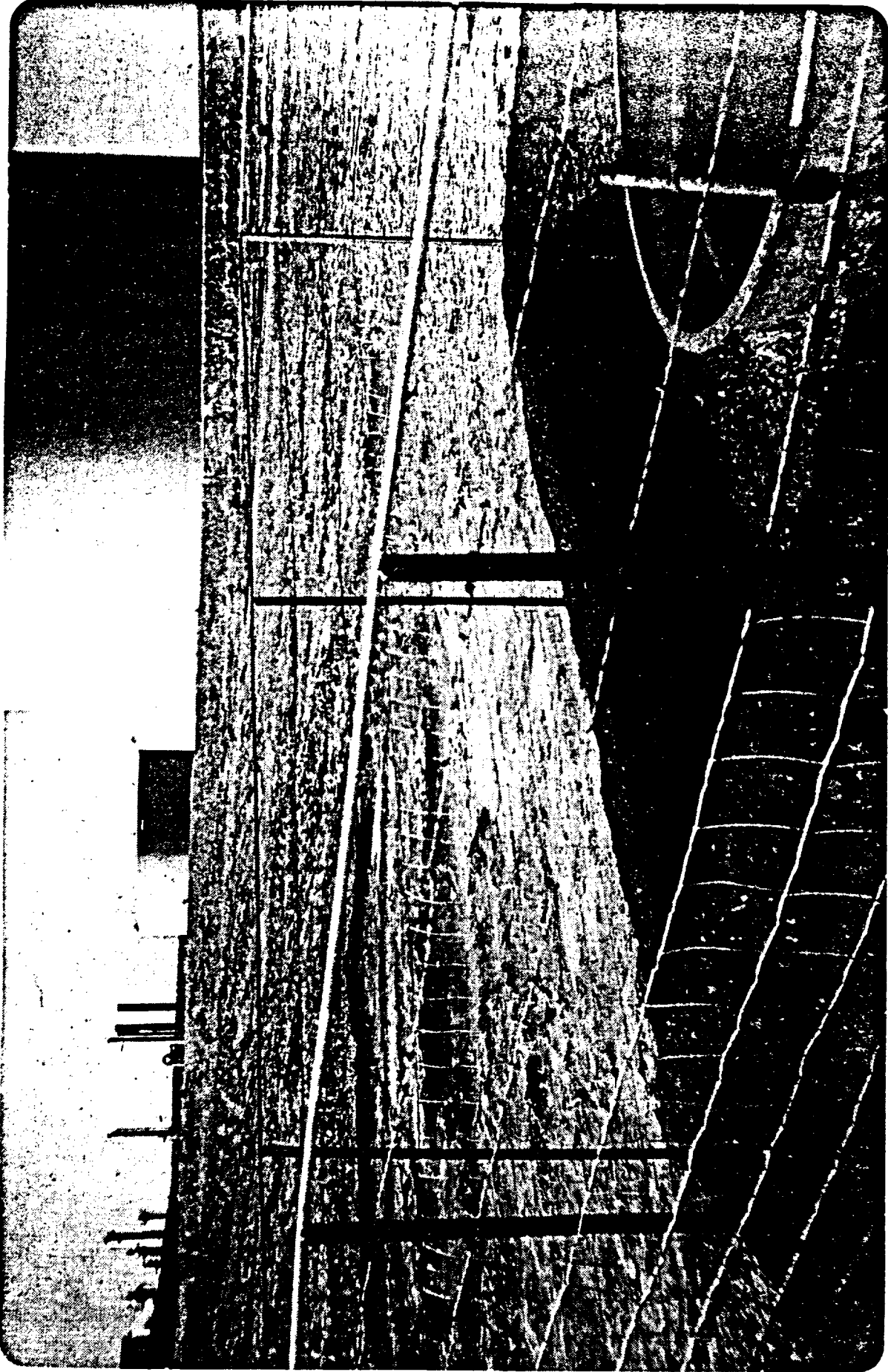
Producing Formation: BASIN DAKOTA

Comments: AT GIANT REFUGERY

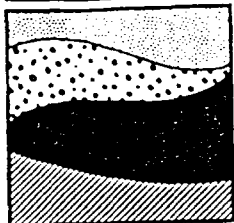
ALL SEDS DERIVED FROM SANDSTONE AND RIVER GRAVEL
SEE PHOTO



GCU 150 Roll #3 Slide 13



GCU 150 Roll #3 Slide 14



Section TWP RNG
Location NWSW 24 29N 10W

WELL NAME CANDELARIA A #1 MARTINEZ F1

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.2

Estimated Hydraulic Gradient:

10² - 10 GPD/FT²

Estimated Hydraulic Conductivity:



0.01

Formation/Grain Size of Unsaturated Zone: SOIL

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water

Estimated Depth: 2'

Photographs of Site:

10, 11 PIT - NOTE FINE SOIL

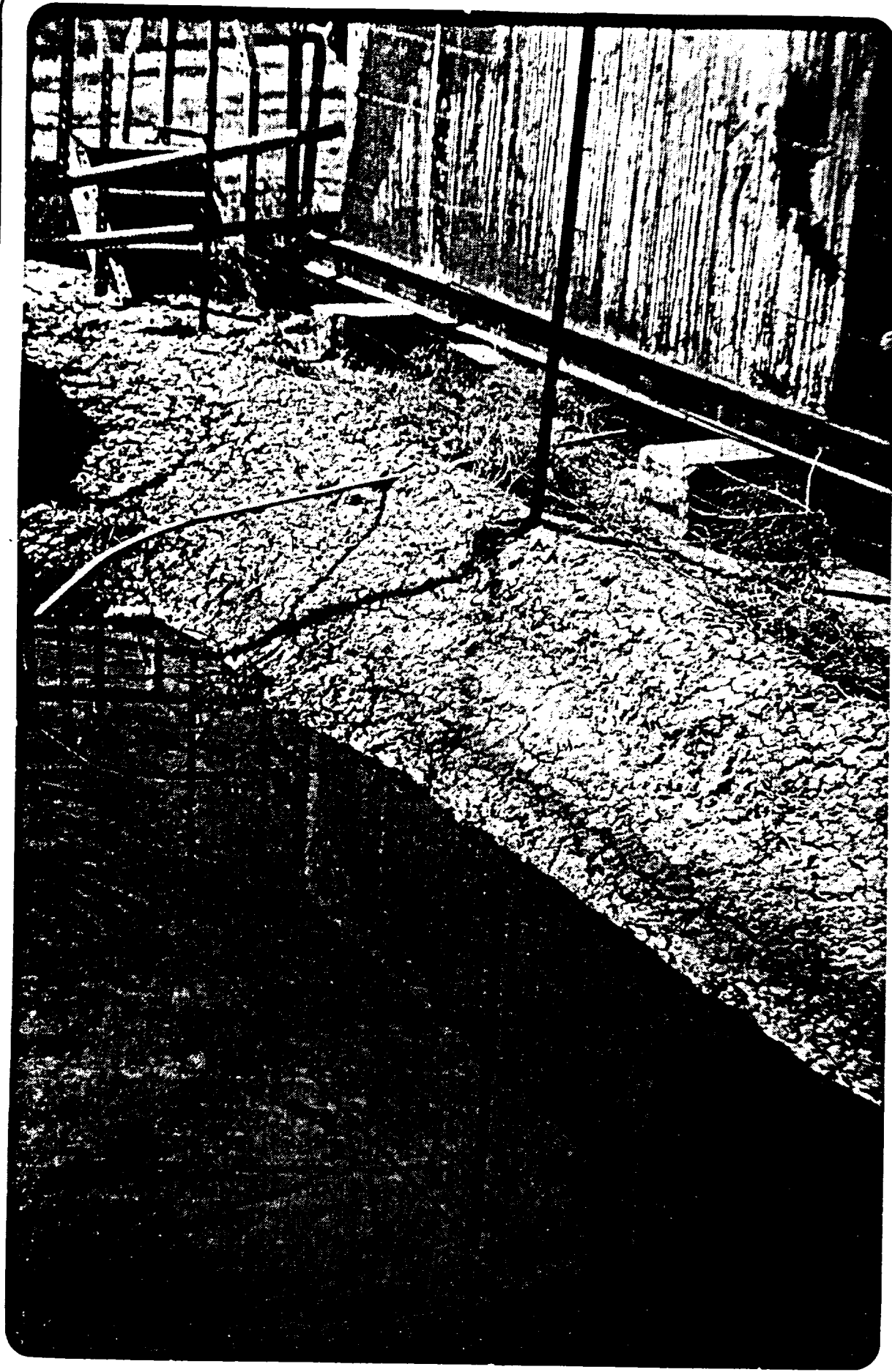
Producing Formation:

ARMENTA GALLUP

Comments:

HIGH TERRACE

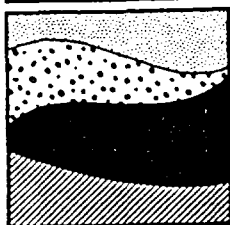
POOR LOOKING WATER



MARTINEZ F1 Roll #1 Slide 10



MARTINEZ F1 Roll #1 Slide 11



Location Section
 SW/NE
 24 TWP RNG
 29N 11W

WELL NAME VALDEZ A 1E

Drainage Basin:

San Juan

~~La Plata~~

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

-Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10⁻²

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 10-12

Pit Description

Dry

Standing Water Estimated Depth: _____

Photographs of Site: _____

Producing Formation: DK/CH

Comments: _____

NO PHOTOGRAPHS AVAILABLE



Section TWP RNG
Location 28 29 10
860 FSL
805 FEL

WELL NAME POLLOCK COM E #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: -- 0.02

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 14-16'

Pit Description Dry

Standing Water Estimated Depth: _____

FENCED - COULD NOT SEE

Photographs of Site: PIT 10, 11

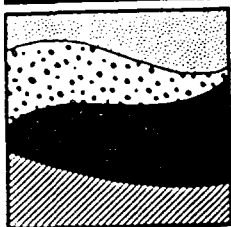
Producing Formation: ARMENTA GALLUP

Comments: CONDENSATE? ENTERING LINED PIT?

SEVERAL UPSET CONDITIONS



POLLOCK E1 Roll #4 Slide 10



Section TWP RNG
Location NENW 29 29N 10W

WELL NAME BLACK GAS COM #1

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

* River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.06

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10^2 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 10-12'

Pit Description

Dry

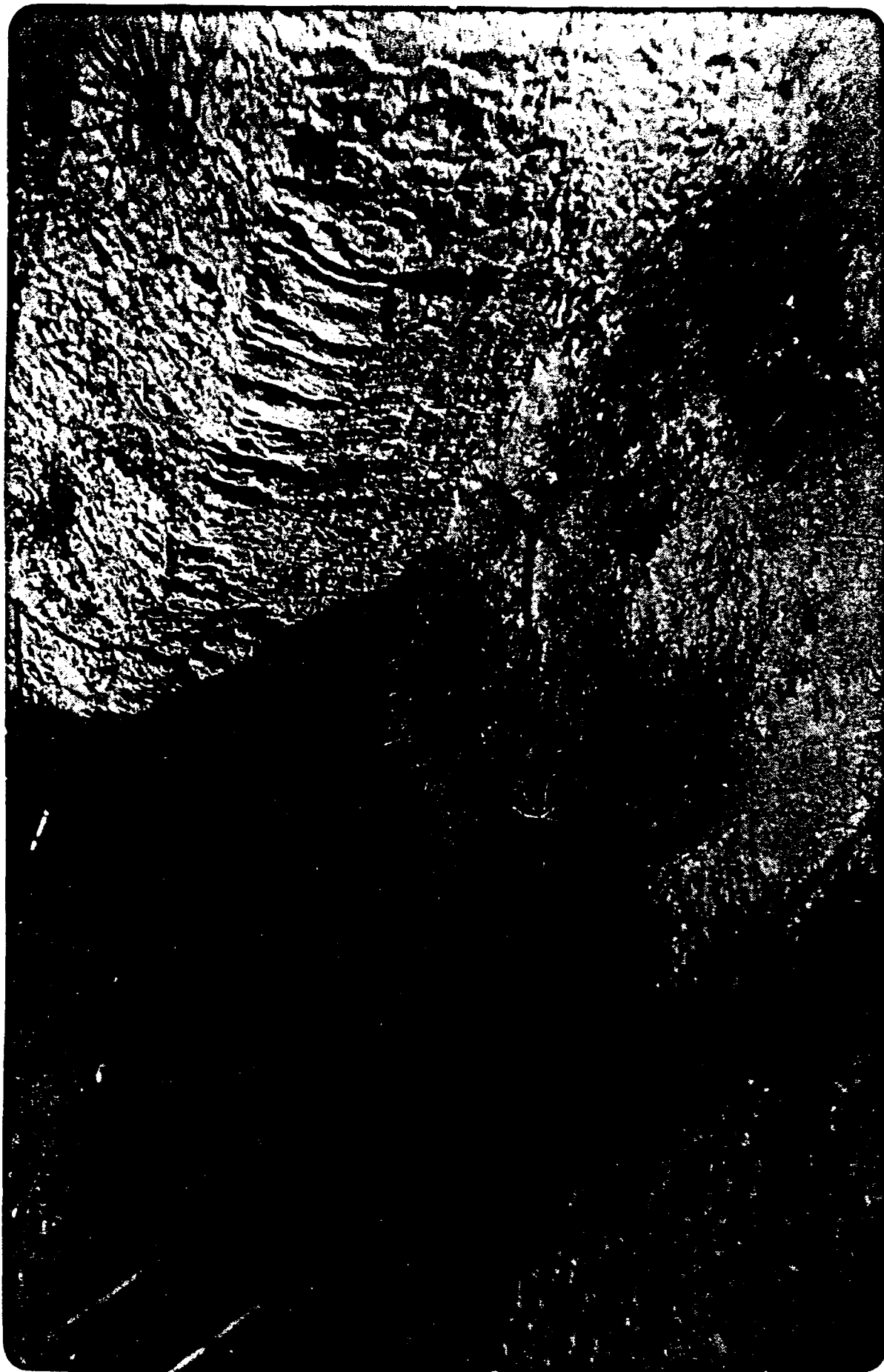
Standing Water

Estimated Depth: _____

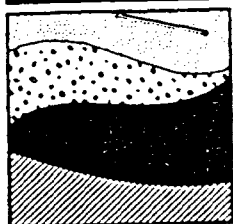
Photographs of Site: 12 PIT

Producing Formation: BASIN DAKOTA

Comments: → FIRST TERRACE



BLACK GAS COM #1 Roll #4 Slide 12



Section TWP RNG
Location 11 29N 13W
1570 FNL
1110 FWL

WELL NAME IRWIN COM 1E

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0 0.02

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: _____

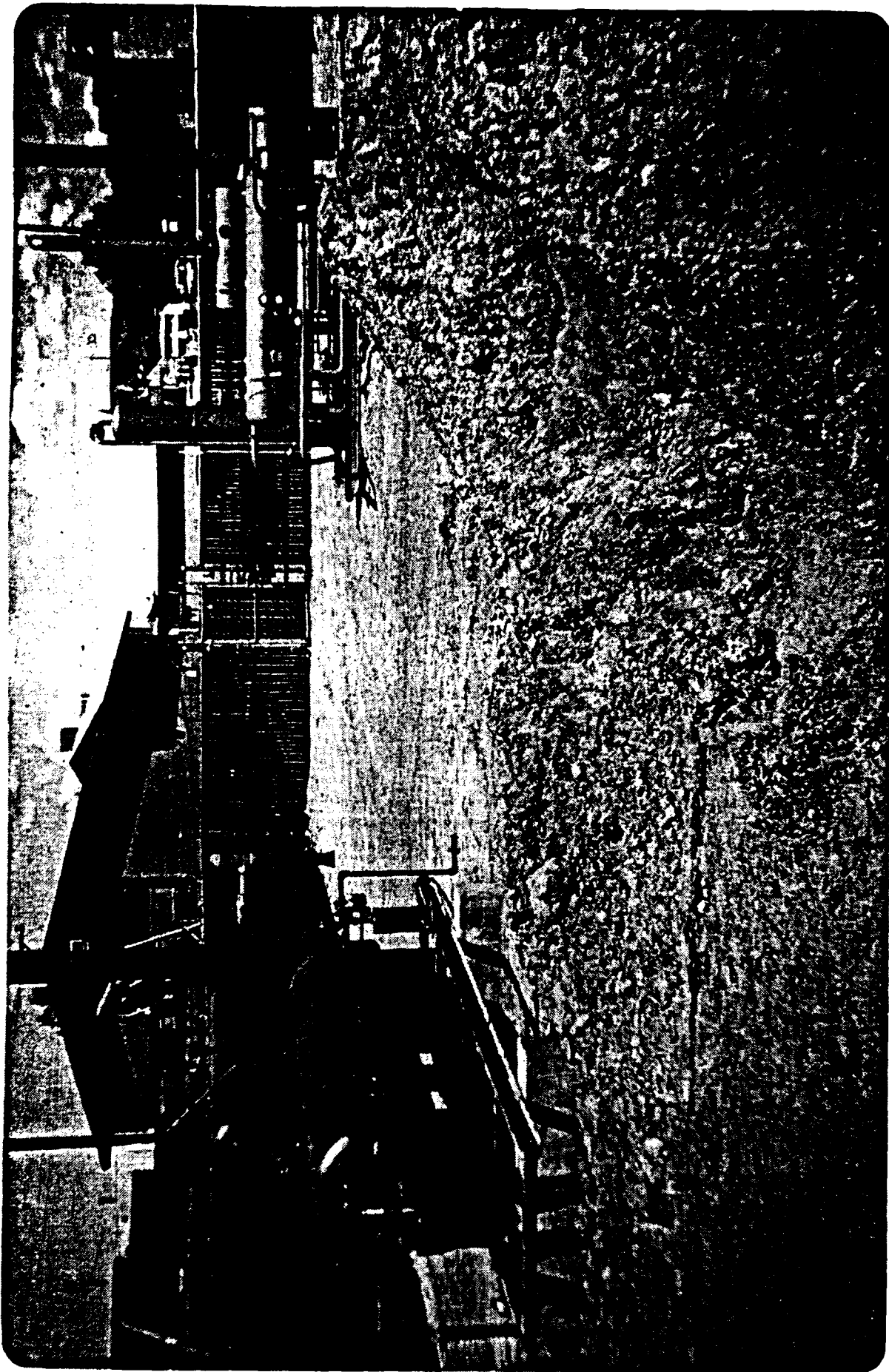
Photographs of Site: #3 SEPARATOR AND DEITY

Producing Formation: DK

Comments: VALLEY BANK PATH 1/2 mile left

NEVER BEEN PUT ON LINE! PIT IS FOR HOEK UP - NOT WATER

4/10/85
LTA



IRWIN 1E Roll #2 Slide 3



Section TWP RNG
Location SESW 8 29N 9W

WELL NAME HEATH GAS COM G #1

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

.007
Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.03

Estimated Hydraulic Gradient: ~~0.01~~ 0.01

Estimated Hydraulic Conductivity: 10^2 GPD/FT²

Formation/Grain Size of Unsaturated Zone: SANDY WASH

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water

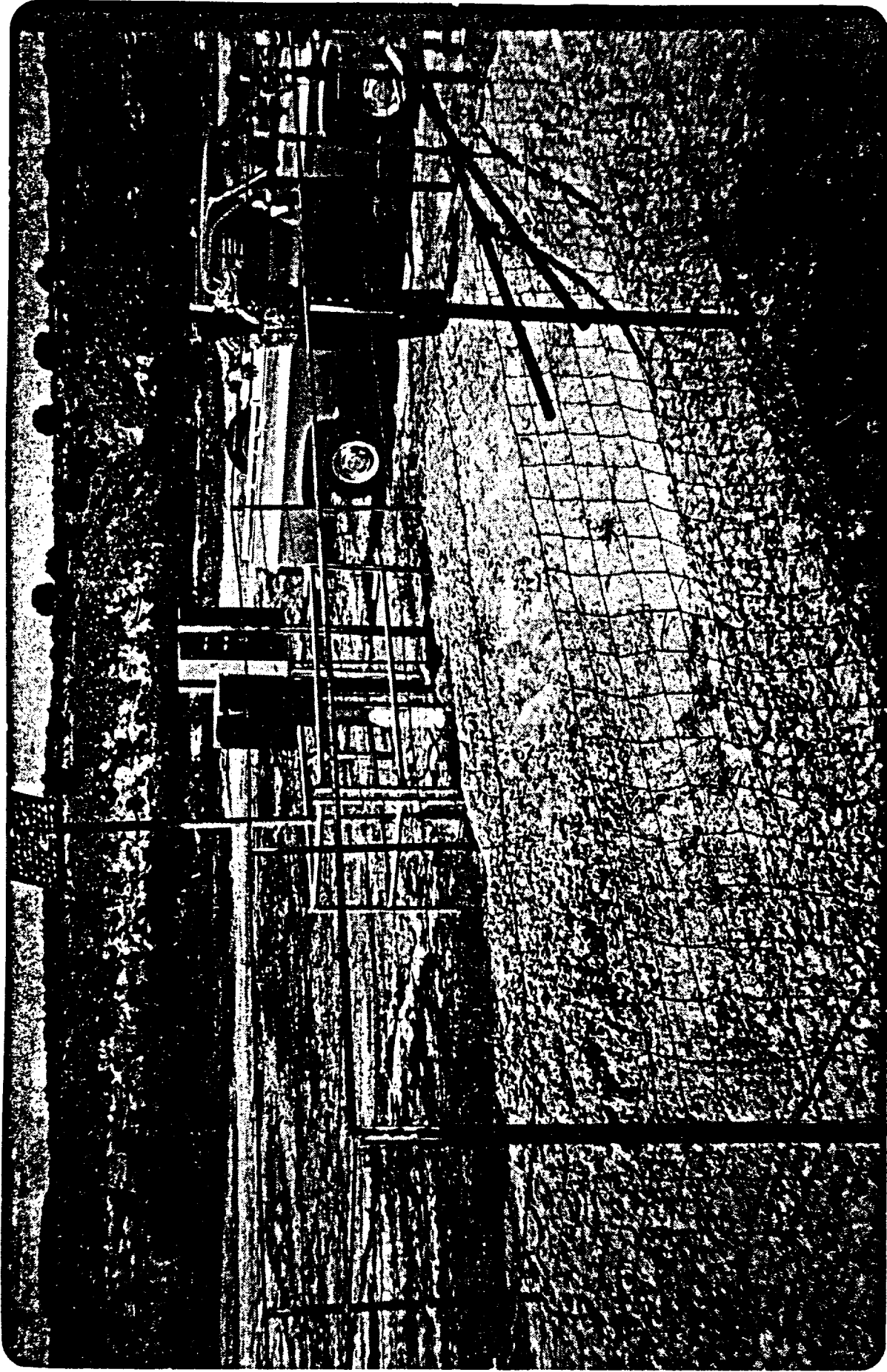
Estimated Depth: _____

Photographs of Site: 15, 16 PIT DISCHARGES NOTE BEDROCK SIDE OF WASH

Producing Formation: BASIN DAKOTA

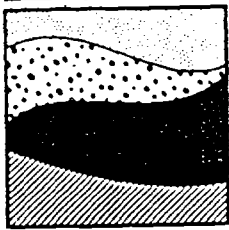
Comments: RAPID INFILTRATION

(LH) 4/11/85



HEATH GAS COM G #1 Roll #5 Slide 15

BEDROCK MESAS CASES



Section TWP RNG
SW/SE
Location 10 30N 8W

WELL NAME HOWELL 2A

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope* Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: 0.01

Estimated Hydraulic Conductivity: 10⁴ GPD/FT

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry?
Standing Water Estimated Depth: _____

Photographs of Site: #5, 6 Pit at separator

Producing Formation: MV

Comments: SHUT IN

* BEDROCK BEHUT SANDSTONE

EXEMPT

4/10/85 RTH



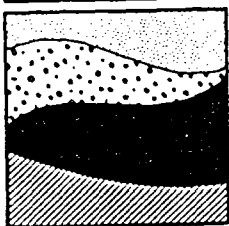
HOWELL 2A

Roll #3

Slide 5



HOWELL 2A Roll #3 Slide 6



Section TWP RNG
Location NW/NE/5 31N 10W

WELL NAME McEWEN GAS COM #1 B1 OUTSIDE UUN AREA

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: --

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 PURIFIED

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: 14¹⁵ RIVER SHOT TOWARD RIVER 15 - PIT w/FLUID

NOTE AREA OF
EVAP POUNDS FOR AMUCO

Pit Description Dry

Standing Water Estimated Depth: 0.33

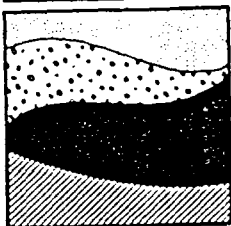
Photographs of Site: _____

Producing Formation: BLANCO - MESA VERDE

Comments: _____

4/10/85 RTH

NO PHOTOGRAPHS AVAILABLE



Section TWP RNG
Location NESW, 7 29N 9W

WELL NAME HEATH, WD, A #3X

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 0.5'

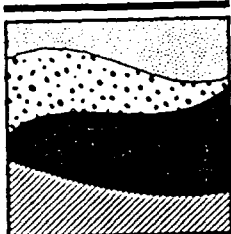
Photographs of Site: 17 PIT DISCHARGE

Producing Formation: BLANCO MESA VERDE

Comments: SHOULD INFILTRATE WELL - SOME H-C MAT
EMPTY



HEATH, WD, A #3X Roll #5 Slide 17



Section TWP RNG
Location NNW20 30N 8W

WELL NAME LINDA NYE 1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10^{-1} GPD/FT

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

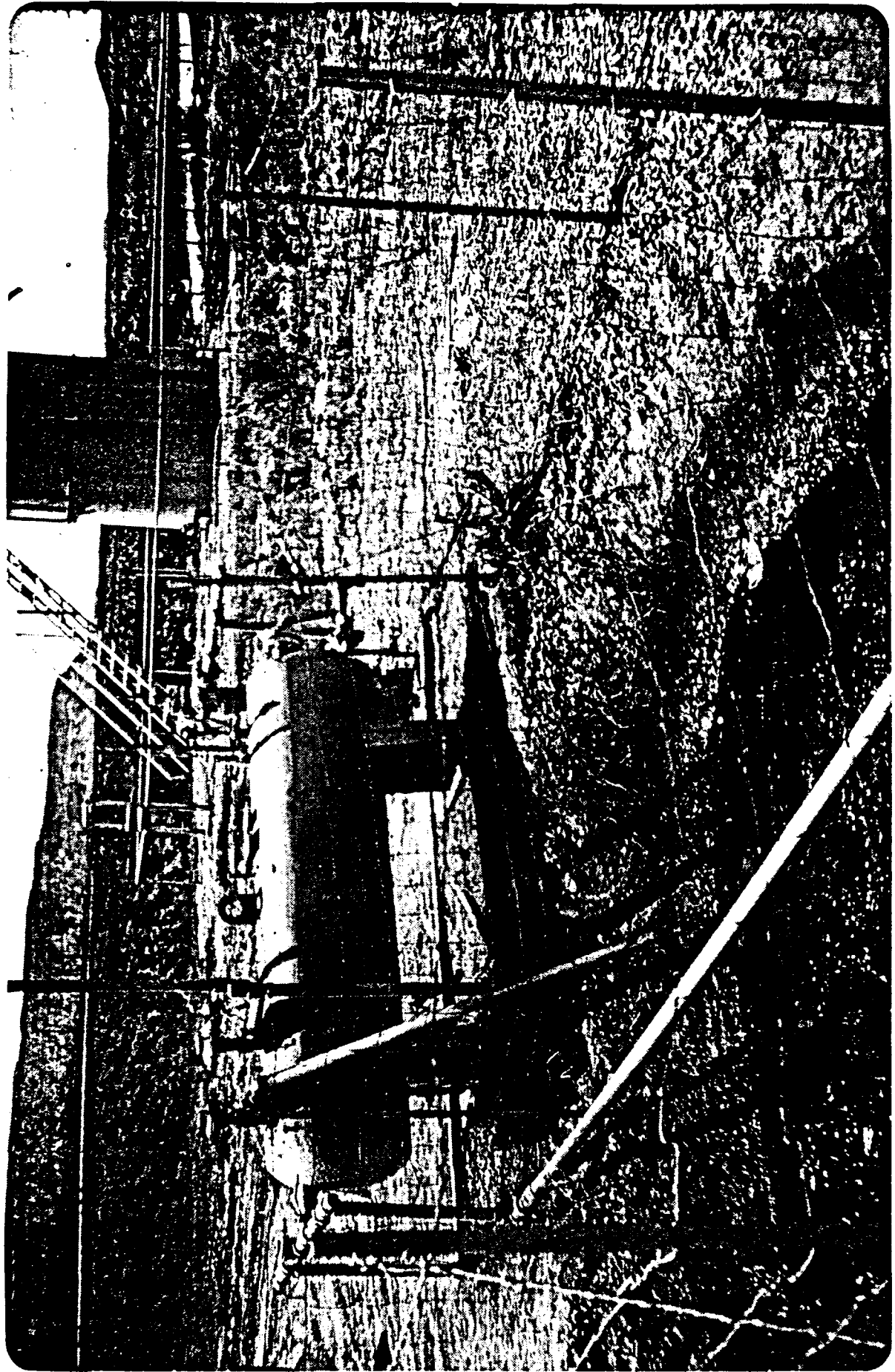
Standing Water Estimated Depth: 0.25 ft

Photographs of Site: 8 PIT #9 PIT 5 MESA/RIVER

Producing Formation: _____

Comments: HC FILM HC LINER

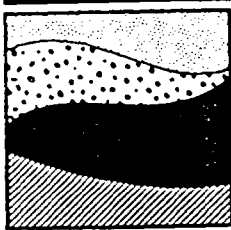
4/11/85 AAH



LINDA NYE 1 Roll #5 Slide 7



LINDA NYE 1 Roll #5 Slide 8



	Section	TWP	RNG
Location	<u>SE NW 8</u>	<u>29N</u>	<u>9W</u>

WELL NAME HEATH GAS COM H #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 GPD/FT²

Formation/Grain Size of Unsaturated Zone: SS / SH

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

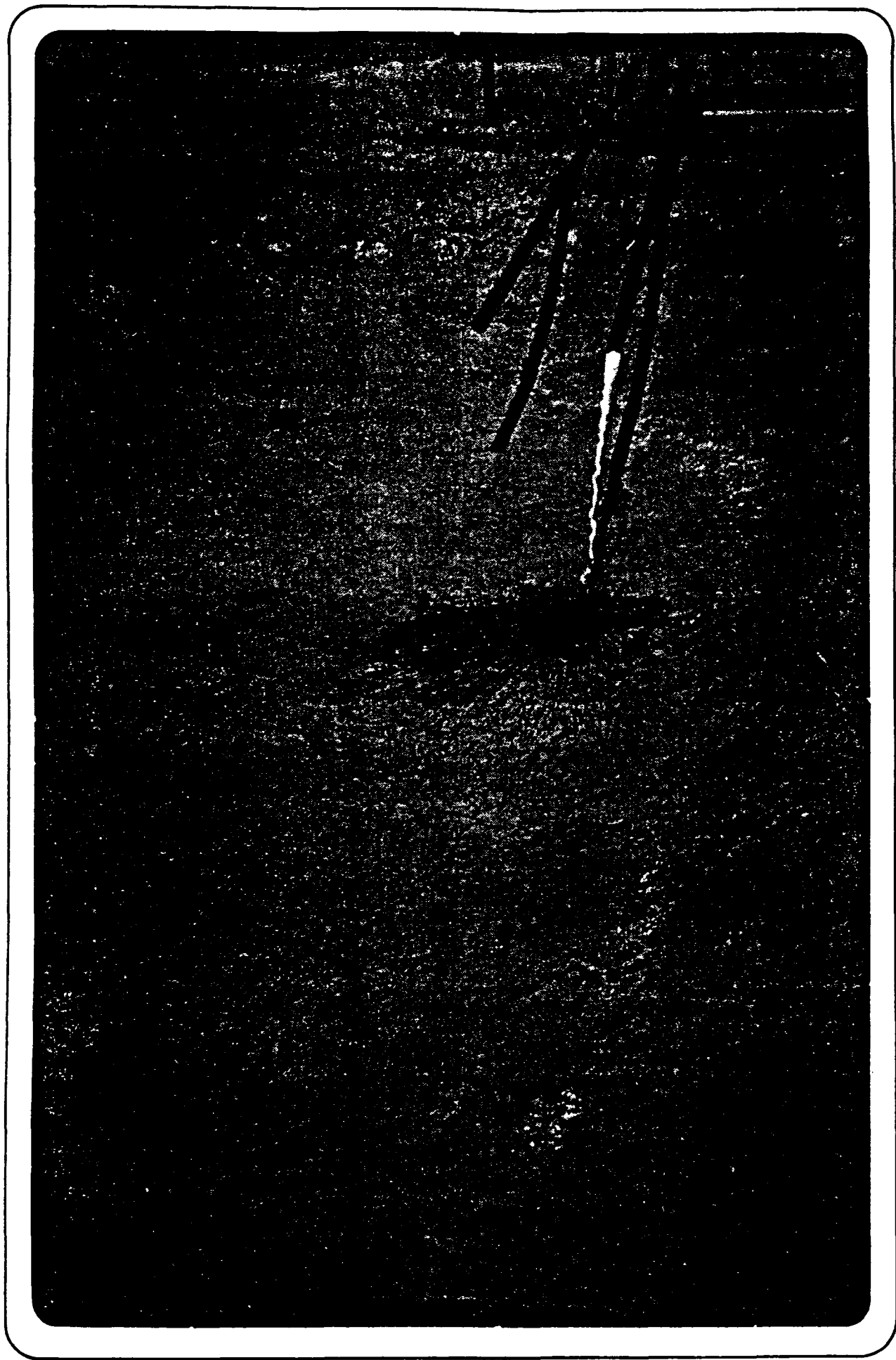
Standing Water Estimated Depth: _____

Photographs of Site: 13, 14 Pit w/ DISCHARGE

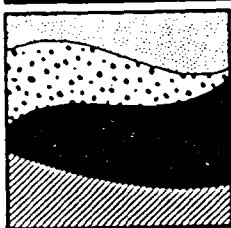
Producing Formation: BASIN DAKOTA

Comments: _____

4/11/05 RTH



HEATH GAS H 1 Roll #5 Slide 14



Section TWP RNG
Location SE NW 7 29N 9W

WELL NAME NYE GAS COM B #1E

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.07

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10⁻³ GPD

Formation/Grain Size of Unsaturated Zone: BEDROCK IN WASH ON SHALE

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water

Estimated Depth: 1.5'

Photographs of Site:

#13

SITE W/ BEDROCK

#14

PIT

#15

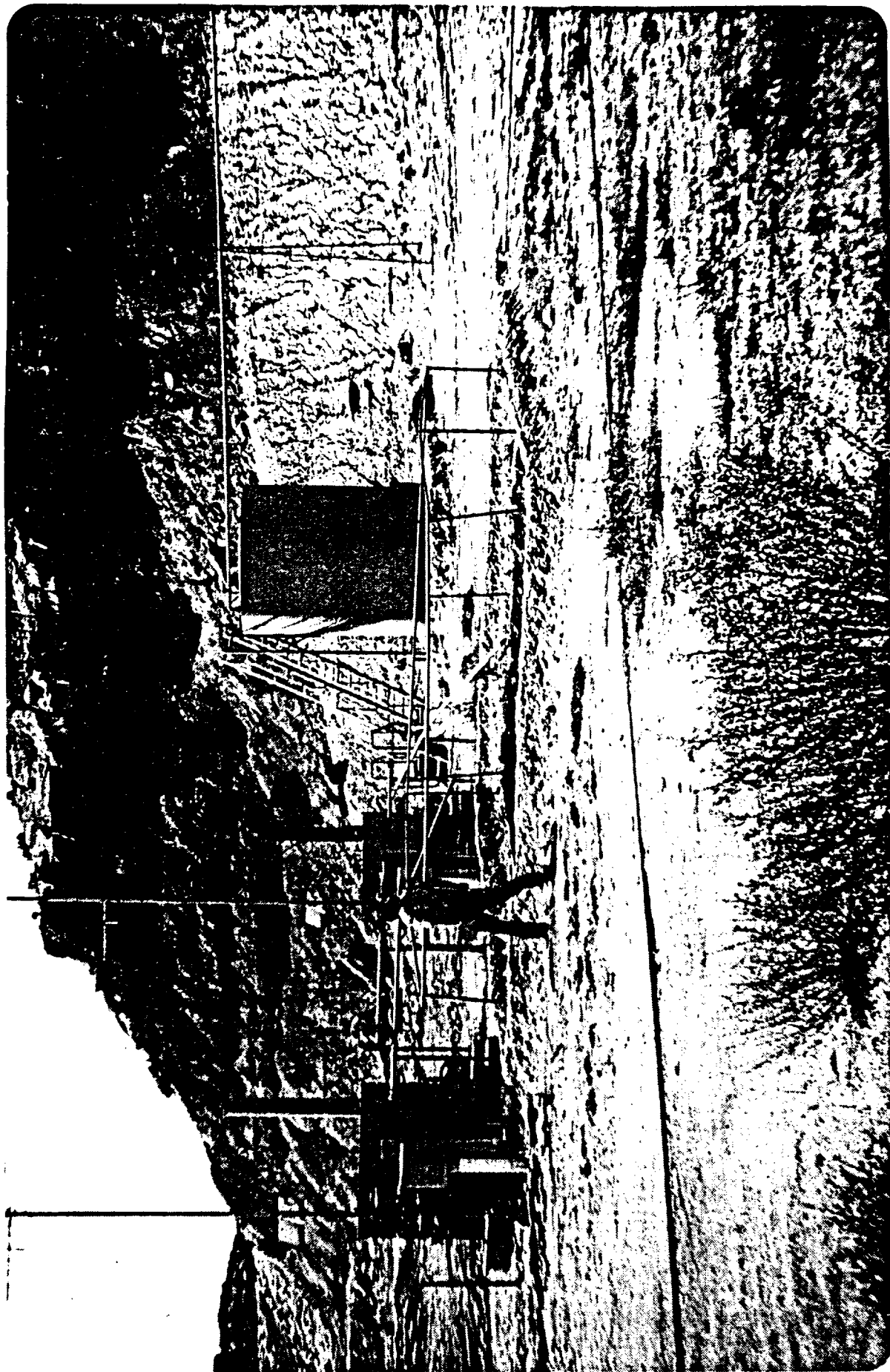
Producing Formation:

BASIN DAKOTA

Comments:

FRM OF HYDROCARBONS ON FLUID

2 SEPS INTO SAME PIT



NYE BIE Roll #1 Slide 12



NYE B1E Roll #1 Slide 13



NYE BIE Roll #1 Slide 14



	Section	TWP	RNG
Location	<u>NESW 17</u>	<u>29 N</u>	<u>9 W</u>

WELL NAME HEATH, WD A #10

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: — — NO FLUID COULD BE DISCHARGED

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 GPD/FT

Formation/Grain Size of Unsaturated Zone: SHALE/SAND

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water

Estimated Depth: _____

Photographs of Site: 16 PIT

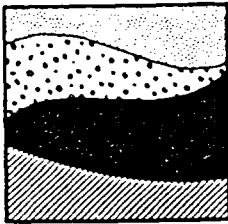
Producing Formation: BASIN DAKOTA

Comments: Appears to be on shale mesa between Largo of
San Juan - HIGH INFILTRATION POSSIBLE

4/11/85 RAH



HEATH, WD, A #10 Roll #5 Slide 16



Section TWP RNG
Location SESE 17 29N 9W

WELL NAME HEATH, WD, A #5

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.03

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10^2 GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry SEP PIT

Standing Water? Estimated Depth: 0.2' Reserve/Blan

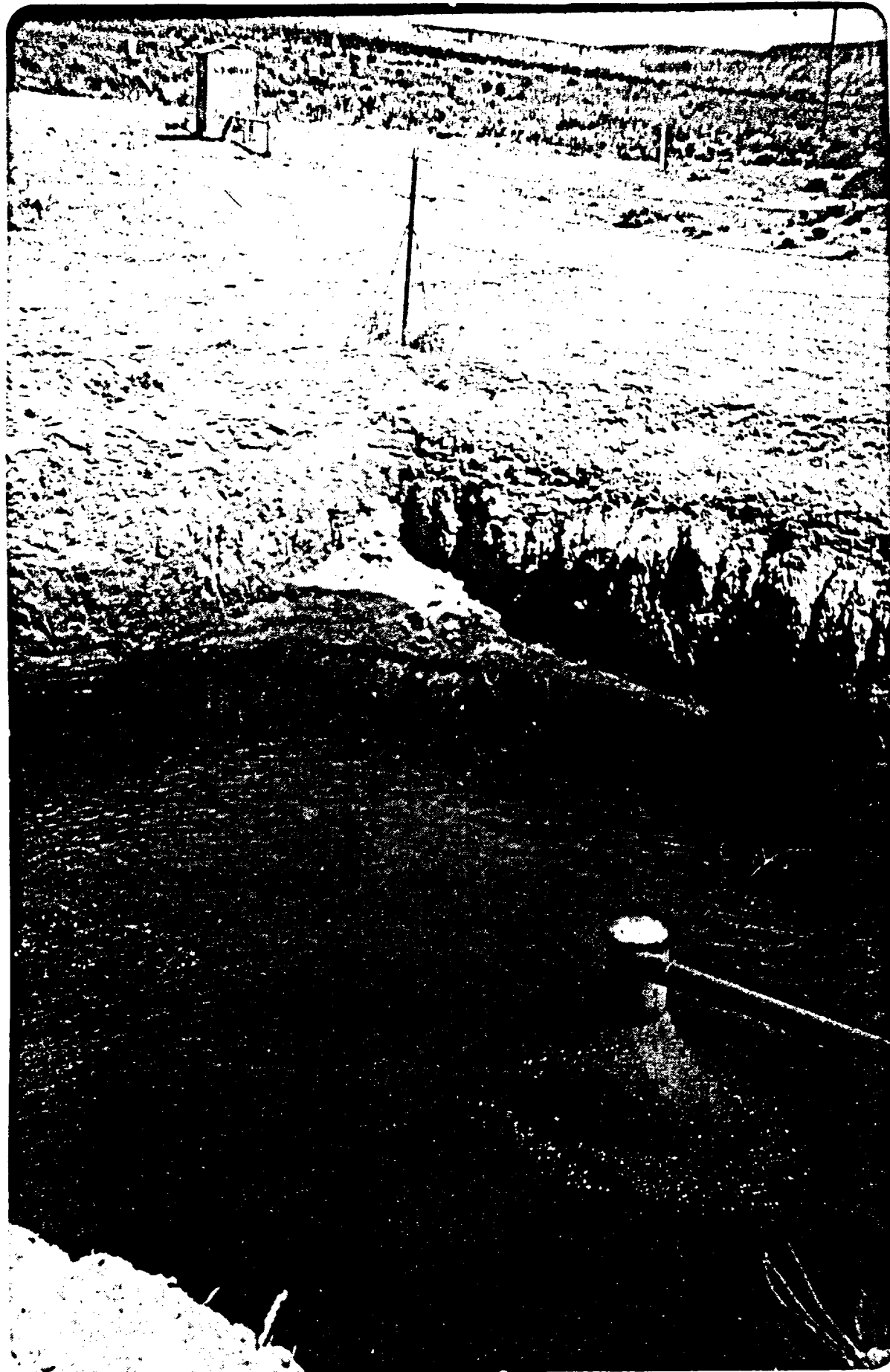
Photographs of Site: 10 Blow Pit FI SEP PIT

Producing Formation: BLANCO PICTURED CLIFFS

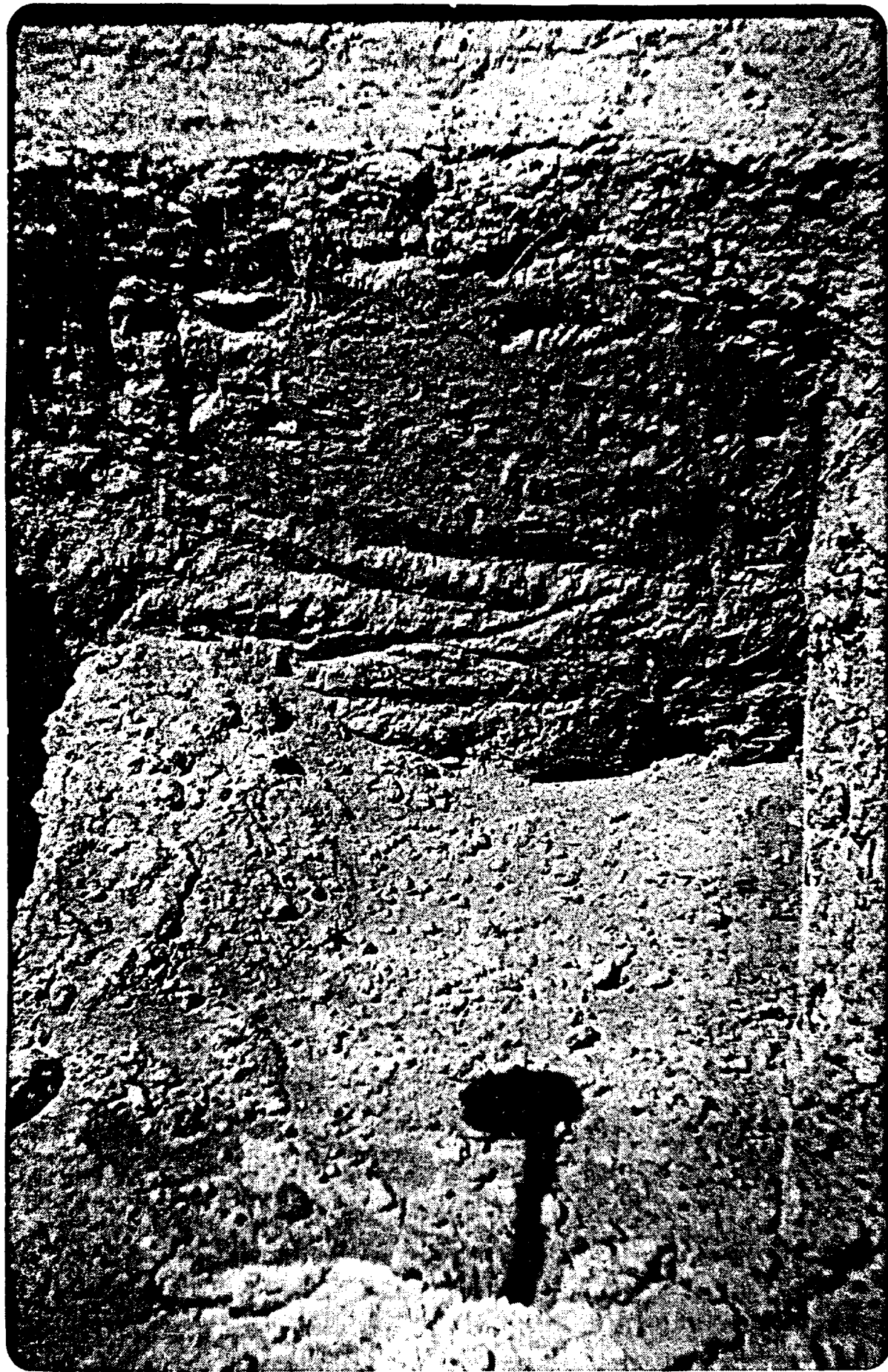
Comments: SHOULD INFILTRATE MAT/LINER PRESENT

SULLIVAN RD DITCH SHOWS SHALE

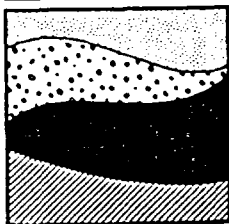
1/11/05 RTH



HEATH, WD, A5 Roll #5 Slide 18



HEATH, WD, A5 Roll #5 Slide 19



Section TWP RNG
Location 15 30N 8W
990 FSL
1650 FWL

WELL NAME FLORANCE 32

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 0.25

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone: Soil

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water Estimated Depth: _____

Photographs of Site: 7, 8, 9 ~~X~~ PIT AND SURROUNDING

Producing Formation: MV

Comments: ON THE TOP OF A HIGH MESA

WHAT IS THE GRADED AREA AND WHY IS

THERE GRAVEL HERE

OUT OF JUN AREA



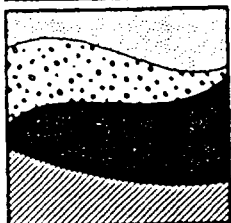
FLORENCE 32 Roll #3 Slide 7



FLORENCE 32 Roll #3 Slide 8



FLORENCE 32 Roll #3 Slide 9



Section TWP RNG
SW/NE
Location 19 30N 8W

WELL NAME FLORANCE 111

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone: SANDSTONE SHALE SOIL

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: 0.5'

Photographs of Site: #2 #3 #4 Pit NOTE BEDROCK IN BACKGROUND #4 RIVERBANK

Producing Formation: DK/PC

Comments: WATER TABLE EXEMPT!

4/10/85 BAH



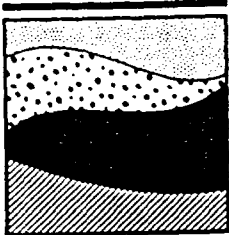
FLORENCE 111 Roll #3 Slide 2



FLORENCE 111 Roll #3 Slide 3



NEAR FLORENCE 111 Roll #3 Slide 4



	Section	TWP	RNG
	SE/SE		
Location	<u>25</u>	<u>30N</u>	<u>9W</u>

WELL NAME JACQUES 1A

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10^{-2} SURFACE 10

Formation/Grain Size of Unsaturated Zone: SAND

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

WET DIRT

Standing Water

Estimated Depth: _____

Photographs of Site: 9, 10 PIT DISCHARGES

Producing Formation: MV

Comments: RAPID INFILTRATION

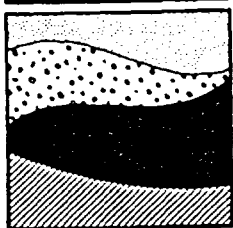
EXEMPT



JACQUEZ 1 A Roll #5 Slide 9



JACQUEZ 1 A Roll #5 Slide 10



	Section	TWP	RNG
Location	<u>NENE 35</u>	<u>30N</u>	<u>9W</u>

WELL NAME SANDOVAL GAS COM A #1R

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.03

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10^{-4} GPD/FT

Formation/Grain Size of Unsaturated Zone: SOIL / UNDERLAIN BY BEDROCK?

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry

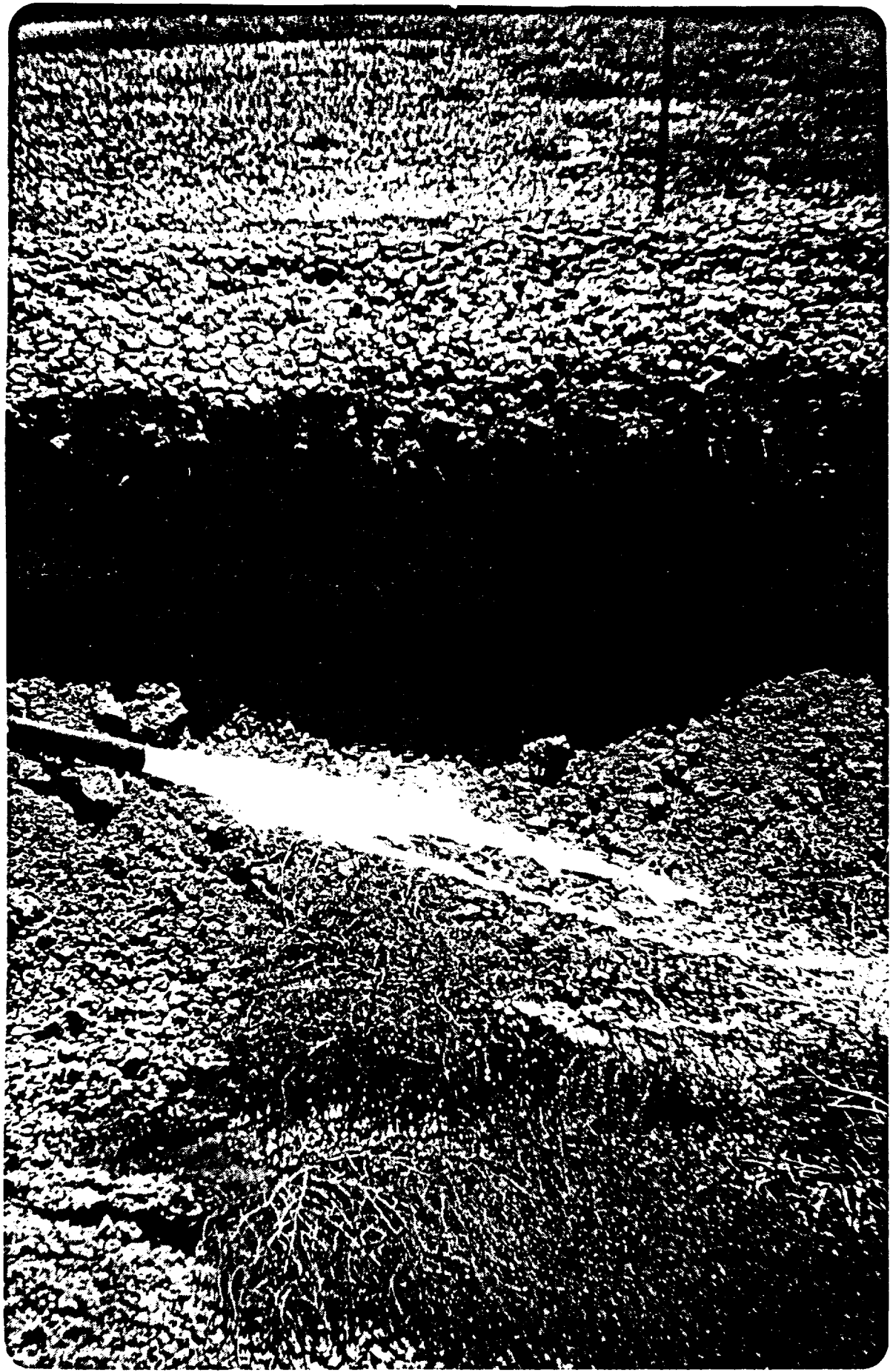
Standing Water Estimated Depth: 0.25'

Photographs of Site: 5, 6 & PIT w/ DISCHARGE

Producing Formation: BLANCO MESAVERDE

Comments: _____

4/11/85 PTH



SANDOVAL A 1 R Roll #5 Slide 5



SANDOVAL A 1 R Roll #5 Slide 6



Section TWP RNG
SE/NW
Location 1 30N 9W

WELL NAME PRITCHARD 1A

Drainage Basin:

San Juan

La Plata

Animas

other: PUMP WASH

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 1

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone: SANDSTONE

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: 250'

Pit Description Dry

Standing Water

Estimated Depth: 0.25

Photographs of Site: #20 #1 P.T VIEW to Pump WASH

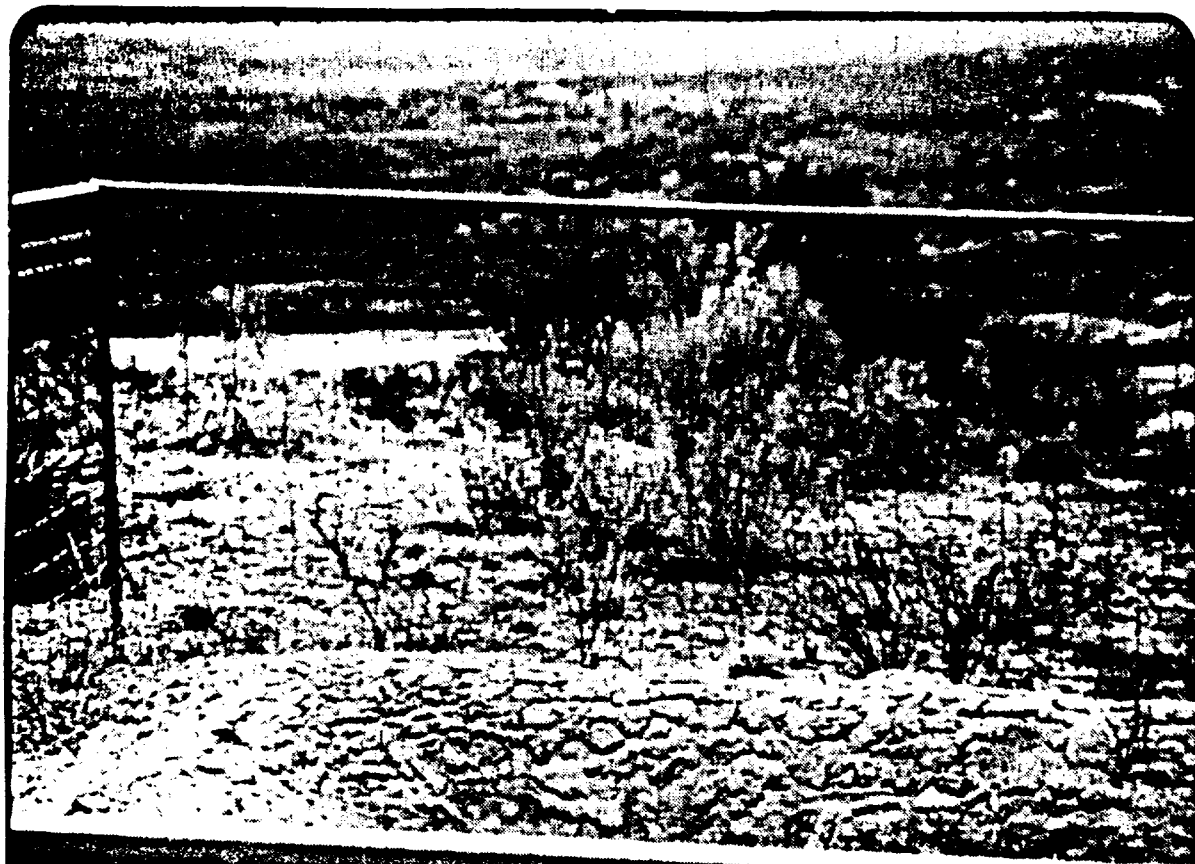
Producing Formation: MV

Comments: UP PUMP WASH SHUT IN

OUTSIDE OF UUN AREA

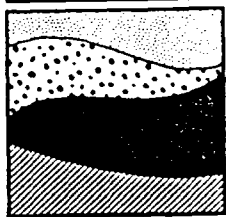
EXEMPT

4/10/85 RPT



PRITCHARD 1A Roll #3 Slide 1

PICTURED CLIFFS CASES



	Section	TWP	RNG
Location	<u>SE SW 5</u>	<u>31N</u>	<u>10W</u>

WELL NAME McEWEN GAS COM C #1 AND #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient: 0.004

Estimated Hydraulic Conductivity: 10⁴ GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

~~TANK WITH #1~~

Pit Description Dry

Standing Water Estimated Depth: 6'

Photographs of Site: #13 Road Cut Along Animas #14^{MS} PIT w TANK → ON #1

Producing Formation: BLANCO PICTURED CLIFFS #1 → MV #16 Dry Pit

Comments: NO PIT FOR 'C' 1

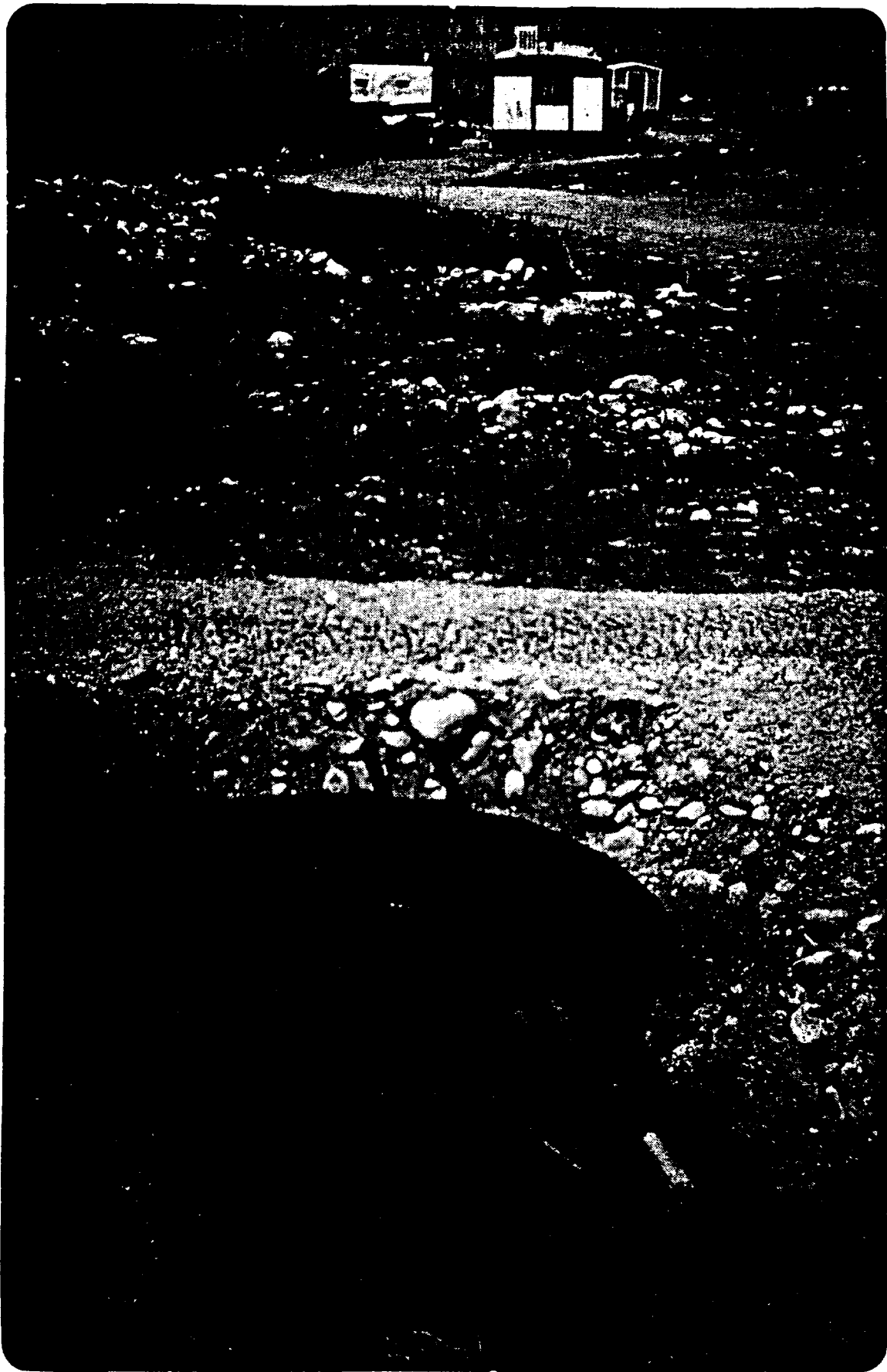
* TERRACE 30' ABOVE RIVER

NOT PUMPED OFTEN LOOKS LIKE

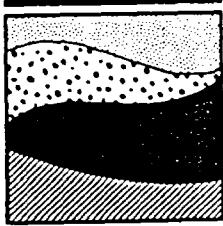
4/10/85 BAH



McEWEN GAS COM #1 Roll #2 Slide 14



McEWEN GAS COM #1 Roll #2 Slide 15



	Section	TWP	RNG
Location	<u>SE NE 35</u>	<u>31N</u>	<u>11W</u>

WELL NAME

WALLACE GAS COM #3 AND #1

also visited (outside of random evaluation)

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient:

~~0.01~~

0.01

Estimated Hydraulic Conductivity:

10⁴ GPD/FT²

Formation/Grain Size of Unsaturated Zone:

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

Standing Water Estimated Depth: _____

Photographs of Site:

#8 "MUFFLER" FOR FLARE PIT/PW PIT ANIMAS IN BACK

Producing Formation:

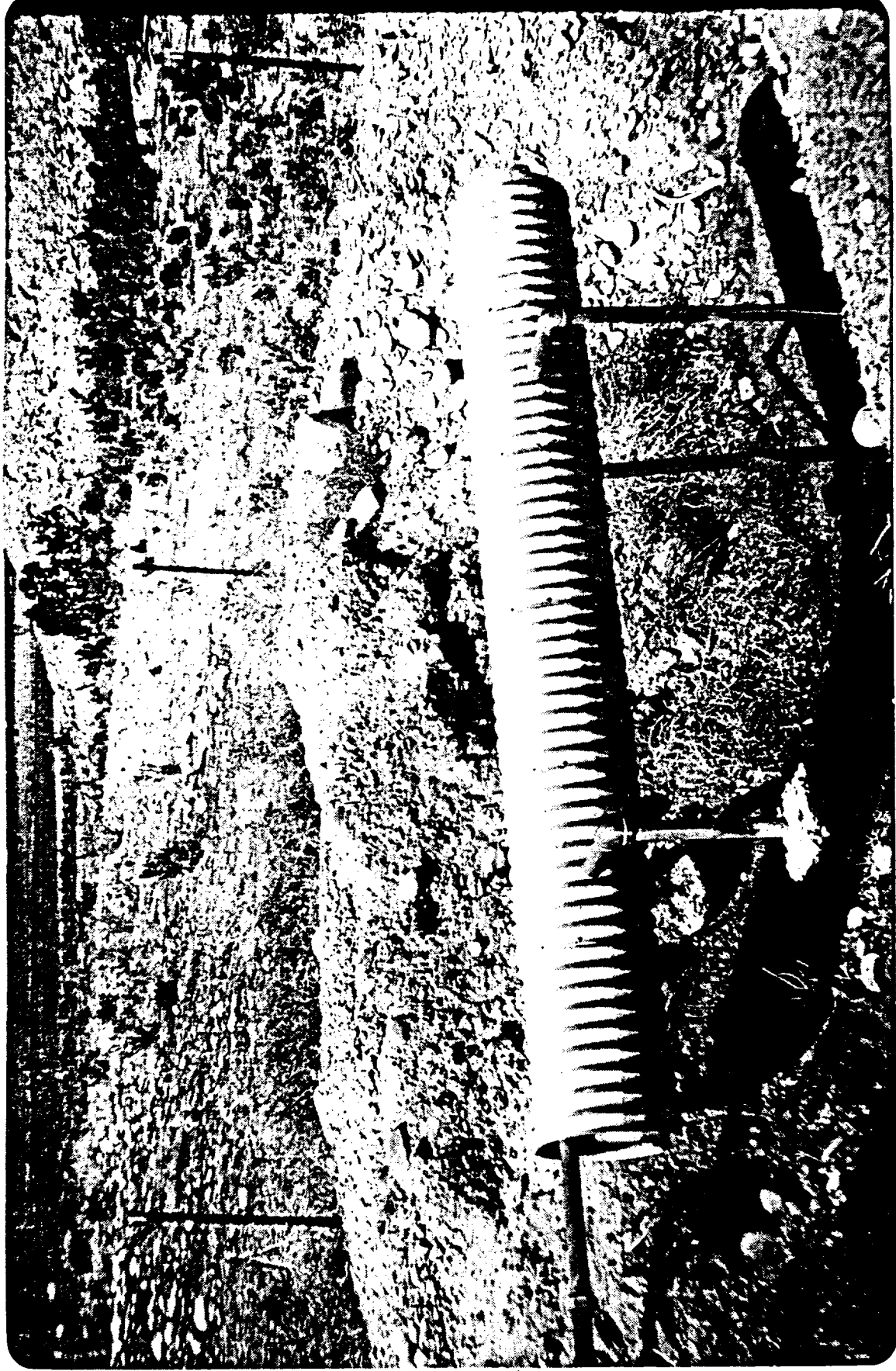
AZTEC PICTURED CLIFFS - SPECIAL AREA

Comments:

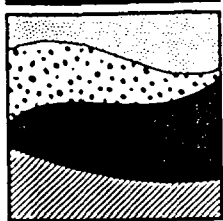
NO PITS TVO SEPARATOR!

SEPARATOR ON WALLACE #3 RUNS INTO FLARE PIT

4/10/05
CJT



WALLACE Roll #2 Slide 8



	Section <i>NE/NE</i>	TWP	RNG
Location	<u>20</u>	<u>29N</u>	<u>9W</u>

WELL NAME HAMNER 9

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone:

Very Fine	Fine	Med	Coarse	Very Coarse
Sorting:	Poor	Fair	Good	

Estimated Depth to Ground Water: _____

Pit Description Dry —

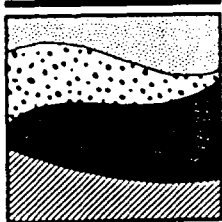
Standing Water Estimated Depth: _____

Photographs of Site: _____

Producing Formation: PC no production equipment

Comments: 3 SIDE LARGO

NO PHOTOGRAPHS AVAILABLE



	Section NE/SE	TWP	RNG
Location	<u>9</u>	<u>27N</u>	<u>9W</u>
1500000	11	2700	1000 1000 6000
1500000			

WELL NAME SULLIVAN, BRUCE I

Drainage Basin:

San Juan La Plata Animas other: OUTSIDE OF UUN AREA?
SPECIAL AREA?

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone:

Very Fine	Fine	Med	Coarse	Very Coarse
Sorting:	Poor	Fair	Good	

Estimated Depth to Ground Water: _____

Pit Description Dry

Standing Water Estimated Depth: _____

Photographs of Site: _____

Producing Formation: PC no production equipment

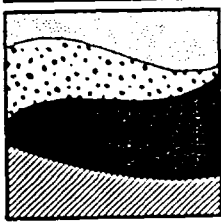
Comments: BLANCO

NO PHOTOGRAPHS AVAILABLE

	Section	TWP	RNG
Location	<u>24</u>	<u>29N</u>	<u>10W</u>

Comments:

NO PHOTOGRAPHS AVAILABLE



	Section	TWP	RNG
Location	<u>SWSE 35</u>	<u>30N</u>	<u>9W</u>

WELL NAME ULIBARRA GAS COM #2

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.03 - ? NO PIT!

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: _____

Formation/Grain Size of Unsaturated Zone:

	Very Fine	Fine	Med	Coarse	Very Coarse
Sorting:		Poor	Fair	Good	

Estimated Depth to Ground Water: _____

Pit Description

Dry NO PIT

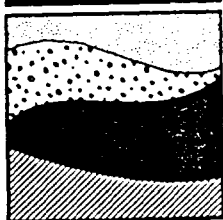
Standing Water Estimated Depth: _____

Photographs of Site: _____

Producing Formation: BLANCO PICTURED CLIFFS

Comments: SEE ULIBARRA #1A

NO PHOTOGRAPHS AVAILABLE



	Section	TWP	RNG
Location	<u>SE NW 19</u>	<u>29N</u>	<u>9W</u>

WELL NAME LIKINS GAS COM B #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient: 0.003

Estimated Hydraulic Conductivity: 10^3

Formation/Grain Size of Unsaturated Zone:

Very Fine Fine Med Coarse Very Coarse
Sorting: Poor Fair Good

Estimated Depth to Ground Water: -2'

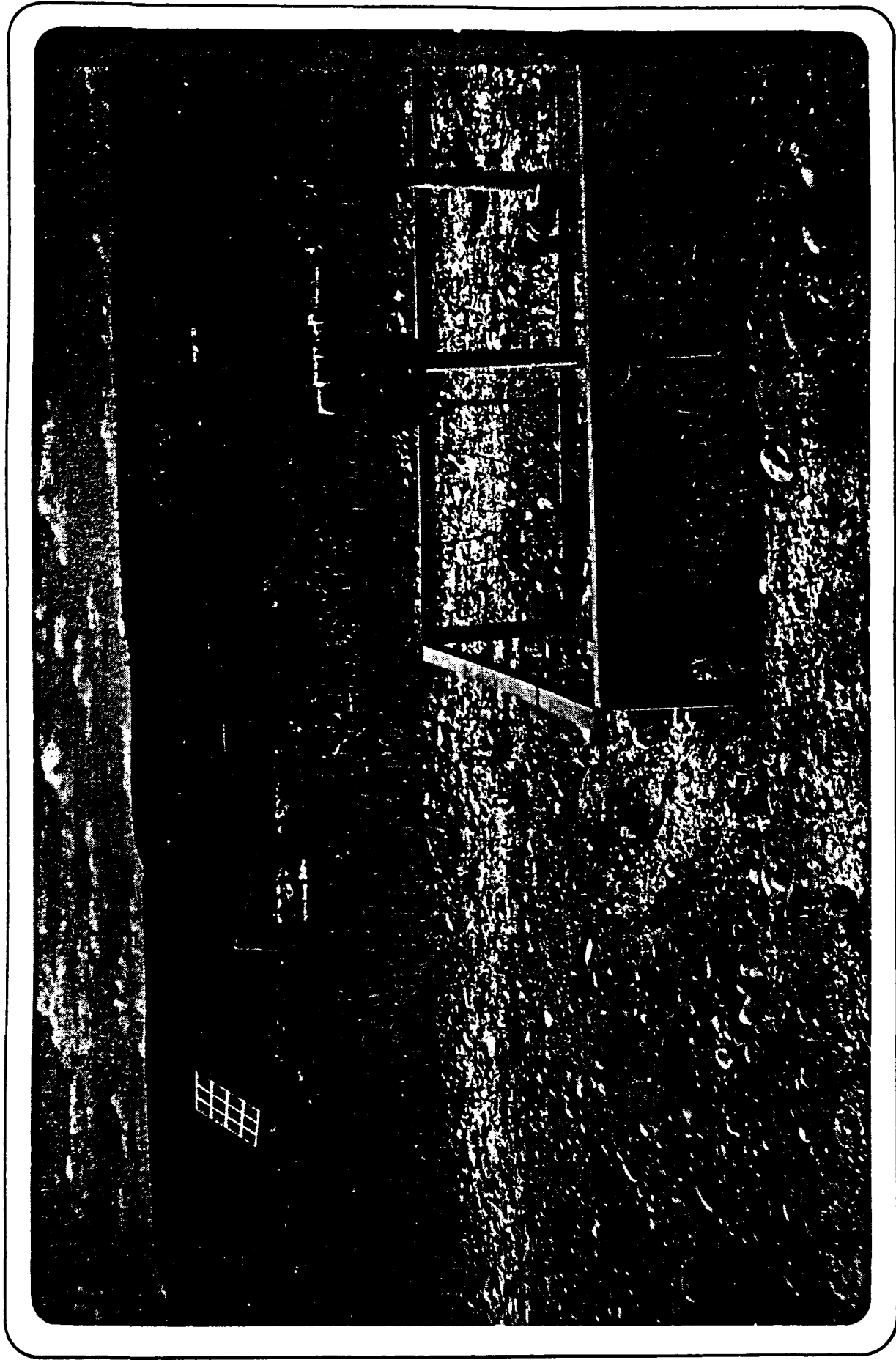
Pit Description Dry BLOWDOWN ONLY

Standing Water Estimated Depth: _____

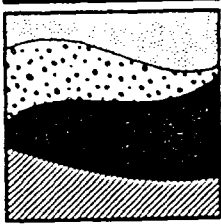
Photographs of Site: #3 BLOWDOWN PIT #4 MAPPING FIE PIT NOTE SKT

Producing Formation: AZTEC PICTURED CLIFFS

Comments: UNDER WATER



LIKENS GAS COM B 1 Roll #4 Slide 3



	Section	TWP	RNG
Location	<u>SW 1/4 8</u>	<u>29N</u>	<u>9W</u>

WELL NAME HEATH GAS COM F #1

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: 0.03 - ? No PIT!

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 GPD/FT

Formation/Grain Size of Unsaturated Zone: Silt / Sand

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry NO ~~SEPARATOR~~ BLOW DOWN PIT

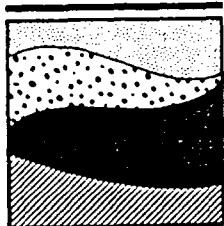
Standing Water Estimated Depth: _____

Photographs of Site: _____

Producing Formation: BLANCO PICTURED CLIFFS

Comments: SHOT 13 TO SANDWAL AIR

NO PHOTOGRAPHS AVAILABLE



Section TWP RNG
Location NESE 33 30N 9W → N1

WELL NAME ELLIOTT GAS COM M #1 NO PIT N1

Drainage Basin:

San Juan

La Plata

Animas

other: _____

Description of Location:

River Bottom

Valley Slope

Dry Tributary

Mesa

Other: _____

Barrels Water/Day Produced: --

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: 10 10² GPD/FT

Formation/Grain Size of Unsaturated Zone: SAND FROM WASH

Very Fine

Fine

Med

Coarse

Very Coarse

Sorting:

Poor

Fair

Good

Estimated Depth to Ground Water: _____

Pit Description

Dry

N1

NO PIT AT PC

Standing Water

Estimated Depth:

0.1 FT

Photographs of Site:

17, 18 N1 PIT

Producing Formation:

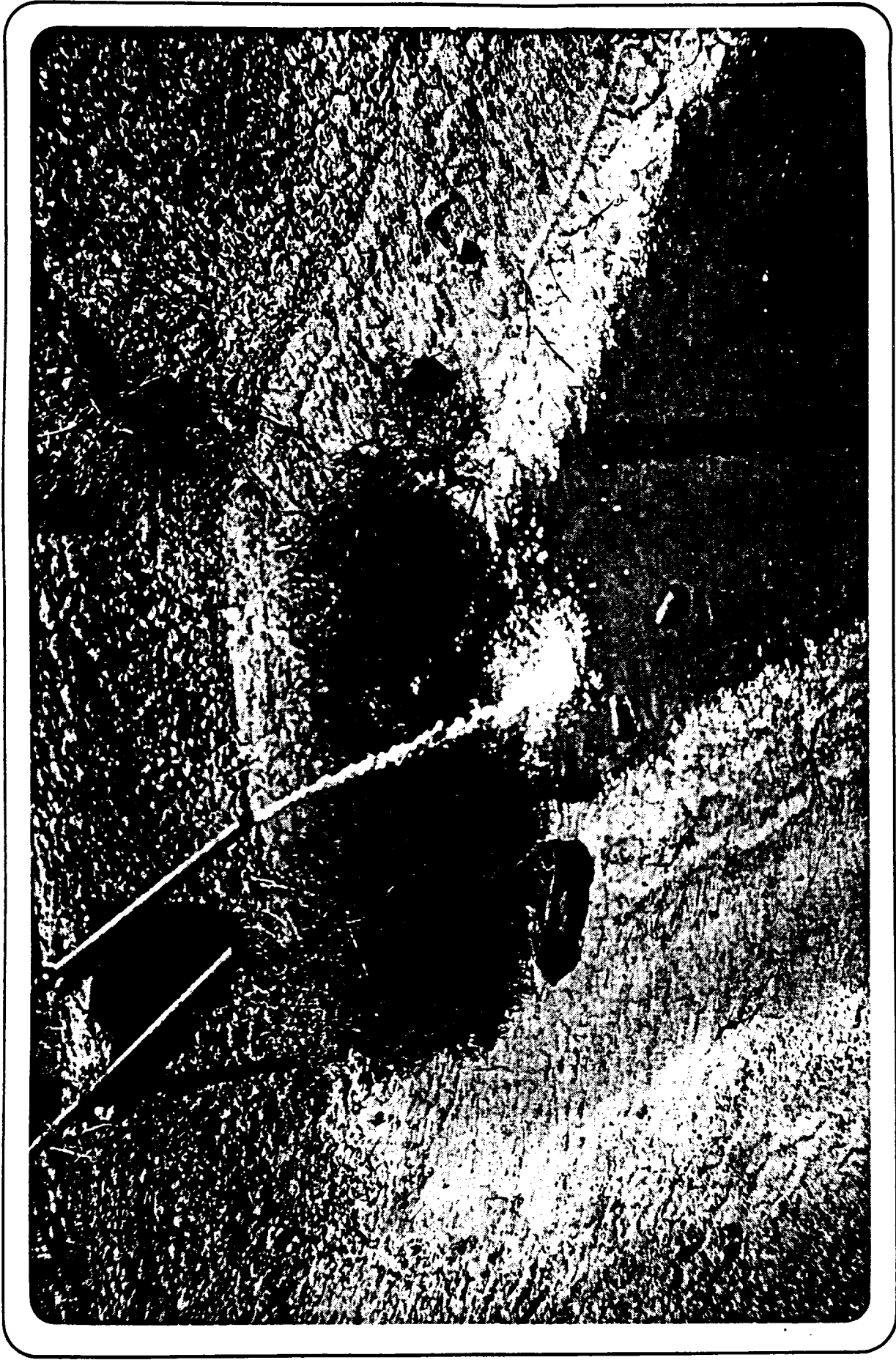
BLANC PICTURED CLIFFS

Comments:

SOME HL FINE SAND LINING

CAPILLARITY SUCKS WATER UP SIDES

40' ABOVE WASH



ELLIOTT N 1 Roll #1 Slide 17



ELLIOTT N 1 Roll #1 Slide 18



Section TWP RNG
Location SW SE 6 29N 9W

WELL NAME JACQUEZ GAS COM E #1 ADJACENT TO "C1"
OUTSIDE OF RANDOM EVALUATION

Drainage Basin:

San Juan La Plata Animas other: _____

Description of Location:

River Bottom Valley Slope Dry Tributary Mesa Other: _____

Barrels Water/Day Produced: — —

Estimated Hydraulic Gradient: _____

Estimated Hydraulic Conductivity: (10 GPD/FT -10²) 10⁴ under

Formation/Grain Size of Unsaturated Zone: Soil and FINE SAND

Very Fine Fine Med Coarse Very Coarse

Sorting: Poor Fair Good

Estimated Depth to Ground Water: _____

Pit Description Dry NO PIT - NO WATER

Standing Water Estimated Depth: 20±

Photographs of Site: ~~None~~ "C1" PIT

Producing Formation: BLANCO PICTURED CLIFFS

Comments: NO WATER FROM PC

JACQUEZ C1 HAS METAL PIT IN FINE SAND



JACQUEZ E1 Roll #1 Slide 15

2.0 ANALYTICAL REPORTS

Enclosed are the analytical reports from Assaigai Analytical Laboratories and Rocky Mountain Analytical Laboratories for all samples done on ground water at the three field sites in the vulnerable area. Soil samples were not taken for analysis.

Several of the samples were submitted to the laboratory "blind" using only the unique identification number. The identity of these unique numbers are found on the chain-of-custody forms, also enclosed.

It is apparent from the chain-of-custody forms that more samples were taken than were analyzed. Priorities for samples were set based on results and some duplicated samples were not analyzed.

ASSOCIATED ANALYTICAL LABORATORIES, INC.
CHIEF OF CUSTODY RECORD

SUPPLIER'S
(Signature) Richard H. Lee

STATION	LOCATION	DATE	TIME	SAMPLE TYPE	WATER	TEMP	DEQB	ALT	SEQ. NO.	NO OF CONTAINERS	ANAL. REQ.
STATION 1	15001	050317	1401		X						3000000000
MC01		050317	1230		X						
STATION 2		050317	1615		X						
STATION 1		050317	1903		X						
STATION 1		050317	1640		X						
STATION 1		050317	1711		X						
STATION 1		050317	1215		X						
MC01		050317	1200		X						

Relinquished by: (Signature) [Signature] Date/Time 03/14/85 1230
 Relinquished by: (Signature) [Signature] Date/Time [Blank]

Relinquished by: (Signature) [Blank] Date/Time [Blank]

Relinquished by: (Signature) [Blank] Date/Time [Blank]

Method of Shipment [Blank]

Distribution: Orig. - Accompany Shipment
 1 Copy - Files

ILLEGIBLE

SAMPLES
of (Gallium)

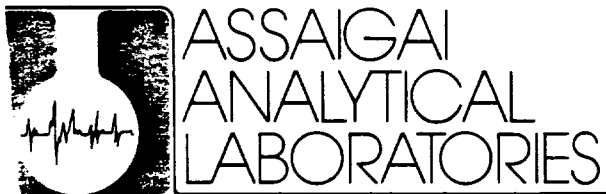
1901

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE		NO. OF CONTAINERS	ANALYSIS REQUESTED
				WATER	AIR		
RAYNE	RAYNE	8/15/12	1740	☒	☒		
MELOJ	MELOJ	8/20/13	1700	☒	☒		
RAYNE	RAYNE	8/25/12	1600	☒	☒		
RAYNE	RAYNE	8/25/12	1545	☒	☒		
Relinquished by: (Signature)		Received by: (Signature)					Date/Time
Relinquished by: (Signature)		Received by: (Signature)					Date/Time
Relinquished by: (Signature)		Received by: (Signature)					Date/Time
Relinquished by: (Signature)		Received by: (Signature)					Date/Time
Method of Shipment		Received by Laboratory for Analysis: (Signature)					Date/Time

44-111-10000
Distribution.Orig. - Accompany Ship out
1 Copy - Files

The all-people school is satisfactory condition
all over each school. Dr.

ILLEGIBLE



GeoScience
Attn: Randy Hicks
500 Copper N.W.
Albuquerque, NM 87102

DATE: 28 March 1985
0292

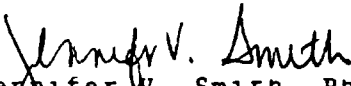
LYTE	SAMPLE ID/ ANALYTICAL RESULTS		
	Eaton 1 850313 1640	Eaton 2 850313 1615	McCoy 1 850313 1225
nzene	<0.001 mg/l	0.011 mg/l	0.006 mg/l
	840312 1545	840312 1505	Eaton Trench 850313 1601
nzene	<0.001 mg/l	0.021 mg/l	<0.001 mg/l
	Eaton Pit 850313 1703	840312 1740	850313 1230
enzene	3.825 mg/l	<0.001 mg/l	0.011 mg/l 0.012 mg/l Duplicate
	850313 1215	850313 1210	Eaton # 4 850313 1711
Benzene	<0.001 mg/l	<0.001 mg/l	<0.001 mg/l

NOMINAL DETECTION LIMITS: Benzene 0.001 mg/l

REFERENCE: "Measurement of Organic Pollutants in Water and Wastewater",
ASTM, STP 686, 1979.

An invoice for services is enclosed. Thank you for contacting Assaigai Laboratories.

Sincerely,


Jennifer V. Smith, Ph.D.
Laboratory Director

ASSAIGAI ANALYTICAL LABORATORIES, INC.
CHAIN OF CUSTODY RECORD

SAMPLERS
(Signature)

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE WATER Comp	AIR Grab	SEQ. NO.	NO OF CONTAINERS	ANALYSIS REQUIRED
1	Eaton Well #1	3/25/85	1520				2 UOA	Benzene, GC scan
2		3/25/85	1050				8 "	"
3		3/25/85	0940				3 "	"
4		3/25/85	1055				4 "	"
5		3/25/85	0945				4 "	"
6		3/25/85	0955				4 "	"
7		3/25/85	1005				4 "	"
	EATON SEPARATOR	3/25/85	0920				8 "	"

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by Laboratory for
Analysis: (Signature)

Date/Time

Method of Shipment: Hand Carry

Distribution: Orig. - Accompany Shipment
1 Copy - Files

ASSAIGAI ANALYTICAL LABORATORIES, INC.
CHAIN OF CUSTODY RECORD

SAMPLERS
(Signature)

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE		SEQ. NO.	NO OF CONTAINERS	ANALYSIS REQUIRED
				WATER	AIR			
	McCoy #1	3/25/85	1330	Comp	Grab		2 VOA	Benzene, GC Scan
	" #2	3/25/85	1335				"	"
	" #3	3/25/85	1340				"	"
	McCoy Pit	3/25/85	1345				"	"
	Payne Well Separator	3/25/85	1020				4 VOA	"

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by Laboratory for
Analysis: (Signature)

Date/Time

3/26/85

Method of Shipment Hand Carry

Distribution: Orig. - Accompany Shipment
1 Copy - Files

ASSAIGAI ANALYTICAL LABORATORIES, INC.
CHAIN OF CUSTODY RECORD

SAMPLERS
(Signature)

STATION NUMBER	STATION LOCATION	DATE	TIME	SAMPLE TYPE		SEQ. NO.	NO OF CONTAINERS	ANALYSIS REQUIRED
				WATER Comp	AIR Grab			
	Mc Coy #1	3/23/85	0851				1 VOA	Benzene, GC Scan
		"	0854				1 "	"
		"	0859				1 "	"
		"	0900				1 "	"
		"	0909				1 "	"
		"	"#3"				1 "	"

EATON UNIT

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by: (Signature)

Date/Time

Relinquished by: (Signature)

Received by Laboratory for
Analysis: (Signature)

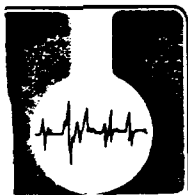
Date/Time

Method of Shipment

Hand Carry

Distribution: Orig. - Accompany Shipment

1 Copy - Files



ASSAIGAI ANALYTICAL LABORATORIES

To: GeoScience
Attn: Randy Hicks
500 Copper N.W.
Albuquerque, NM 87102

DATE: 3 April 1985
0347

ANALYTE

SAMPLE ID/ ANALYTICAL RESULTS

	Eaton 1 325851520	Eaton 2 325851050	Eaton 3 325850940
enzone	<0.001 mg/l	0.014 mg/l	0.007 mg/l
	Eaton 4 325851055	Eaton 5 325850945	Eaton 6 325850955
enzone	<0.001 mg/l	<0.001 mg/l	0.002 mg/l
	Eaton 7 325851005	Eaton Sep. 325850920	McCoy 1 325851330
Benzene	<0.001 mg/l	10.846 mg/l	0.002 mg/l
	McCoy 2 325851335	McCoy 3 325851340	McCoy Separator 325851345
Benzene	<0.001 mg/l	<0.001 mg/l	0.002 mg/l
	Payne Well 325851020	McCoy Gas Unit 1 325850900	Field Blank
Benzene	53.01 mg/l	0.001 mg/l	<0.001 mg/l

NOMINAL DETECTION LIMIT: 0.001 mg/l

REFERENCE: "Measurement of Organic Pollutants in Water and Wastewater",
ASTM, STP 686, 1979.

An invoice for services is enclosed. Thank you for contacting Assaigai
Laboratories.

Sincerely,

Jennifer V. Smith
Jennifer V. Smith, Ph.D.
Laboratory Director

SAMPLE DESCRIPTION INFORMATION

for

Assaigai Analytical Laboratories

<u>RMA Sample No.</u>	<u>Sample Description</u>	<u>Sample Type</u>	<u>Date Sampled</u>	<u>Date Received</u>
4822-01	Eaton# 2 325851050	water		3/28/85
4822-02	Eaton Sep. 920	water		3/28/85
4822-03	Eaton# 4 325851055	water		3/28/85

April 8, 1985

ANALYTICAL RESULTS
for
Assagai Analytical Laboratories

PURGEABLE ORGANICS METHOD 602

<u>Parameter</u>	<u>Units</u>	Detection		<u>4822-01</u>	<u>4822-02</u>	<u>4822-03</u>
		<u>Limit</u>				
Benzene	ug/l	3		4	7100	ND

ND = Not detected.

3.0 SPECIFIC CONDUCTANCE MEASUREMENTS FROM FIELD SITES

Specific conductance measurements were not conducted at any of the field sites nor the random sampling sites in the vulnerable area. Benzene was considered to be the most conservative tracer parameter for the study in. TDS is affected by irrigation for agriculture and is generally high in the uppermost portion of water table aquifers due to evapotranspiration. Due to the lack of background wells and background data, TDS and specific conductants were not analyzed at the field sites.

4.0 VOLUME RECORDS FOR PRODUCED WATER

Tenneco and Amoco provided estimates of the volume of produced water at each of the individual sites. These estimates were based upon the "pumpers" knowledge of the individual sites and observations during a several month period. To calibrate the pumper's estimates, flow measurement counters were placed on individual sites throughout the vulnerable area. The counters corroborated the accuracy of the pumper's estimates. Produced water volumes for all simulations are found as part of the data on the simulated map of benzene concentration in ground water.

5.0 DILUTION OF BENZENE IN PRODUCED WATER PITS DUE TO RAINFALL AND SNOWFALL

Enclosed is a calculation which demonstrates insignificant dilution of benzene in produced water pits due to the small amount of rainfall which occurred during the sampling (Table 5-1). The sites that were sampled had at least one or two feet of water in each of the pits and the calculation demonstrates that only slight dilution is observed (Figure 5-1). In no way does this dilution affect the results of the modelling.

TABLE 5-1
 RAINFALL DATA FARMINGTON, NEW MEXICO
 N.M.S.U. EXPERIMENTAL STATION
 MARCH 1985

DATE	PRECIPITATION IN INCHES	
4	TR	
9	0.03	
10	0.04	
11	0.05	
12	0.43	
13	0.01	GEOSCIENCE CONSULTANTS, LTD SAMPLING
16	0.12	
17	TR	
19	0.15	
20	0.27	
25	—	GEOSCIENCE CONSULTANTS, LTD. SAMPLING
29	0.41	
30	<u>0.23</u>	
TOTAL	1.71	

FIGURE 5-1
CALCULATION OF PRECIPITATION EFFECT ON
BENZENE CONCENTRATION

EATON A1E EXAMPLE

Fluid pit dimensions
10ft x 10ft x 2ft (Depth of fluid)

TOTAL VOLUME IN PIT
200 feet³

TOTAL MAXIMUM PRECIPITATION IN PIT (March 9, - March 13)
10ft x 10ft x 0.047ft = 4.7ft³

EMPLOY DILUTION CALCULATION TO SOLVE FOR BENZENE CONCENTRATION PRIOR
TO PRECIPITATION:

$$\frac{C_{RF} * Q_{RF} + Q_P * C_P}{Q_{RF} + Q_P} = C_{FINAL}$$

WHERE:

C_{RF} = 0 mg/l benzene in rainfall
 Q_{RF} = 4.7 ft³ rainfall into pit
 Q_P = 200 ft³ of fluid in the pit
 C_P = original benzene concentration in pit prior to rainfall
 C_{FINAL} = 3.80 mg/l measured benzene concentration in pit after rainfall

$$\frac{0 \text{ mg/l} * 4.7\text{ft}^3 + 200\text{ft}^3 * C_P \text{ mg/l}}{200\text{ft}^3 + 4.7\text{ft}^3} = 3.80 \text{ mg/l}$$

$$X \text{ mg/l} = \frac{3.8 * 204.7}{200}$$

$$X \text{ mg/l} = 3.89 \text{ mg/l}$$

Rainfall diluted the benzene from 3.89 to 3.80 mg/l

6.0 STATISTICAL ANALYSIS OF SAMPLING (TO BE SUPPLIED)

7.0 COMPUTER PROGRAM, INPUT AND OUTPUT

The computer program was obtained through a National Water Well Association short course. Ground Water Modelling Without Mathematics. The Random Walk solute transport model was based upon the article entitled: A "Random Walk" Solute Transport Model for Selected Ground Water Quality Evaluations, by Thomas A. Prickett, Thomas A. Naymik, and Carl L. Lonquist, Bulletin 65, Illinois State Water Survey, 1981.

The data from the program are out put by the computer in terms of particles per cell. Middligram per liter concentration of each particle is then calculated by determining the volume of water in each cell and, based on the source term, the mass of contaminant which particle represents. The calculation for the enclosed computer run is presented as Figure 7-1.

FIGURE 7-1

WELL: GCU 153 E

T = 125000 GPD/FT (K * 25)

S = 0.1

K = 5000 GPD/FT²

DH/DL = 0.003

LONG DIS = 10 FOR T GREATER THAN 7500 GPD/FT 5 FOR LESSER T

TRANS DIS = 2

RET COEF = 1

GPD/FT² * 1.55 * 10⁻⁶ * 60 * 60 * 24 = FT/DAY

REG X FLOW = 8.04 $\frac{K * 0.133 * 0.003 \text{ DH/DL}}{0.25}$ = 8.0352 FT/DAY

REG Y FLOW = 0

DMAX = 121 (NO MORE THAN 0.5 * CELL SIZE IN X DIRECTION)

CIRCLE COORDS 500,1500 FOR T GREATER THAN 100,000 50,150 FOR LESSER T

CIRCLE RAD = 5

NO. OF PARTICLES = 20

MAP COORDS = LOWER LEFT 0,0 UPPER RIGHT 300,300 FOR T GREATER THAN 100,000
300,300 FOR LESSER T

CELL SIZE = 250,250 FOR T GREATER THAN 100,000 25,25 FOR LESSER T

INCREMENTAL TIME STEP = 15 DAYS

3.5 MG/L IN PIT

0.33 BBL/DAY * 42 GAL/BBL * 3.785 L/GAL * 3.5 MG/L = 183 MG INPUT PER DAY

$$\frac{183 \text{ mg}}{\text{day}} * \frac{15 \text{ DAY}}{20 \text{ PARTICLES}} * \frac{1 \text{ CELL}}{11,062,500 \text{ liters}} = 0.000012 \text{ PPM}$$

.002 PPB = 1 PART
CELL

PROGRAM INPUT AND OUTPUT

-RANDOM WALK

TRANSMISSIVITY (GPD/FT) = 125000 GPD/FT
STORAGE COEFFICIENT = .1
HYDRAULIC CONDUCTIVITY = 5000 GPD/SQ.FT.
POROSITY = .25
LONGITUDINAL DISPERSIVITY= 10
TRANSVERSE DISPERSIVITY (FT)= 2
RETARDATION COEFFICIENT = 1 FT
REGIONAL X FLOW (FT/DAY) = 8.04
REGIONAL Y FLOW (FT/DAY)= 0

////////////////////

```

PARTICLES ON A CIRCLE
CIRCLE NUMBER 1
CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT
CIRCLE RADIUS = 5 FT
NUMBER OF PARTICLES = 20

```

////////////////////////////////////
 //////////////////////////////////PARTICLE MAPPING////////////////////////////////

```

MAP WINDOW LOCATION
LOWER-LEFT COORDINATES = 0 , 0 FT
UPPER-RIGHT COORDINATES = 3000 , 3000 FT
CELL SIZE (CDX,CDY) = 250 , 250 FT

```

	0	500	1000	1500	2000	2500	3000
3000:	0	0	0	0	0	0	0
2750:	0	0	0	0	0	0	0
2500:	0	0	0	0	0	0	0
2250:	0	0	0	0	0	0	0
2000:	0	0	0	0	0	0	0
1750:	0	0	0	0	0	0	0
1500:	0	0	20	0	0	0	0

[illegible]

```

PARTICLES ON A CIRCLE
CIRCLE NUMBER      5
CIRCLE CENTER COORDINATES (X,Y) =  500 , 1500  FT
CIRCLE RADIUS      =  5  FT

```


[illegible]

(-1:PUMPING WELL, -2:INJECTION WELL)

```

PARTICLES ON A CIRCLE
CIRCLE NUMBER 7
CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT
CIRCLE RADIUS = 5 FT
NUMBER OF PARTICLES = 20

```

TOTAL SYSTEM PARTICLES = 140

PRESENT SIMULATION TIME = 90 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

MAX = 121 FT

F= 140

PARTICLES ON A CIRCLE

CIRCLE NUMBER 8

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 160

PRESENT SIMULATION TIME = 105 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

MAX = 121 FT

IF= 160

PARTICLES ON A CIRCLE

CIRCLE NUMBER 9

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 180.

PRESENT SIMULATION TIME = 120 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

MAX = 121 FT

$$|F| = 180$$


```

TOTAL SYSTEM PARTICLES = 300
////////////////////////////////////
PRESENT SIMULATION TIME = 210 DAYS
INCREMENTAL SIMULATION TIME = 15 DAYS
DMAX = 121 FT
IF= 300

```

```

TOTAL SYSTEM PARTICLES = 320
////////////////////////////////////
PRESENT SIMULATION TIME = 225 DAYS
INCREMENTAL SIMULATION TIME = 15 DAYS
MAX = 121 FT
F= 320

```

```

////////////////////////PARTICLE MAPPING\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
  MAP WINDOW LOCATION
  LOWER-LEFT COORDINATES =  0 , 0 FT
  UPPER-RIGHT COORDINATES = 3000 , 3000 FT
  CELL SIZE (CDX,CDY) = 250 , 250 FT

  SIMULATION TIME = 240 DAYS
      0          500      1000      1500      2000      2500      3000
3000!  - - - - -| - - - -| - - - -| - - - -| - - - -| - - - -| - - - -| - - - -|
      0          0          0          0          0          0          0          0
2750!   0          0          0          0          0          0          0          0
2500!   0          0          0          0          0          0          0          0
2250!   0          0          0          0          0          0          0          0
2000!   0          0          0          0          0          0          0          0
1750!   0          0          0          0          0          1          0          1          2          3          2          1          0
1500!   0          0          15          42          43          34          37          30          25          22          17          12          8

```


1500:	0	0	14	38	45	45	41	36	31	41	29	31	26
1250:	0	0	0	0	0	0	1	2	3	2	2	3	2
1000:	0	0	0	0	0	0	0	0	0	0	0	0	0
750:	0	0	0	0	0	0	0	0	0	0	0	0	0
500:	0	0	0	0	0	0	0	0	0	0	0	0	0
250:	0	0	0	0	0	0	0	0	0	0	0	0	0
0:	0	0	0	0	0	0	0	0	0	0	0	0	0

(-1:PUMPING WELL, -2:INJECTION WELL)

PARTICLES ON A CIRCLE

CIRCLE NUMBER 22

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 440

////////////////////////////////////

PRESENT SIMULATION TIME = 315 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

MAX = 121 FT

JP= 440

////////////////////////////////PARTICLE MAPPING////////////////////////////////

MAP WINDOW LOCATION

LOWER-LEFT COORDINATES = 0 , 0 FT

UPPER-RIGHT COORDINATES = 3000 , 3000 FT

CELL SIZE (CDX,CDY) = 250 , 250 FT

SIMULATION TIME = 330 DAYS

	0	500	1000	1500	2000	2500	3000
3000:	0	0	0	0	0	0	0
2750:	0	0	0	0	0	0	0
2500:	0	0	0	0	0	0	0
2250:	0	0	0	0	0	0	0
2000:	0	0	0	0	0	0	0

[illegible]

(-1:PUMPING WELL, -2:INJECTION WELL)

```

PARTICLES ON A CIRCLE
CIRCLE NUMBER 23
CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT
CIRCLE RADIUS = 5 FT
NUMBER OF PARTICLES = 20

```

TOTAL SYSTEM PARTICLES = 460

[illegible]

PRESENT SIMULATION TIME = 330 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

MAX = 121 FT

$|F| = 460$

PARTICLES ON A CIRCLE

CIRCLE NUMBER 24

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 480

[illegible]

PRESENT SIMULATION TIME = 345 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

YMAX = 121 FT

$\mathcal{F} = 480$

PARTICLES ON A CIRCLE

CIRCLE NUMBER 25

CIRCLE CENTER COORDINATES (Y V) - 500 1500 --

```

////////////////////////////////////
PRESENT SIMULATION TIME = 360 DAYS
INCREMENTAL SIMULATION TIME = 15 DAYS

```

NF= 500

NUMBER OF PARTICLES = 20

F= 520

CELL SIZE (CDX,CDY) = 250 , 250 FT

	0	500	1000	1500	2000	2500	3000
3000:	0	0	0	0	0	0	0
2750:	0	0	0	0	0	0	0
2500:	0	0	0	0	0	0	0
2250:	0	0	0	0	0	0	0
2000:	0	0	0	0	0	0	0
1750:	0	0	0	0	0	3	2
1500:	0	0	8	53	41	44	34
1250:	0	0	0	0	0	1	4
1000:	0	0	0	0	0	0	0

[illegible]

(-1:PUMPING WELL, -2:INJECTION WELL)

PARTICLES ON A CIRCLE

CIRCLE NUMBER 28

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 560

[illegible]

PRESENT SIMULATION TIME = 405 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

DMAX = 121 FT

$$\sqrt{F} = 560$$

PARTICLES ON A CIRCLE

CIRCLE NUMBER 29

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 580

[illegible]

PRESENT SIMULATION TIME = 420 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

DMAX = 121 FT

$\sqrt{F} = 580$

PARTICLES ON A CIRCLE

CIRCLE NUMBER 30

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 600

[illegible]

PRESENT SIMULATION TIME = 435 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

DMAX = 121 FT

$\sqrt{P} = 600$

NUMBER OF PARTICLES = 20

NF= 620

	0	500	1000	1500	2000	2500	3000
3000:	0	0	0	0	0	0	0
2750:	0	0	0	0	0	0	0
2500:	0	0	0	0	0	0	0
2250:	0	0	0	0	0	0	0
2000:	0	0	0	0	0	0	0
1750:	0	0	0	0	0	3	3
1500:	0	0	13	45	37	42	36
1250:	0	0	0	0	0	0	1
1000:	0	0	0	0	0	0	0
750:	0	0	0	0	0	0	0
500:	0	0	0	0	0	0	0
250:	0	0	0	0	0	0	0
0:	0	0	0	0	0	0	0

(-1:PUMPING WELL, -2:INJECTION WELL)

PARTICLES ON A CIRCLE
CIRCLE NUMBER 32
CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT
CIRCLE RADIUS = 5 FT
NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 640
////////////////////////////////////

PRESENT SIMULATION TIME = 465 DAYS
INCREMENTAL SIMULATION TIME = 15 DAYS

DMAX = 121 FT

NP= 640

////////////////////////////////PARTICLE MAPPING////////////////////////////////

MAP WINDOW LOCATION
LOWER-LEFT COORDINATES = 0 , 0 FT
UPPER-RIGHT COORDINATES = 3000 , 3000 FT
CELL SIZE (CDX,CDY) = 250 , 250 FT

SIMULATION TIME = 480 DAYS

	0	500	1000	1500	2000	2500	3000
3000:	0	0	0	0	0	0	0
2750:	0	0	0	0	0	0	0
2500:	0	0	0	0	0	0	0
2250:	0	0	0	0	0	0	0
2000:	0	0	0	0	0	0	0
1750:	0	0	0	0	2	2	2
1500:	0	0	17	39	38	39	47
1250:	0	0	0	0	0	0	1
1000:	0	0	0	0	0	0	0
750:	0	0	0	0	0	0	0
500:	0	0	0	0	0	0	0
250:	0	0	0	0	0	0	0

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

•

BLUE LEFT COORDINATE

```

UPPER-LEFT COORDINATES = 0 , 0 FT
UPPER-RIGHT COORDINATES = 3000 , 3000 FT

```

CELL SIZE (CDX,CDY) = 250 , 250 FT

0 500 1000 1500 2000 2500 3000

```

30001: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

```

2750: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2500: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2250: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2000: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

| | | | | | | | | | | | | | |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17501 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 3 | 3 | 5 |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | | | | | |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 15001 | 0 | 0 | 12 | 42 | 43 | 40 | 29 | 50 | 39 | 26 | 43 | 30 | 30 |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|

```
1250:  0  0  0  0  0  1  0  1  0  2  1  7  4
```

```
1000:  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

750: 0 0 0 0 0 0 0 0 0 0 0 0 0

500: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

[illegible]

0: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(-1:PUMPING WELL, -2: INJECTION WELL)

CIRCLE NUMBER 37

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

DMAX = 121 FT

MAF' WINDOW LOCATION

POWER-LEFT COORDINATES = 0 . 0 FT

UPPER-RIGHT COORDINATES = 3000 . 3000 FT

CELL SIZE (CDX,CDY) = 250 , 250 FT

| | | | | | | |
|---|-----|------|------|------|------|------|
| 0 | 500 | 1000 | 1500 | 2000 | 2500 | 3000 |
|---|-----|------|------|------|------|------|

3000: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

27501 0 0 0 0 0 0 0 0 0 0 0 0 0

2500: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

2250: 0 0 0 0 0 0 0 0 0 0 0 0 0

2000: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

17501 0 0 0 0 0 0 3 0 4 6 3 2 4

| | | | | | | | | | | | | | |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1500: | 0 | 0 | 12 | 43 | 48 | 34 | 31 | 39 | 36 | 39 | 34 | 32 | 32 |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|

| | | | | | | | | | | | | | |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12501 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 4 | 6 |
|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|

```
1000:  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

750: 0 0 0 0 0 0 0 0 0 0 0 0 0

500: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

[illegible]

0; 0 0 0 0 0 0 0 0 0 0 0

PARTICLES ON A CIRCLE

CIRCLE NUMBER 38

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RANTING - F FT

CELL SIZE (CDX,CDY) = 250 , 250 FT

SIMULATION TIME = 615 DAYS

| | 0 | 500 | 1000 | 1500 | 2000 | 2500 | 3000 |
|-------|---|-----|------|------|------|------|------|
| 3000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2750: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1750: | 0 | 0 | 0 | 0 | 3 | 3 | 2 |
| 1500: | 0 | 0 | 12 | 42 | 40 | 44 | 43 |
| 1250: | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 1000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 750: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(-1:PUMPING WELL, -2:INJECTION WELL)

```

PARTICLES ON A CIRCLE
CIRCLE NUMBER 42
CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT
CIRCLE RADIUS = 5 FT
NUMBER OF PARTICLES = 20

```

TOTAL SYSTEM PARTICLES = 840

[illegible]

```
PRESENT SIMULATION TIME = 615 DAYS
INCREMENTAL SIMULATION TIME = 15 DAYS
```

$$T_{MAX} = 121 \text{ FT}$$

NF= 840

```

LOWER-LEFT COORDINATES = 0 , 0 FT
UPPER-RIGHT COORDINATES = 3000 , 3000 FT
CELL SIZE (CDX,CDY) = 250 , 250 FT

```

SIMULATION TIME = 630 DAYS

| | 0 | 500 | 1000 | 1500 | 2000 | 2500 | 3000 |
|-------|---|-----|------|------|------|------|------|
| 3000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2750: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1750: | 0 | 0 | 0 | 0 | 2 | 2 | 5 |
| 1500: | 0 | 0 | 14 | 43 | 38 | 31 | 57 |
| 1250: | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 1000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 750: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0: | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(-1:PUMPING WELL, -2:INJECTION WELL)

PARTICLES ON A CIRCLE

CIRCLE NUMBER 43

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 860

[illegible]

PRESENT SIMULATION TIME = 630 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

DMAX = 121 FT

 $\sqrt{F} = 860$

A horizontal number line is shown, ranging from 0 to 3000. Major tick marks are labeled at 0, 500, 1000, 1500, 2000, 2500, and 3000. Minor tick marks are present every 100 units. The number 1000 is marked with a red dot and a red bracket above it.

| | | | | | | | | | | | | | |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 2500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1750: | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 3 | 4 | 5 | 8 | 3 |
| 1500: | 0 | 0 | 10 | 44 | 35 | 48 | 70 | 38 | 44 | 34 | 27 | 25 | 28 |
| 1250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 3 | 5 | 5 |
| 1000: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 750: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 500: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 250: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(-1:PUMPING WELL, -2:INJECTION WELL)

PARTICLES ON A CIRCLE

CIRCLE NUMBER 48

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 960

////////////////////////////////////

PRESENT SIMULATION TIME = 705 DAYS

INCREMENTAL SIMULATION TIME = 15 DAYS

OMAX = 121 FT

NF= 960

PARTICLES ON A CIRCLE

CIRCLE NUMBER 49

CIRCLE CENTER COORDINATES (X,Y) = 500 , 1500 FT

CIRCLE RADIUS = 5 FT

NUMBER OF PARTICLES = 20

TOTAL SYSTEM PARTICLES = 980

////////////////////////////////////

PRESENT SIMULATION TIME = 720 DAYS

2000

ALL CONTOURS IN PPB

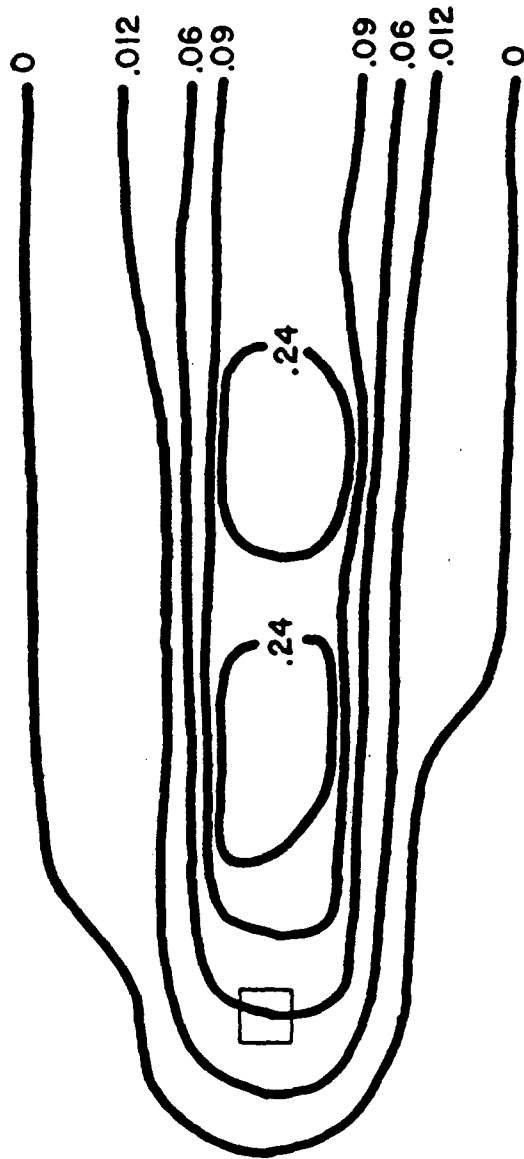
2500-

2000-

1500-

1000-

500-



0

500

1000

1500

2000

2500

3000

3500

4000

MODEL INPUT PARAMETERS

Transmissivity (GPD/FT)-125000

Storage Coefficient -.1

Hydraulic Conductivity (GPD/FT²)-5000

Porosity -.25

Longitudinal Dispersivity -10

Transverse Dispersivity -2

Retardation Coefficient (FT) -1

Regional X Flow(FT/DAY)-8.04

Regional Y Flow (FT/DAY)-0

SOURCE TERM

Volume Of Produced Water (BBL/DAY)-.33

Benzene Concentration (PPB)-3500

CASE NUMBER-GCU 153E

Simulation Time (DAYS)- 705

NE, NW 28 29 N 12 W

SAN JUAN RIVER

dh/d1 = 0.003