3R - 124

REPORTS

DATE:

1996 - 1998

CROSS TIMBERS OIL COMPANY

GROUNDWATER REMEDIATION REPORT

1996-1998

ROWLAND GC #1
(P) SECTION 25, T30N, R12W, NMPM
SAN JUAN COUNTY, NEW MEXICO

PREPARED FOR:
MR. WILLIAM C. OLSON
NEW MEXICO OIL CONSERVATION DIVISION

FEBRUARY 1999

PREPARD BY:
BLAGG ENGINEERING, INC.

Consulting Petroleum / Reclamation Services
P.O. Box 87
Bloomfield, New Mexico 87413

ROWLAND GC # 1 - Separator & Production Tank Pits
Se/4 Se/4 Sec. 25, T30N, R12W

Site Assessment Date:	**Not Applicable**
Pit Closure Dates:	**August 2 & 3, 1993 (Documentation Included)**
Monitor Well Installation Dates:	**May 30 - June 3, 1996**
Monitor Well Sampling Date:	**June 14, 1996**

Groundwater Monitor Well Sampling Procedures:

Groundwater samples were collected from site monitor wells following USEPA: SW-846 protocol. The samples were collected using new disposable bailers and placed in new laboratory supplied 40 ml glass vials with teflon septa caps. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) per USEPA Method 8020. When applicable, additional groundwater was collected and place in laboratory supplied 250 or 500 ml plastic containers and analyzed for general water quality per USEPA Method 600/4-79-020. The samples were preserved cool (BTEX samples also preserved with mercuric chloride) and hand delivered to a qualified laboratory for testing. Waste generated during monitor well sampling and development was disposed of utilizing the separator tank pit located on the well site.

Water Quality Information:

BTEX and general chemistry results for the 1996 second quarter sampling event are summarized in the following tables. Following Amoco's NMOCD approved groundwater plan, sampling of MW's #1, #2, and #3 were terminated after the initial BTEX results revealed non detectable levels or were less than 25% of the New Mexico Water Quality Control Commission's (NMWQCC) allowable concentration for groundwater.

The laboratory results for MW #4 & #5 indicate that the benzene levels exceeded NMWQCC's standards (94.3 and 25.4 parts per billion respectively). In addition, MW #5's ethylbenzene and total xylene results also exceeded those standards. The general chemistry results indicate that the total dissolved solids for the site varies tremendously ranging from 972 (MW #5) to 19,200 mg/L (MW #1 - expected background).

Summary and/or Recommendations:

Based on the enclosed documentation, the groundwater within the separator pit area appears to have been remediated during the pit closure activities while the production tank pit appears to have sustained groundwater impact exceeding NMWQCC's standards. Based on the groundwater flow direction findings, it is evident that possible down gradient migration from the production tank pit has not been fully delineated. Therefore, it is advised that an additional monitor well be installed to resolve the issue.

It is presumed that MW #5 was installed in a location within or immediately adjacent to an abandoned dehydrator pit according to a 1/2 foot lift observed in an area of approximately 15 ft. by 15 ft. in dimension. Further investigation is necessary in order to verify this presumption. According to the findings, MW #4 and #5 will be placed on an annual sampling schedule until results indicate otherwise. All aspects of Amoco's revised groundwater plan dated October 22, 1996 (proved by NMOCD with letter dated February 7, 1997) has been adhered to.

ROWLAND GC # 1 - Separator & Production Tank Pits
Se/4 Se/4 Sec. 25, T30N, R12W

Monitor Well Workover Date:	**May 7, 1997 (MW #'s 3, 4, & 5)**
Monitor Well Installation Date:	**June 17, 1997**
Monitor Well Sampling Date:	**June 24, 1997**

Groundwater Monitor Well Sampling Procedures:

Groundwater samples were collected from site monitor wells following USEPA: SW-846 protocol. The samples were collected using new disposable bailers and placed in new laboratory supplied 40 ml glass vials with teflon septa caps. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) per USEPA Method 8020. When applicable, additional groundwater was collected and place in laboratory supplied 250 or 500 ml plastic containers and analyzed for general water quality per USEPA Method 600/4-79-020. The samples were preserved cool (BTEX samples also preserved with mercuric chloride) and hand delivered to a qualified laboratory for testing. Waste generated during monitor well sampling and development was disposed of utilizing the separator tank pit located on the well site.

Water Quality Information:

BTEX and general chemistry results for the 1997 annual sampling event are summarized in the following tables. Following Amoco's NMOCD approved groundwater plan, sampling of MW's #6 will be terminated *after the initial BTEX results revealed non detectable levels or were less than 25% of the New Mexico* Water Quality Control Commission's (NMWQCC) allowable concentration for groundwater.

The laboratory results for MW #4 & #5 indicate that the benzene levels continue to exceed NMWQCC's standards (44.7 and 58.8 parts per billion [ppb] respectively). In addition, MW #5's total xylene results also exceeded those standards, but has decreased from the previous year's sampling (9,070 / 6,290 ppb). The general chemistry results indicate that the total dissolved solids for MW #6 was below that of MW #1 - expected background (8,390 to 19,200 mg/L respectively).

Summary and/or Recommendations:

On May 7, 1997, Blagg Engineering, Inc. (BEI) modified the screen interval in MW #'s 3, 4, and 5 within the measured water level (pulled casing up 1.14, 1.13, and 1.95 ft. respectively). Depth to water measurements was collected during the June 24th sampling event to address the data needed for accurate groundwater flow direction. Based on the flow direction findings, it appears that down gradient delineation has been achieved by the introduction of MW #6. In addition, the flow direction has diverted to the east northeast direction away from the nearby irrigation ditch immediately west of the area (refer to Figure 4).

According to the enclosed documentation, the groundwater within the production tank pit appears to have sustained groundwater impact exceeding NMWQCC's standards in a relative limited area, but may be influenced by a suspected abandoned dehydrator pit located up gradient near MW #5. No attempt has been made to the transmission operator of the possible existence of the abandoned pit. BEI recommends *that MW #4 and #5 continue to be sampled on an annual basis until results indicate otherwise.*

ROWLAND GC # 1 - Separator & Production Tank Pits
Se/4 Se/4 Sec. 25, T30N, R12W

Monitor Well Installation Date: **June 19, 1998 (MW #4R replacement well)**

Monitor Well Sampling Date: **June 26, 1998**

Water Quality Information:

BTEX results for the 1998 annual sampling event are summarized in the following tables. The laboratory results for MW #4R & #5 indicate that the benzene levels continue to exceed NMWQCC's allowable concentration for groundwater (13.4 and 1,270 parts per billion [ppb] respectively). It should also be noted that MW #5's benzene level has increased dramatically from the previous sampling events, but that total xylene level continues to decrease.

Summary and/or Recommendations:

During a site visit prior to the sampling event, it was apparent that the well site surface equipment had been revamped (refer to Figures 1 & 2). It was evident that during the reestablishment of the equipment, MW #4 was either removed or destroyed. Amoco was later notified of the situation and then approved to drill a replacement well (see Bore/Test Hole Report, page 4R and Monitor Well Completion Schematic labeled Monitor Well #4R) which was positioned closer to the production tank pit excavation. Completion of the monitor well was conducted on June 19th and then sampled on June 26th.

According to the enclosed documentation, the groundwater within the production tank pit continues to exceed the NMWQCC's standards for BTEX; however, the impacted area appears to be within a relative limited area on the well pad. It seems that down gradient delineation has been maintained for the production tank pit although the groundwater flow direction has diverted to the east southeast direction. In addition, the flow direction continues to travel away from the nearby irrigation ditch located west of impacted area (refer to Figure 5).

It is recommended that MW #'s 4R and #5 continue to be sampled on an annual basis until results indicate another course of action. It is also suggested to resample MW #3 to assure that no further migration has taken place from the production tank pit or the assumed abandoned dehydrator pit located in the vicinity of MW #5 (refer to preceding page summary).

AMOCO GROUNDWATER MONITOR WELL LABORATORY RESULTS

SUBMITTED BY BLAGG ENGINEERING, INC.

ROWLAND GC # 1 - SEPARATOR PIT
UNIT P, SEC. 25, T30N, R12W

REVISED DATE: June 26, 1998

FILENAME: (RW-2Q-98.WK3) NJV

SAMPLE DATE	MONITOR WELL No:	D.T.W. (ft)	T.D. (ft)	TDS mg/L	COND. umhos	pH	PRODUCT (in)	BTEX EPA METHOD 8020 (PPB) Benzene	Toluene	Ethyl Benzene	Total Xylene
14-Jun-96	MW #1	16.11	25.00	19200	10200	7.5		ND	ND	ND	ND
14-Jun-96	MW #2	15.44	20.00	6790	5200	6.9		ND	1.19	ND	3.41
14-Jun-96	MW #3	14.39	20.00	2740	2600	6.7		ND	ND	ND	ND
14-Jun-96	MW #4	13.72	19.00	12000	8500	6.9		94.3	2.71	ND	106.4
24-Jun-97		14.02	19.00		6800	6.9		44.7	0.5	0.4	3.0
26-Jun-98	MW #4R	11.52	19.09		1700	6.7		13.4	ND	ND	0.6
14-Jun-96	MW #5	10.40	16.90	972	1700	6.9		25.4	732	953	9070
24-Jun-97		10.27	15.00		2600	7.0		58.8	2.5	2.8	6290
26-Jun-98		10.34	15.00		1900	6.9		1270	89.0	41.4	3200
24-Jun-97	MW #6	15.55	25.00	8390	5100	7.6		ND	0.6	0.5	5.4

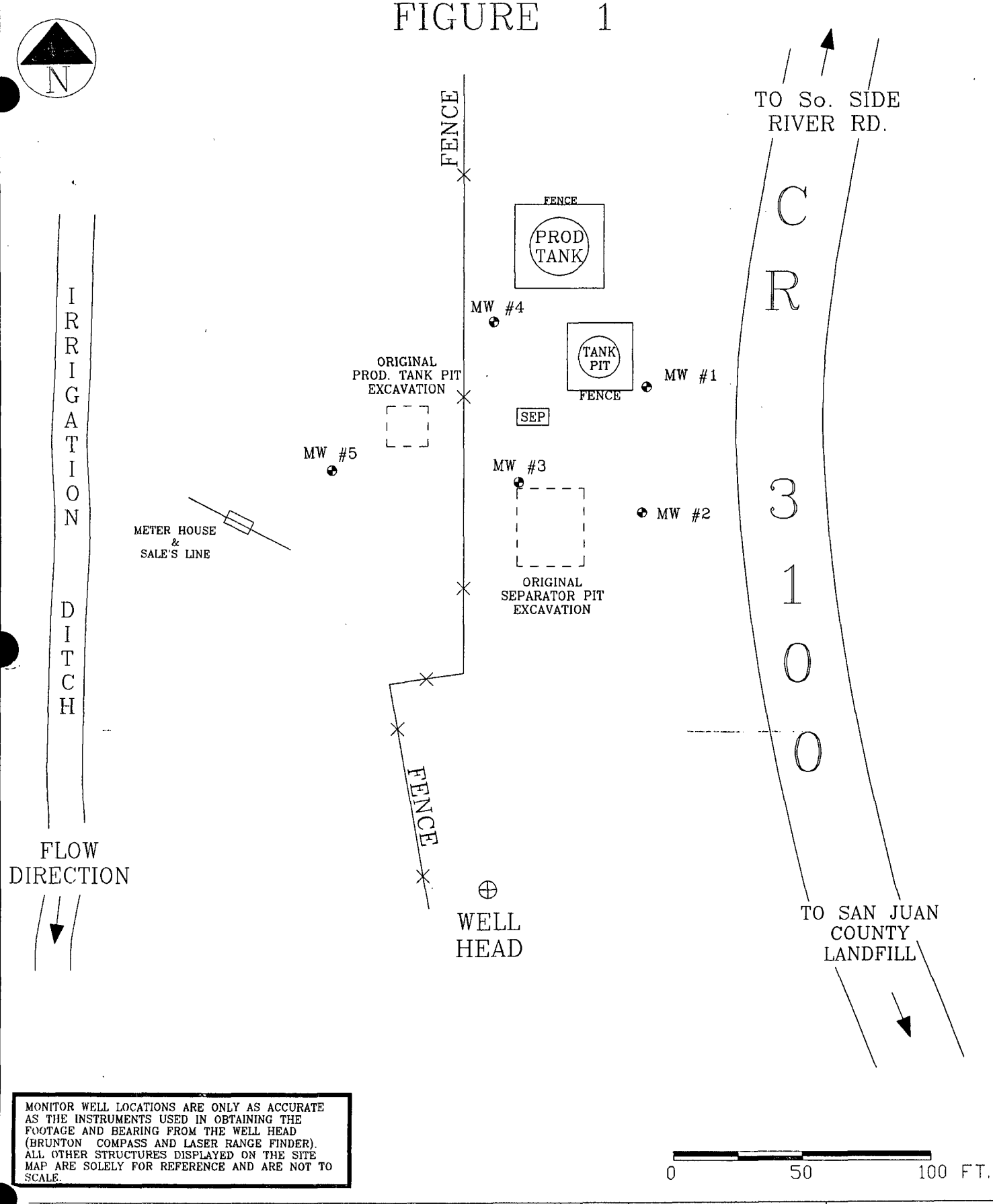
GENERAL WATER QUALITY
AMOCO PRODUCTION COMPANY
ROWLAND GC # 1
SAMPLE DATE : JUNE 14, 1996

PARAMETERS		MW # 1	MW # 2	MW # 3	MW # 4	MW # 5	Units
GENERAL	LAB pH	8.0	7.8	8.0	7.9	7.9	s. u.
	LAB CONDUCTIVITY (25 DEG. CELCIUS)	27,000	10,200	3,980	20,800	1,760	umhos cm
	TOTAL DISSOLVED SOLIDS (180 DEG. CELCIUS)	21,500	8,050	3,050	13,700	1,080	mg / L
	TOTAL DISSOLVED SOLIDS (CALCULATED)	19,200	6,790	2,740	12,000	972	mg / L
ANIONS	TOTAL ALKALINITY AS CaCO3	740	525	501	1,220	573	mg / L
	BICARBONATE ALKALINITY (AS CaCO3)	740	525	501	1,220	573	mg / L
	CARBONATE ALKALINITY (AS CaCO3)	NA	NA	NA	NA	NA	mg / L
	HYDROXIDE ALKALINITY (AS CaCO3)	NA	NA	NA	NA	NA	mg / L
	CHLORIDE	820	695	262	1,190	200	mg / L
	SULFATE	11,800	3,590	1,310	5,790	49.4	mg / L
	NITRATE + NITRITE - N	NA	NA	NA	NA	NA	
	NITRATE - N	NA	NA	NA	NA	NA	
	NITRITE - N	NA	NA	NA	NA	NA	
CATIONS	TOTAL HARDNESS AS CaCO3	2,430	1,890	1,320	1,950	617	mg / L
	CALCIUM	495	566	443	522	199	mg / L
	MAGNESIUM	290	116	53.2	157	29.0	mg / L
	POTASSIUM	8.00	<5.0	<5.0	5.00	<5.0	mg / L
	SODIUM	5,300	1,500	370	3600	150	mg / L
DATA VALIDATION							ACCEPTANCE LEVEL
	CATION/ANION DIFFERENCE	0.77	0.87	2.37	4.59	1.98	+/- 5 %
	TDS (180):TDS (CALCULATED)	1.1	1.2	1.1	1.1	1.1	1.0 - 1.2

GENERAL WATER QUALITY
AMOCO PRODUCTION COMPANY
ROWLAND GC # 1
SAMPLE DATE : JUNE 24, 1997

	PARAMETERS	MW # 6	Units
GENERAL	LAB pH	7.21	s. u.
	LAB CONDUCTIVITY (25 DEG. CELCIUS)	16,850	umhos/cm
	TOTAL DISSOLVED SOLIDS (180 DEG. CELCIUS)	8,400	mg / L
	TOTAL DISSOLVED SOLIDS (CALCULATED)	8,390	mg / L
ANIONS	TOTAL ALKALINITY AS CaCO3	298	mg / L
	BICARBONATE AS HCO3	298	mg / L
	CARBONATE AS CO3	< 1	mg / L
	FLUORIDE	3.26	mg / L
	CHLORIDE	278	mg / L
	SULFATE	5,250	mg / L
	PHOSPHATE	2.3	mg / L
	NITRATE - N	0.8	mg / L
	NITRITE - N	<0.001	mg / L
CATIONS	TOTAL HARDNESS AS CaCO3	1,490	mg / L
	CALCIUM	477	mg / L
	MAGNESIUM	73.2	mg / L
	POTASSIUM	4.8	mg / L
	SODIUM	2,120	mg / L
DATA VALIDATION			ACCEPTANCE LEVEL
	CATION/ANION DIFFERENCE	0.10%	+/- 5 %
	SODIUM ABSORPTION RATIO	23.9	

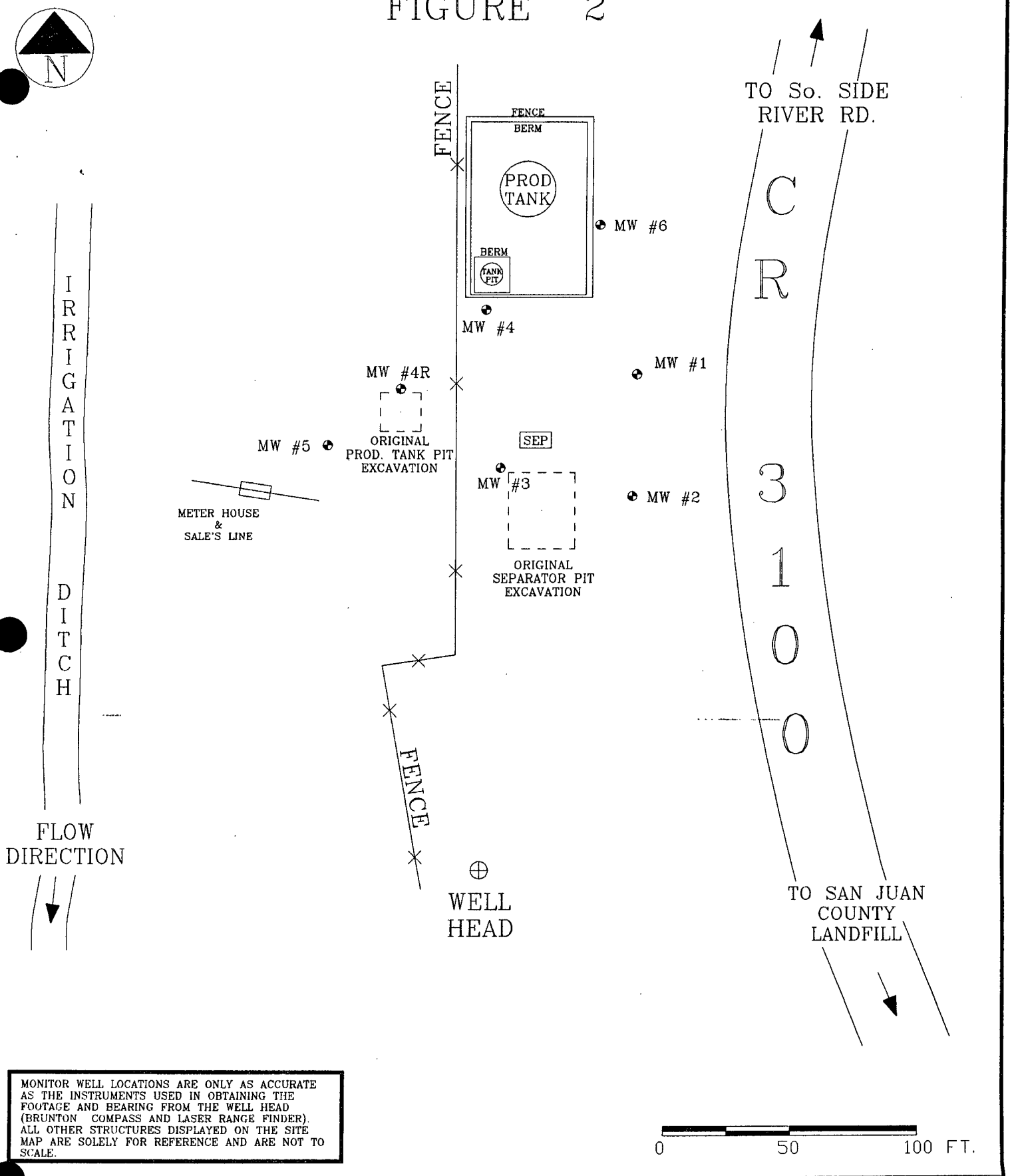
FIGURE 1



MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE.

AMOCO PRODUCTION COMPANY ROWLAND GC 1 NE/4 NW/4 . SEC. 25, T30N, R12W SAN JUAN COUNTY, NEW MEXICO	BLAGG ENGINEERING, INC. CONSULTING PETROLEUM / RECLAMATION SERVICES P.O. BOX 87 BLOOMFIELD, NEW MEXICO 87413 PHONE: (505) 632-1199	PROJECT: 1/4ly MONITOR. DRAWN BY: NJV FILENAME: 06-14-SM REVISED: 5/25/98 NJV	SITE MAP 6/96

FIGURE 2



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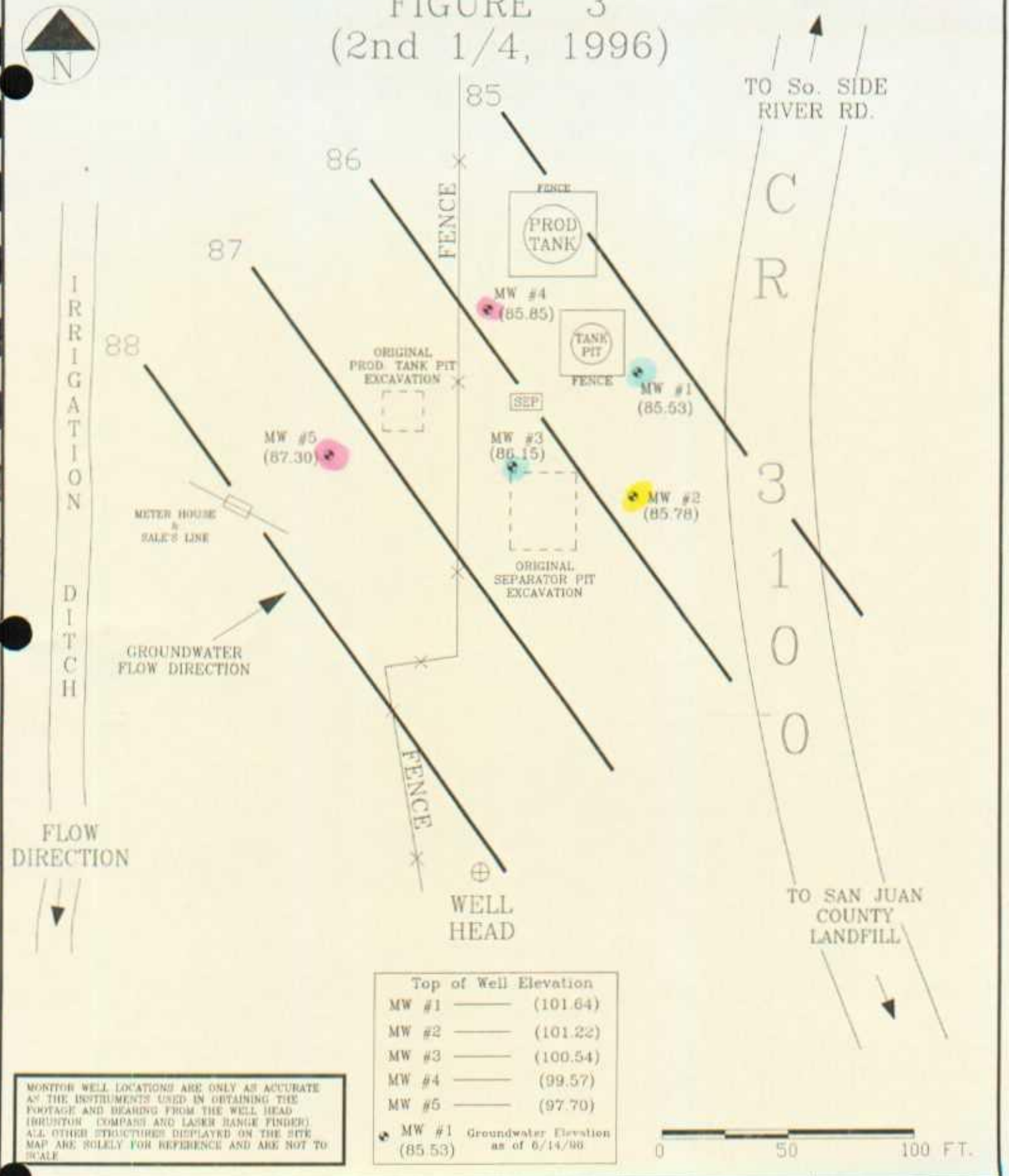
AMOCO PRODUCTION COMPANY ROWLAND GC 1 NE/4 NW/4 SEC. 25, T30N, R12W SAN JUAN COUNTY, NEW MEXICO	BLAGG ENGINEERING, INC. CONSULTING PETROLEUM / RECLAMATION SERVICES P.O. BOX 87 BLOOMFIELD, NEW MEXICO 87413 PHONE: (505) 632-1199	PROJECT: 1/4ly MONITOR. DRAWN BY: NJV FILENAME: 06-26-SM REVISED: 1/28/99 NJV	SITE MAP 6/98

FIGURE 3
(2nd 1/4, 1996)



Top of Well Elevation	
MW #1	(101.64)
MW #2	(101.22)
MW #3	(100.54)
MW #4	(99.57)
MW #5	(97.70)

MW #1 (85.53) Groundwater Elevation as of 6/14/96

0 50 100 FT.

MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE

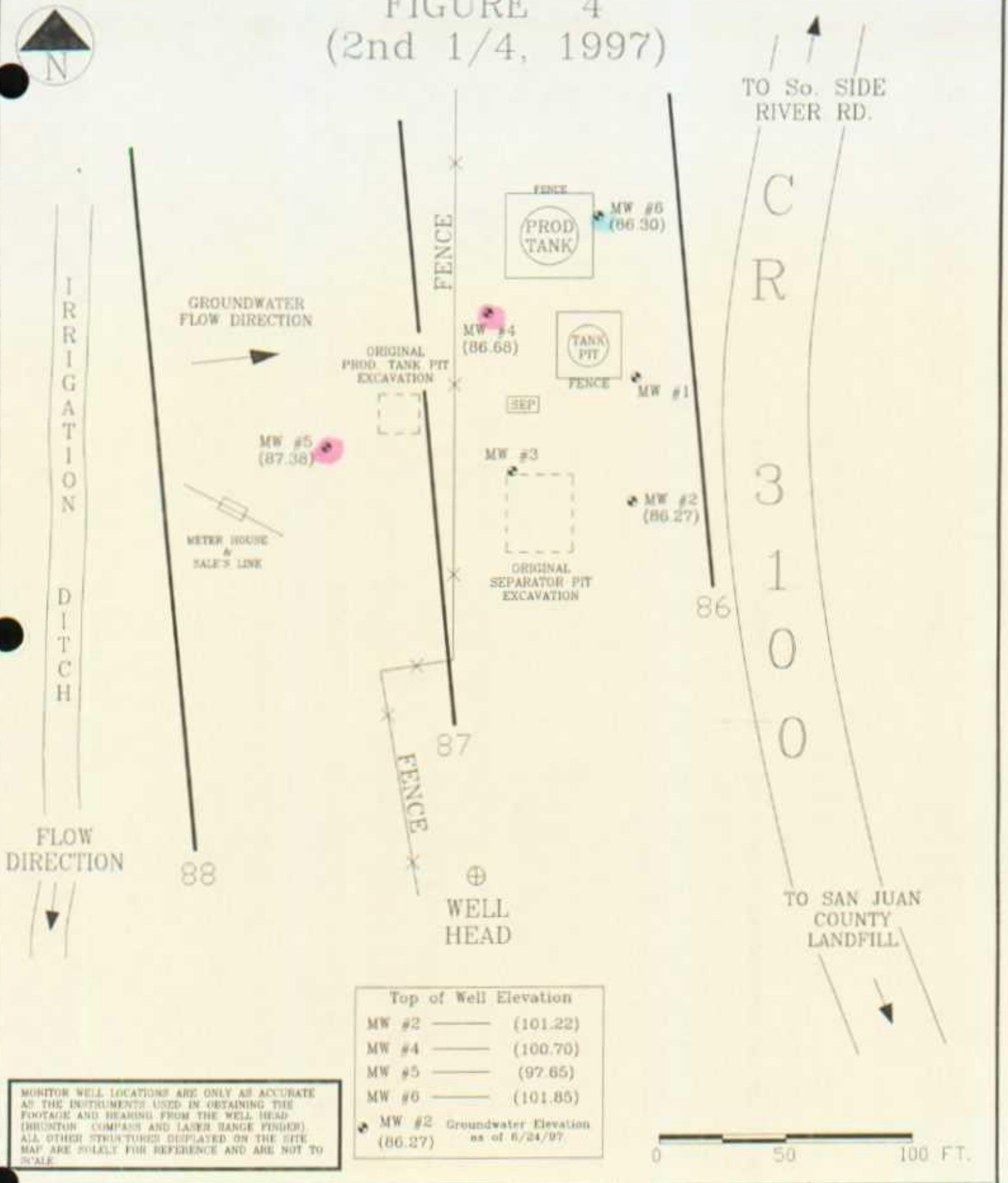
AMOCO PRODUCTION COMPANY
ROWLAND GC 1
NE/4 NW/4 SEC. 25, T30N, R12W
SAN JUAN COUNTY, NEW MEXICO

BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES
P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413
PHONE: (505) 632-1199

PROJECT: 1/4ly MONITOR.
DRAWN BY: NJV
FILENAME: 06-14-GM
REVISED: 5/25/98 NJV

GROUNDWATER GRADIENT MAP 6/96

FIGURE 4
(2nd 1/4, 1997)



Top of Well Elevation	
MW #2	(101.22)
MW #4	(100.70)
MW #5	(97.65)
MW #6	(101.85)

MW #2 (86.27) Groundwater Elevation as of 6/24/97

MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE.

AMOCO PRODUCTION COMPANY
ROWLAND GC 1
NE/4 NW/4 SEC. 25, T30N, R12W
SAN JUAN COUNTY, NEW MEXICO

BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES
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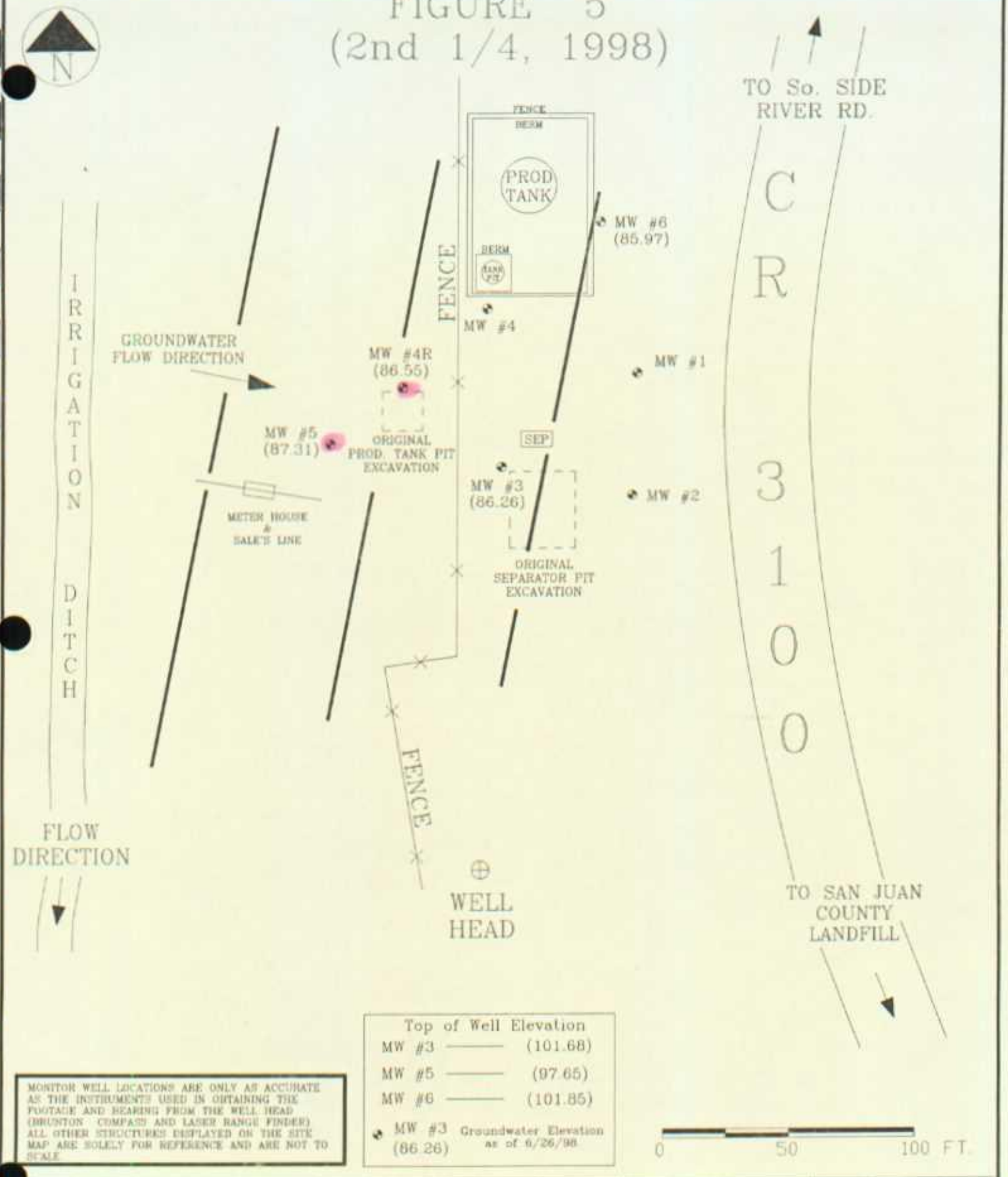
PHONE (505) 632-1199

PROJECT: 1/4ly MONITOR.
DRAWN BY: NJV
FILENAME: -24-GM
REVISED: 8/98 NJV

GROUNDWATER GRADIENT MAP 6/97

FIGURE 5
(2nd 1/4, 1998)



Top of Well Elevation	
MW #3	(101.68)
MW #5	(97.65)
MW #6	(101.85)

MW #3 (86.26) Groundwater Elevation as of 6/26/98

MONITOR WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER) ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND ARE NOT TO SCALE

AMOCO PRODUCTION COMPANY

ROWLAND GC 1

NE/4 NW/4 SEC. 25, T30N, R12W

SAN JUAN COUNTY, NEW MEXICO

BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES
P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413
PHONE (505) 632-1199

PROJECT: 1/4ly MONITOR
DRAWN BY: NJV
FILENAME: [illegible]-26-SM
REVISED 1/28/99 NJV

GROUNDWATER GRADIENT MAP 6/98

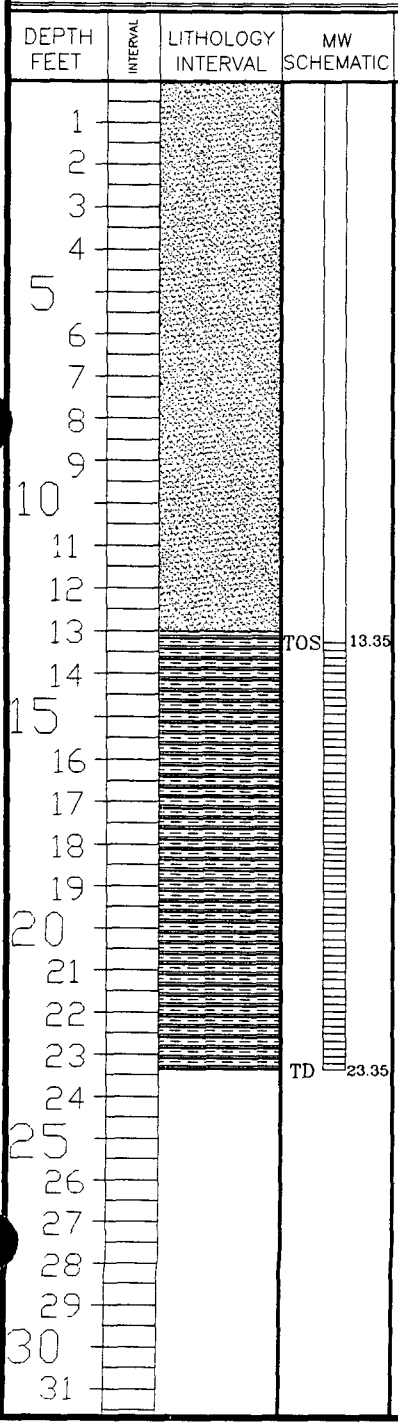
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #..... BH - 1
MW #..... 1
PAGE #..... 1
DATE STARTED 5/30/96
DATE FINISHED 6/03/96
OPERATOR..... JCB
PREPARED BY NJV

LOCATION NAME: ROWLAND GC # 1
CLIENT: AMOCO PRODUCTION COMPANY
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: N18E, 201 FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.65 FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0 - 13.00 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 14.46 FT. (APPROX.) FROM GROUND SURFACE.

DARK YELLOWISH BROWN CLAY, PLASTIC, SLIGHTLY MOIST TO SATURATED (AT GROUNDWATER), STIFF TO HARD, NO APPARENT HYDROCARBON ODOR OBSERVED (13.00 - 23.35 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-1 | DATE: 3/06/97 | DWN BY: NJV

BLAGG ENGINEERING, Inc.

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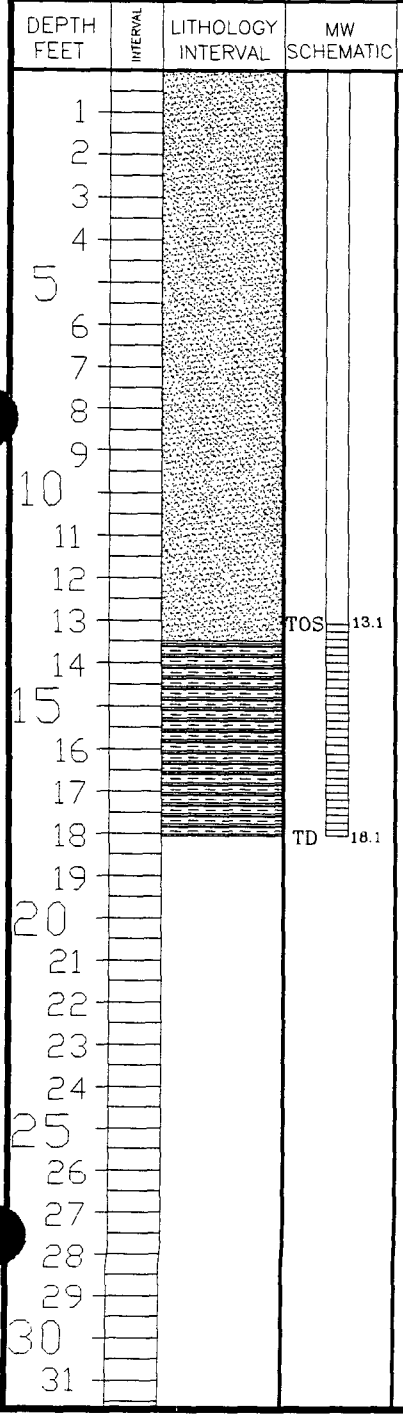
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #..... BH - 2
MW #..... 2
PAGE #..... 2
DATE STARTED 5/30/96
DATE FINISHED 6/03/96
OPERATOR..... JCB
PREPARED BY NJV

LOCATION NAME: ROWLAND GC # 1
CLIENT: AMOCO PRODUCTION COMPANY
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: N23E, 156 FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.90 FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 13.5 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 13.54 FT. (APPROX.) FROM GROUND SURFACE.

DARK YELLOWISH BROWN CLAY, PLASTIC, SATURATED (AT GROUNDWATER), STIFF TO HARD, NO APPARENT HYDROCARBON ODOR OBSERVED (13.5 - 18.1 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-2 | DATE: 3/06/97 | DWN BY: NJV

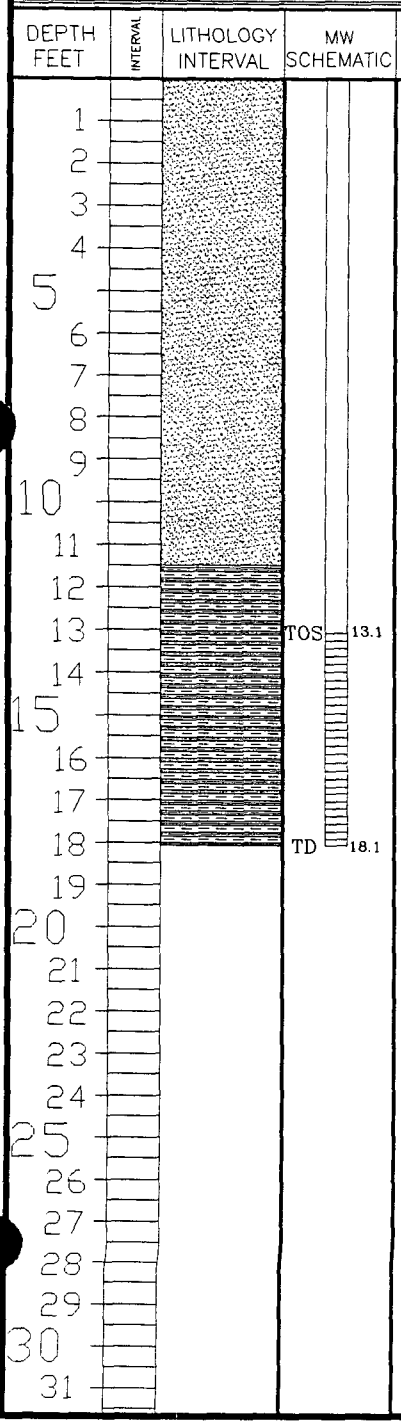
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N5E, 156 FEET FROM WELL HEAD.

BORING #.....	BH - 3
MW #.....	3
PAGE #.....	3
DATE STARTED	5/30/96
DATE FINISHED	6/03/96
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.90 FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 11.5 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 12.49 FT. (APPROX.) FROM GROUND SURFACE.

DARK YELLOWISH BROWN CLAY, PLASTIC, SATURATED (AT GROUNDWATER), STIFF TO HARD, NO APPARENT HYDROCARBON ODOR OBSERVED (11.5 - 18.1 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-3	DATE: 3/06/97	DWN BY: NJV

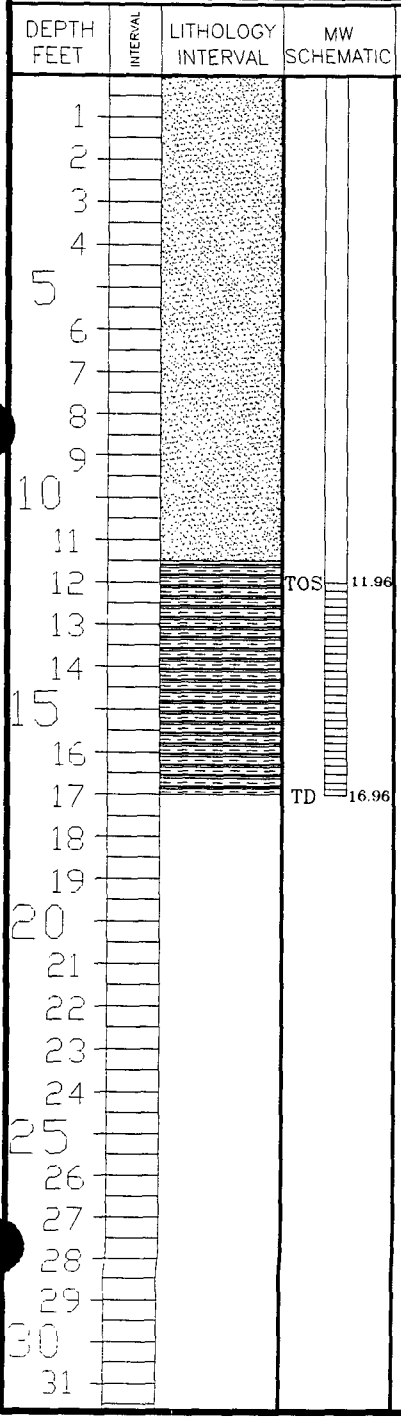
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N5E, 156 FEET FROM WELL HEAD.

BORING #.....	BH - 3
MW #.....	3
PAGE #.....	3A
DATE STARTED	5/30/96
DATE FINISHED	6/03/96
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 3.04 FT. ABOVE GROUND SURFACE (PULLED CASING UP 1.14 FT. 5/7/97).

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 11.5 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 12.49 FT. (APPROX.) FROM GROUND SURFACE.

DARK YELLOWISH BROWN CLAY, PLASTIC, SATURATED (AT GROUNDWATER), STIFF TO HARD, NO APPARENT HYDROCARBON ODOR OBSERVED (11.5 - 18.1 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROW-3R	DATE: 5/08/97	REV. BY: NJV

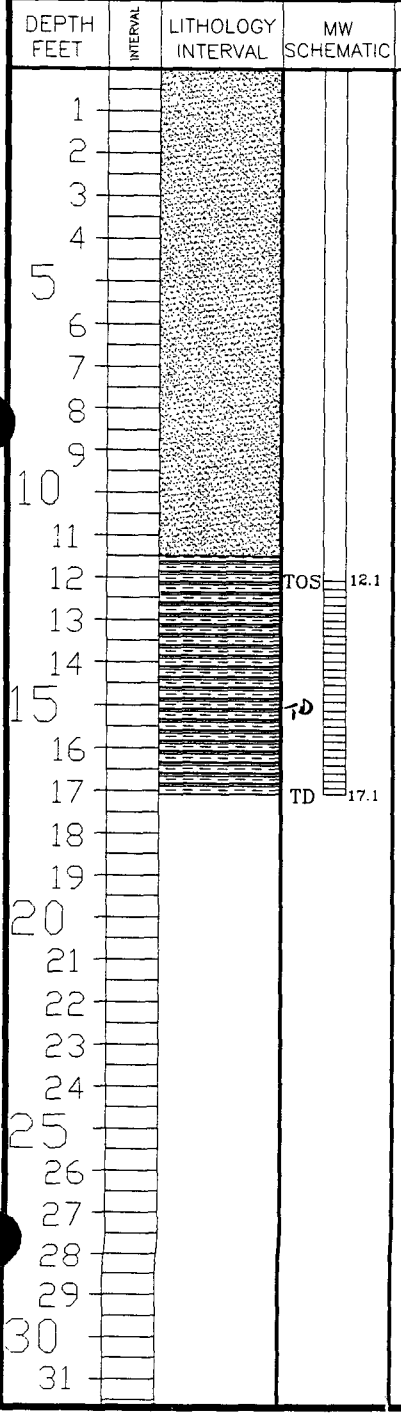
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N1E, 216 FEET FROM WELL HEAD.

BORING #.....	BH - 4
MW #.....	4
PAGE #.....	4
DATE STARTED	5/30/96
DATE FINISHED	6/03/96
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. ~~1.90~~ FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 10.0 FT. INTERVAL), LIGHT TO DARK MEDIUM GRAY, STRONG HYDROCARBON ODOR OBSERVED (10.0 - 11.5 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 11.82 FT. (APPROX.) FROM GROUND SURFACE.

DARK MEDIUM GRAY CLAY, PLASTIC, SATURATED, STIFF TO HARD, STRONG HYDROCARBON ODOR OBSERVED (11.5 - 17.1 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-4	DATE: 3/06/97	DWN BY: NJV

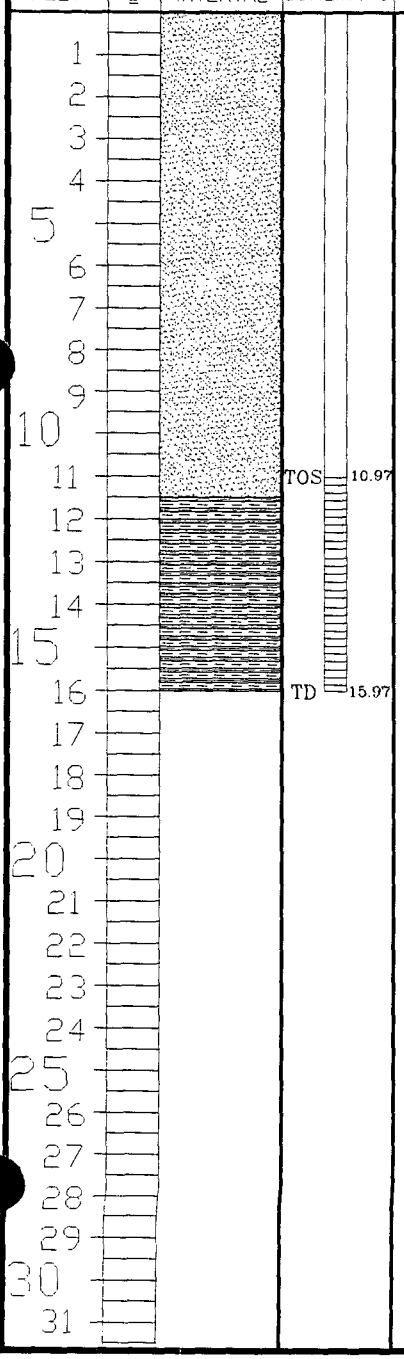
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #..... BH - 4
MW #..... 4
PAGE #..... 4A
DATE STARTED 5/30/96
DATE FINISHED 6/03/96
OPERATOR..... JCB
PREPARED BY NJV

LOCATION NAME: ROWLAND GC # 1
CLIENT: AMOCO PRODUCTION COMPANY
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: N1E, 216 FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 3.03 FT. ABOVE GROUND SURFACE (PULLED CASING UP 1.13 FT. 5/7/97).

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 10.0 FT. INTERVAL), LIGHT TO DARK MEDIUM GRAY, STRONG HYDROCARBON ODOR OBSERVED (10.0 - 11.5 FT. INTERVAL).

▼ GW DEPTH ON 6/24/97 = 10.99 FT. (APPROX.) FROM GROUND SURFACE.

DARK MEDIUM GRAY CLAY, PLASTIC, SATURATED, STIFF TO HARD, STRONG HYDROCARBON ODOR OBSERVED (11.5 - 17.1 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROW-4R | DATE: 6/25/97 | REV. BY: NJV

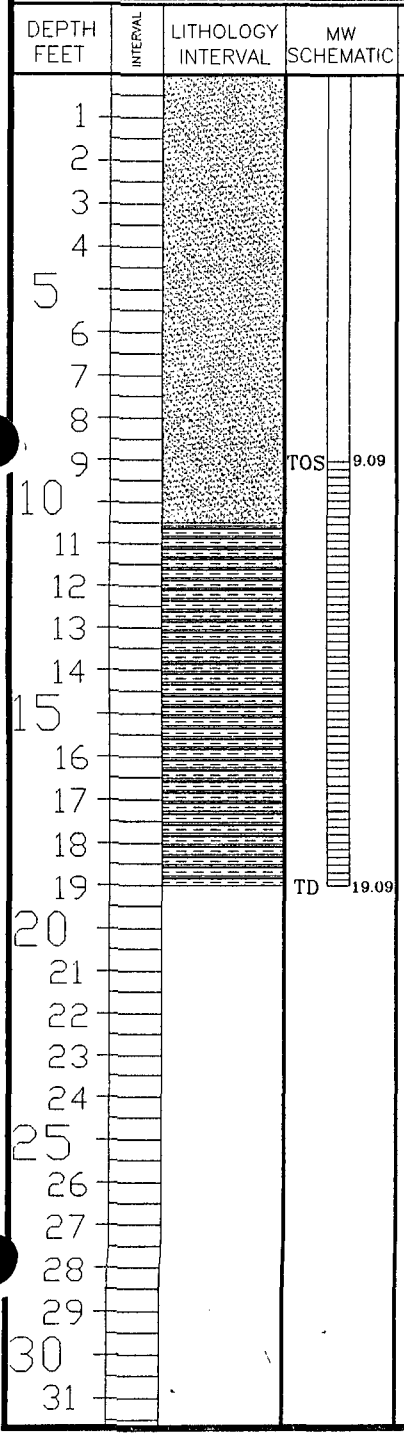
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N9.5W, 189 FEET FROM WELL HEAD.

BORING #.....	BH - 4R
MW #.....	4R
PAGE #.....	4R
DATE STARTED	6/19/98
DATE FINISHED	6/19/98
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 0.91 FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 10.5 FT. INTERVAL).

▼ GW DEPTH ON 6/26/98 = 10.61 FT. (APPROX.) FROM GROUND SURFACE.

DARK MEDIUM GRAY CLAY, PLASTIC, SATURATED, STIFF TO HARD, HYDROCARBON ODOR DETECTED (10.5 - 19.09 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROW-4R	DATE: 6/22/98	DRN. BY: NJV

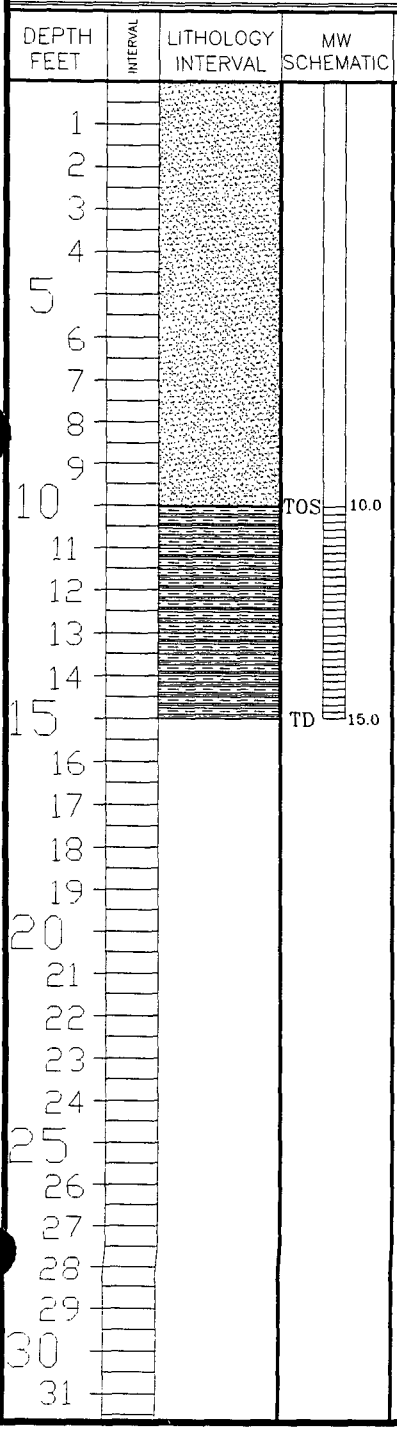
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N20W, 171 FEET FROM WELL HEAD.

BORING #.....	BH - 5
MW #.....	5
PAGE #.....	5
DATE STARTED	5/30/96
DATE FINISHED	6/03/96
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

TOP OF CASING FLUSH WITH GROUND SURFACE (ADDED 1.95 FT. EXTENSION FOR SAMPLING PURPOSES).

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 8.0 FT. INTERVAL), LIGHT TO DARK MEDIUM GRAY, STRONG HYDROCARBON ODOR OBSERVED (8.0 - 10.0 FT. INTERVAL).

▼ GW DEPTH ON 6/14/96 = 8.45 FT. (APPROX.) FROM GROUND SURFACE.

DARK MEDIUM GRAY CLAY, PLASTIC, SATURATED, STIFF TO HARD, STRONG HYDROCARBON ODOR OBSERVED (10.0 - 15.0 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-5	DATE: 3/06/97	DWN BY: NJV

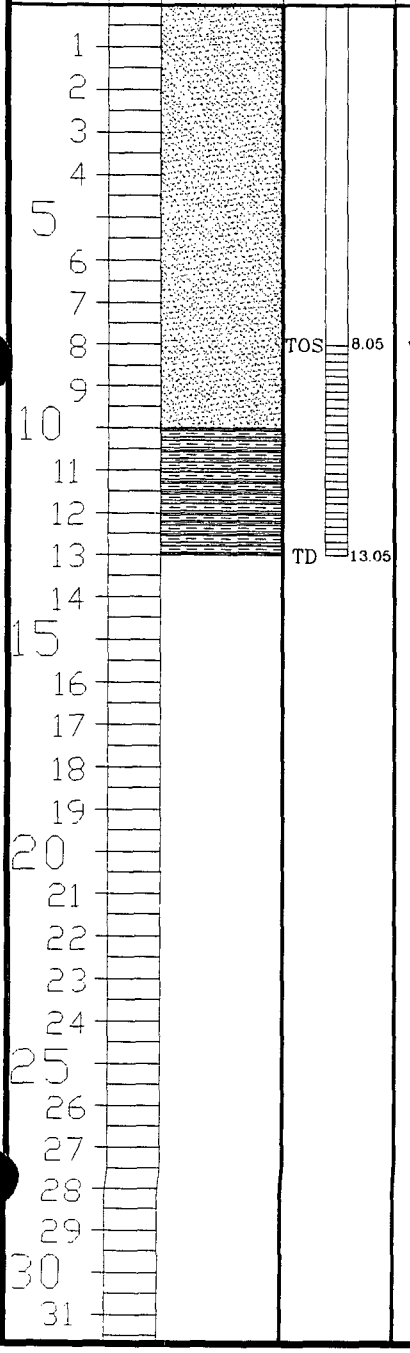
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N20W, 171 FEET FROM WELL HEAD.

BORING #.....	BH - 5
MW #.....	5
PAGE #.....	5A
DATE STARTED	5/30/96
DATE FINISHED	6/03/96
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.95 FT. ABOVE GROUND SURFACE (PULLED CASING UP 1.95 FT. 5/7/97).

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 8.0 FT. INTERVAL), LIGHT TO DARK MEDIUM GRAY, STRONG HYDROCARBON ODOR OBSERVED (8.0 - 10.0 FT. INTERVAL).

▼ GW DEPTH ON 6/24/97 = 8.32 FT. (APPROX.) FROM GROUND SURFACE.

DARK MEDIUM GRAY CLAY, PLASTIC, SATURATED, STIFF TO HARD, STRONG HYDROCARBON ODOR OBSERVED (10.0 - 15.0 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROW-5R	DATE: 6/25/97	REV. BY: NJV

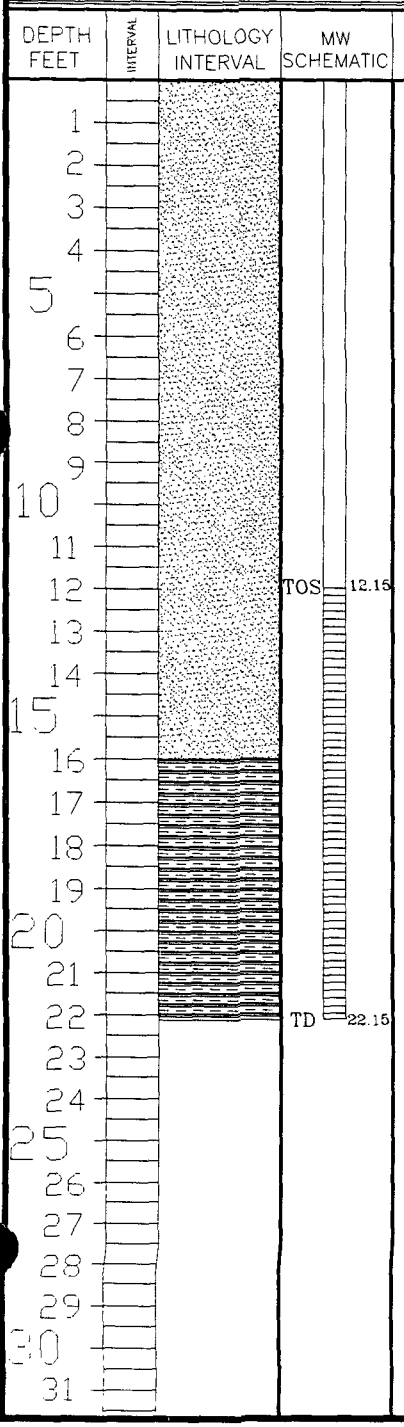
BLAGG ENGINEERING, Inc.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

LOCATION NAME:	ROWLAND GC # 1
CLIENT:	AMOCO PRODUCTION COMPANY
CONTRACTOR:	BLAGG ENGINEERING, INC.
EQUIPMENT USED:	MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION:	N10.5E, 258 FEET FROM WELL HEAD.

BORING #.....	BH - 6
MW #.....	6
PAGE #.....	6
DATE STARTED	6/17/97
DATE FINISHED	6/17/97
OPERATOR.....	JCB
PREPARED BY	NJV



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 2.85 FT. ABOVE GROUND SURFACE.

DARK YELLOWISH BROWN SAND TO SILTY SAND, NON COHESIVE TO SLIGHTLY PLASTIC, SLIGHTLY MOIST, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR OBSERVED (0.0 - 16.0 FT. INTERVAL).

▼ GW DEPTH ON 6/24/97 = 12.70 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT OLIVE GRAY CLAY, HIGHLY PLASTIC, SATURATED, STIFF TO HARD, NO APPARENT HYDROCARBON ODOR DETECTED (16.0 - 22.15 FT. INTERVAL).

NOTES:
- SAND TO SILTY SAND.
- CLAY.
- TOS - TOP OF SCREEN FROM GROUND SURFACE.
- TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
- GW - GROUND WATER.

DRAWING: ROWLAN-6	DATE: 6/25/97	DWN BY: NJV

MONITOR WELL #1

AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

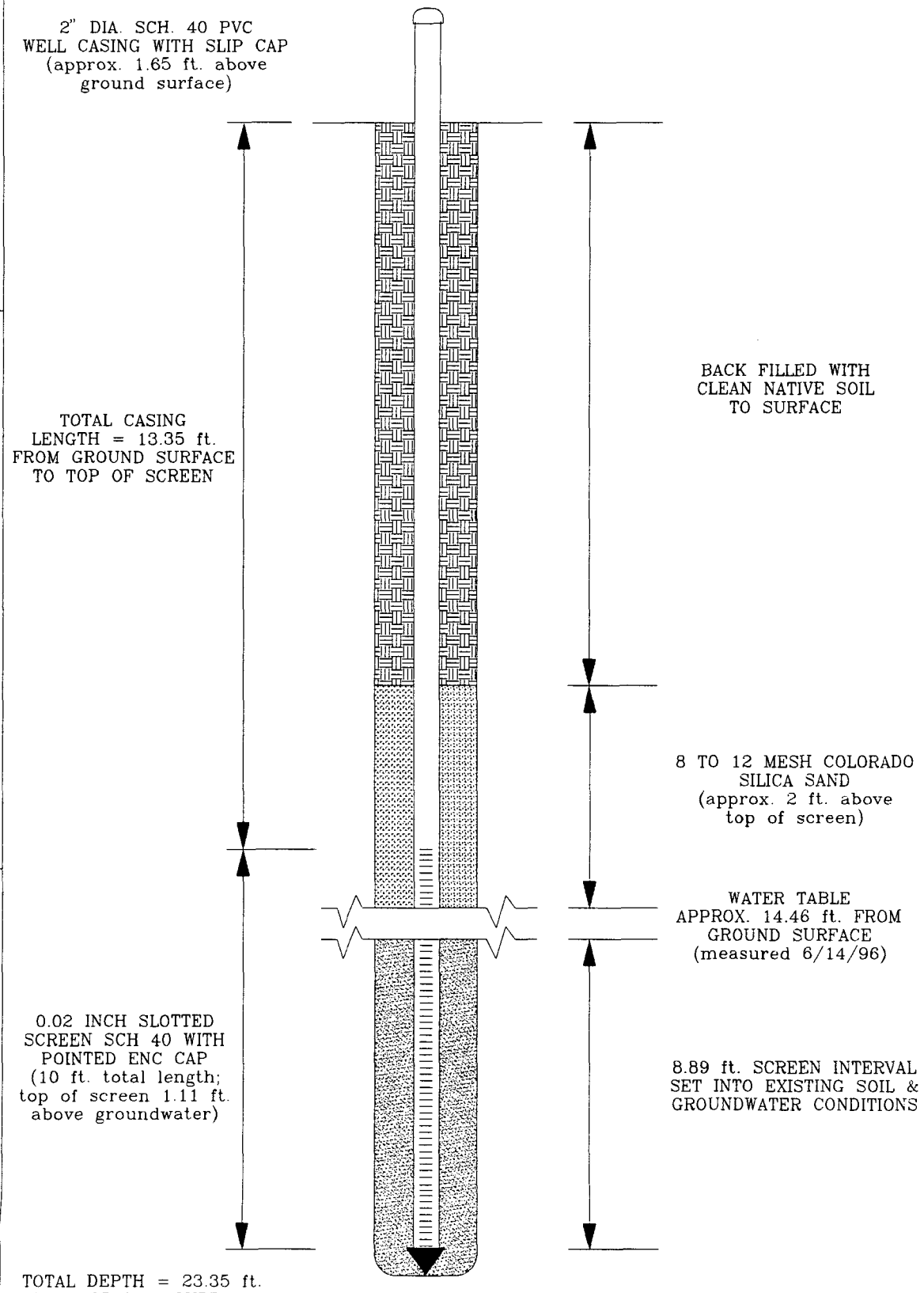
PHONE: (505) 632-1199

MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: APR. '97

FILENAME: MW-1



MONITOR WELL #2

AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: APR. '97

FILENAME: MW-2

MONITOR WELL #3

AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

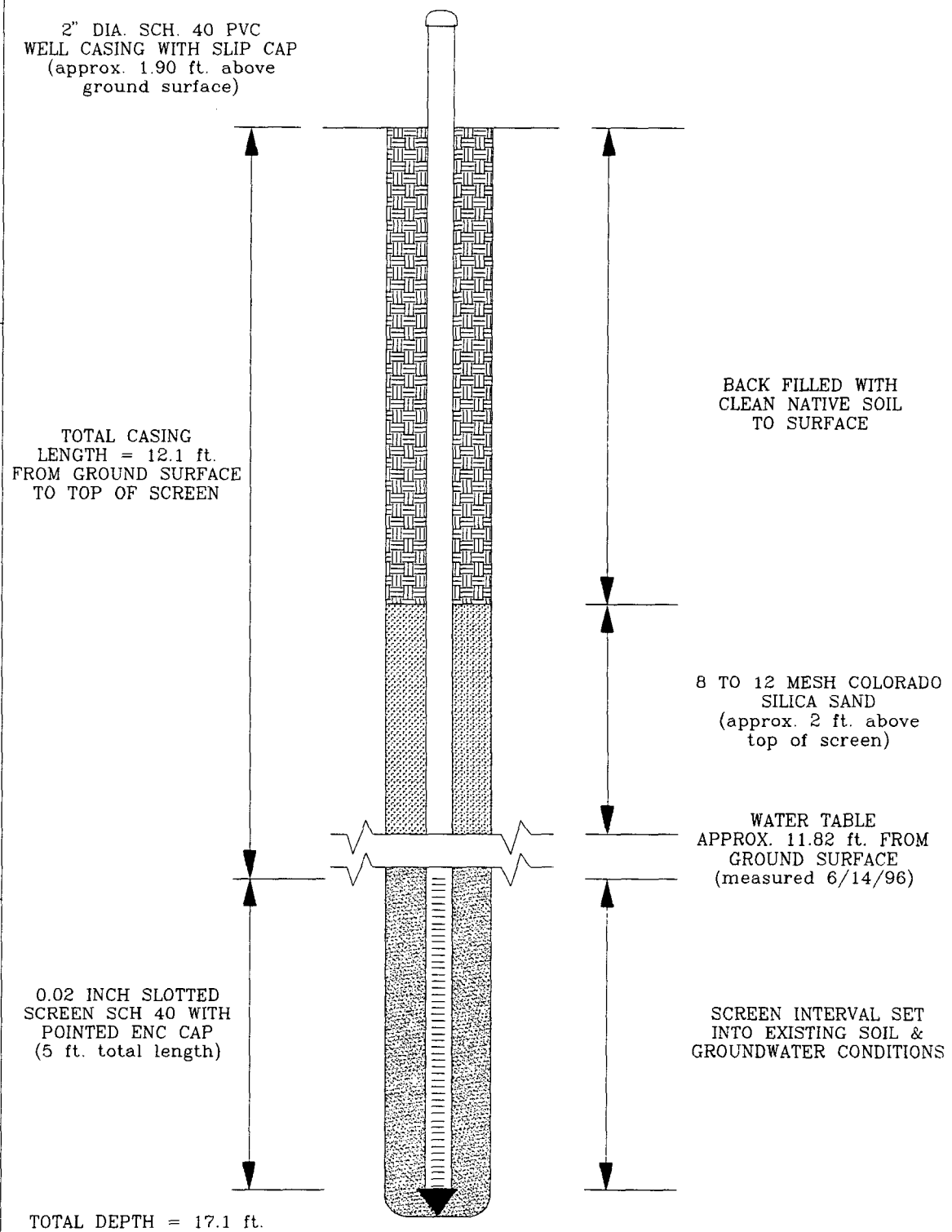
MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: APR. '97

FILENAME: MW-3

MONITOR WELL #4



AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: APR. '97

FILENAME: MW-

MONITOR WELL #4R

AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

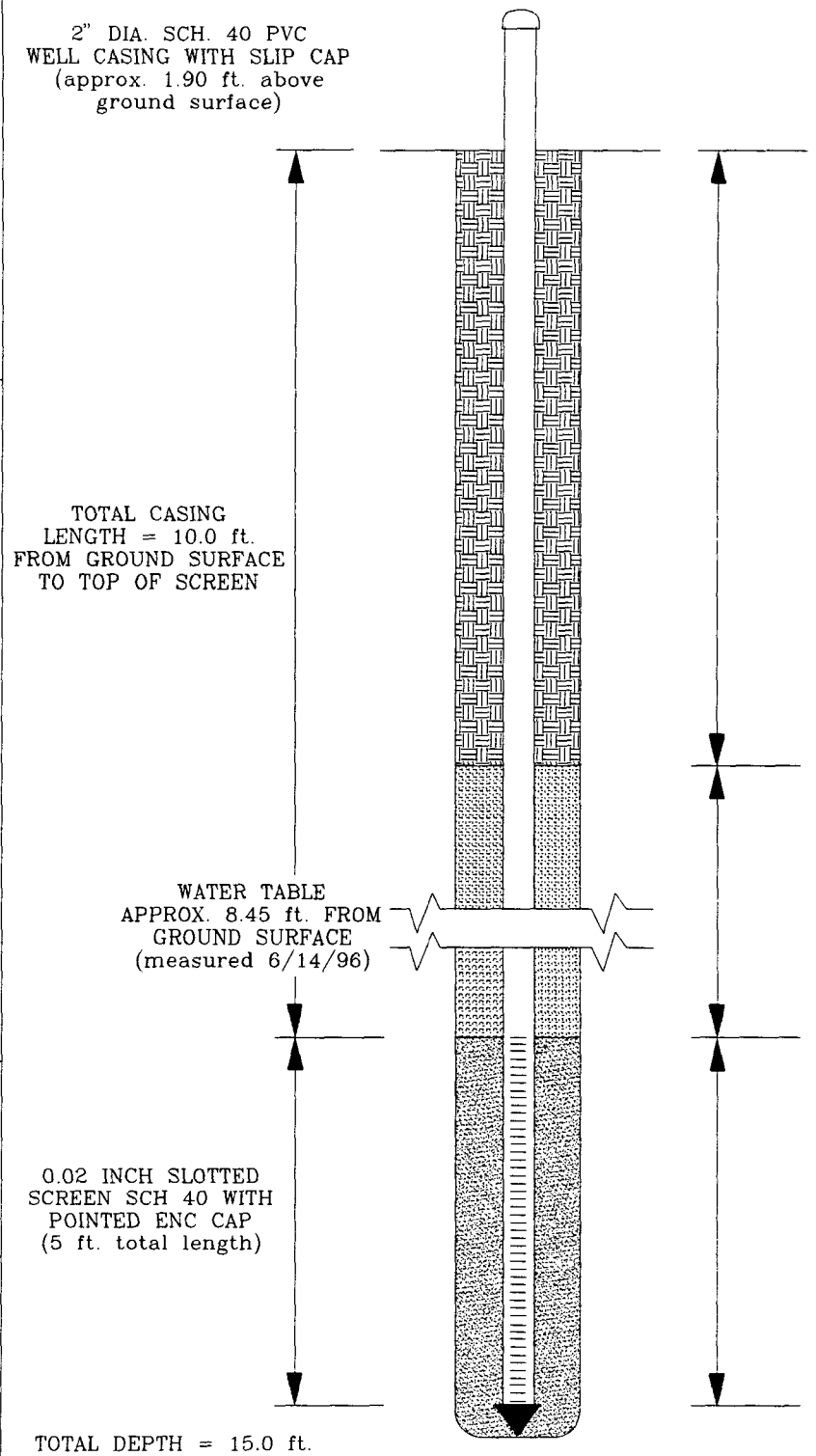
MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: JUN. '98

FILENAME: MW-4R

MONITOR WELL #5



AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

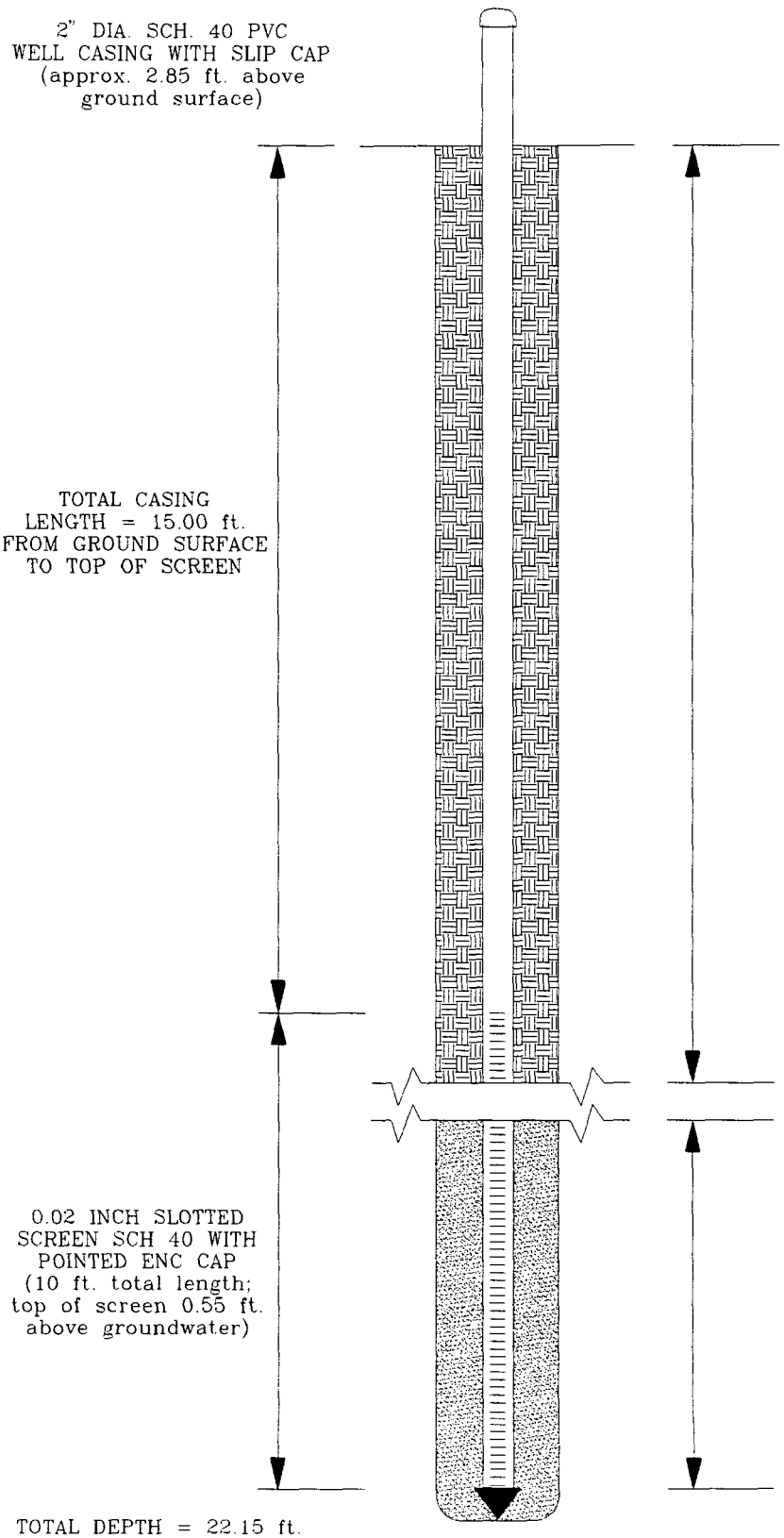
MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: APR. '97

FILENAME: MW-5

MONITOR WELL #6



AMOCO PRODUCTION COMPANY

ROWLAND GC # 1

MONITOR WELL CONSTRUCTION & COMPLETION

INSTALLED WITH MOBILE RIG

BLAGG ENGINEERING, INC.

CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87

BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

MONITOR WELL SCHEMATIC

DRAFTED BY: NJV

DATE: JUN. '97

FILENAME: MW-6

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 2498

ROWLAND GC # 1 - SEPARATOR PIT
UNIT P, SEC. 25, T30N, R12W

LABORATORY (S) USED : ANAITAS

Date : June 14, 1996

Filename : 06-14-96.WK3

SAMPLER : R E O

PROJECT MANAGER : R E O

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING	pH TIME	CONDUCT (umhos)	VOLUME PURGED (gal.)	FREE PRODUCT (ft)
1	101.64	85.53	16.11	25.00	0830	7.5	10,200	4.50	-
2	101.22	85.78	15.44	20.00	0850	6.9	5,200	2.25	-
3	100.54	86.15	14.39	20.00	0915	6.7	2,600	2.75	-
4	99.57	85.85	13.72	19.00	0940	6.9	8,500	2.75	-
5	97.70	87.30	10.40	16.90	1010	6.9	1,700	3.25	-

NOTES : Volume of water purged from well prior to sampling: V = pi X r2 X h X 7.48 gal./ft3) X 3 (wellbores).

Ideally a minimum of three (3) wellbore volumes:

1.25 " well diameter = 0.19 gallons per foot of water (or 24 oz.).

2 bails per foot - small teflon bailer.

3 bails per foot - 3 / 4 " teflon bailer.

2.00 " well diameter = 0.49 gallons per foot of water.

4.00 " well diameter = 1.95 gallons per foot of water.

Comments or note well diameter if not standard 2 ".

ANAITAS ENVIRONMENTAL LABS

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Report Date:	07/01/96
Sample ID:	MW - 1	Date Sampled:	06/14/96
Lab ID:	3940	Date Received:	06/14/96
Sample Matrix:	Water	Date Analyzed:	06/26/96
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50

Total BTEX	ND

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	99	88 - 110%
Bromofluorobenzene	99	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANAITAS ENVIRONMENTAL LABS

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Report Date:	07/01/96
Sample ID:	MW - 2	Date Sampled:	06/14/96
Lab ID:	3941	Date Received:	06/14/96
Sample Matrix:	Water	Date Analyzed:	06/26/96
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	1.19	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	2.82	1.00
o-Xylene	0.59	0.50

Total BTEX	4.60

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	102	88 - 110%
Bromofluorobenzene	104	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANAITAS ENVIRONMENTAL LABS

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Report Date:	07/01/96
Sample ID:	MW - 3	Date Sampled:	06/14/96
Lab ID:	3942	Date Received:	06/14/96
Sample Matrix:	Water	Date Analyzed:	06/26/96
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50

Total BTEX	ND

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	104	88 - 110%
Bromofluorobenzene	106	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANAITAS ENVIRONMENTAL LABS

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Report Date:	07/01/96
Sample ID:	MW - 4	Date Sampled:	06/14/96
Lab ID:	3943	Date Received:	06/14/96
Sample Matrix:	Water	Date Analyzed:	06/26/96
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	94.3	2.50
Toluene	2.71	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	79.8	5.00
o-Xylene	26.6	2.50

Total BTEX	204

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	101	88 - 110%
Bromofluorobenzene	106	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANAITAS ENVIRONMENTAL LABS

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Report Date:	07/01/96
Sample ID:	MW - 5	Date Sampled:	06/14/96
Lab ID:	3944	Date Received:	06/14/96
Sample Matrix:	Water	Date Analyzed:	06/26/96
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	25.4	5.00
Toluene	732	125
Ethylbenzene	953	125
m,p-Xylenes	7,410	250
o-Xylene	1,660	125

Total BTEX	10,800

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	101	88 - 110%
Bromofluorobenzene	107	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANAITAS ENVIRONMENTAL LABS

General Water Quality

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Date Reported:	07/01/96
Sample ID:	MW - 1	Date Sampled:	06/14/96
Laboratory ID:	3940	Time Sampled:	8:30
Sample Matrix:	Water	Date Received:	06/14/96

Parameter		Analytical Result	Units
General	Lab pH	8.0	s.u.
	Lab Conductivity @ 25° C	27,000	µmhos/cm
	Total Dissolved Solids @ 180°C	21,500	mg/L
	Total Dissolved Solids (Calc)	19,200	mg/L
Anions	Total Alkalinity as $CaCO_3$	740	mg/L
	Bicarbonate Alkalinity as $CaCO_3$	740	mg/L
	Carbonate Alkalinity as $CaCO_3$	NA	mg/L
	Hydroxide Alkalinity as $CaCO_3$	NA	mg/L
	Chloride	820	mg/L
	Sulfate	11,800	mg/L
	Nitrate + Nitrite - N	NA	
	Nitrate - N	NA	
	Nitrite - N	NA	
Cations	Total Hardness as $CaCO_3$	2,430	mg/L
	Calcium	495	mg/L
	Magnesium	290	mg/L
	Potassium	8.00	mg/L
	Sodium	5,300	mg/L

Data Validation			Acceptance Level
	Cation/Anion Difference	0.77	+/- 5 %
	TDS (180):TDS (calculated)	1.1	1.0 - 1.2

Reference U.S.E.P.A. 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1983.
Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Review

ANAITAS ENVIRONMENTAL LABS

General Water Quality

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Date Reported:	07/01/96
Sample ID:	MW - 2	Date Sampled:	06/14/96
Laboratory ID:	3941	Time Sampled:	8:50
Sample Matrix:	Water	Date Received:	06/14/96

Parameter		Analytical Result	Units
General	Lab pH	7.8	s.u.
	Lab Conductivity @ 25° C	10,200	µmhos/cm
	Total Dissolved Solids @ 180°C	8,050	mg/L
	Total Dissolved Solids (Calc)	6,790	mg/L
Anions	Total Alkalinity as $CaCO_3$	525	mg/L
	Bicarbonate Alkalinity as $CaCO_3$	525	mg/L
	Carbonate Alkalinity as $CaCO_3$	NA	mg/L
	Hydroxide Alkalinity as $CaCO_3$	NA	mg/L
	Chloride	695	mg/L
	Sulfate	3,590	mg/L
	Nitrate + Nitrite - N	NA	
	Nitrate - N	NA	
	Nitrite - N	NA	
Cations	Total Hardness as $CaCO_3$	1,890	mg/L
	Calcium	566	mg/L
	Magnesium	116	mg/L
	Potassium	< 5.0	mg/L
	Sodium	1,500	mg/L
Data Validation			Acceptance Level
	Cation/Anion Difference	0.87	+/- 5 %
	TDS (180):TDS (calculated)	1.2	1.0 - 1.2

Reference U.S.E.P.A. 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1983.
Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Review

ANAITAS ENVIRONMENTAL LABS

General Water Quality

Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Date Reported:	07/01/96
Sample ID:	MW - 3	Date Sampled:	06/14/96
Laboratory ID:	3942	Time Sampled:	9:15
Sample Matrix:	Water	Date Received:	06/14/96

Parameter		Analytical Result	Units
General	Lab pH	8.0	s.u.
	Lab Conductivity @ 25° C	3,980	µmhos/cm
	Total Dissolved Solids @ 180°C	3,050	mg/L
	Total Dissolved Solids (Calc)	2,740	mg/L
Anions	Total Alkalinity as $CaCO_3$	501	mg/L
	Bicarbonate Alkalinity as $CaCO_3$	501	mg/L
	Carbonate Alkalinity as $CaCO_3$	NA	mg/L
	Hydroxide Alkalinity as $CaCO_3$	NA	mg/L
	Chloride	262	mg/L
	Sulfate	1,310	mg/L
	Nitrate + Nitrite - N	NA	
	Nitrate - N	NA	
	Nitrite - N	NA	
Cations	Total Hardness as $CaCO_3$	1,320	mg/L
	Calcium	443	mg/L
	Magnesium	53.2	mg/L
	Potassium	< 5.0	mg/L
	Sodium	370	mg/L
Data Validation			Acceptance Level
	Cation/Anion Difference	2.37	+/- 5 %
	TDS (180):TDS (calculated)	1.1	1.0 - 1.2

Reference U.S.E.P.A. 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1983.
Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Review

ANAITAS ENVIRONMENTAL LABS

General Water Quality
Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Date Reported:	07/01/96
Sample ID:	MW - 4	Date Sampled:	06/14/96
Laboratory ID:	3943	Time Sampled:	9:40
Sample Matrix:	Water	Date Received:	06/14/96

Parameter		Analytical Result	Units
General	Lab pH	7.9	s.u.
	Lab Conductivity @ 25° C	20,800	µmhos/cm
	Total Dissolved Solids @ 180°C	13,700	mg/L
	Total Dissolved Solids (Calc)	12,000	mg/L
Anions	Total Alkalinity as $CaCO_3$	1,220	mg/L
	Bicarbonate Alkalinity as $CaCO_3$	1,220	mg/L
	Carbonate Alkalinity as $CaCO_3$	NA	mg/L
	Hydroxide Alkalinity as $CaCO_3$	NA	mg/L
	Chloride	1,190	mg/L
	Sulfate	5,790	mg/L
	Nitrate + Nitrite - N	NA	
	Nitrate - N	NA	
	Nitrite - N	NA	
Cations	Total Hardness as $CaCO_3$	1,950	mg/L
	Calcium	522	mg/L
	Magnesium	157	mg/L
	Potassium	5.00	mg/L
	Sodium	3,600	mg/L
Data Validation			Acceptance Level
	Cation/Anion Difference	4.59	+/- 5 %
	TDS (180):TDS (calculated)	1.1	1.0 - 1.2

Reference U.S.E.P.A. 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1983.
Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Review

ANAITAS ENVIRONMENTAL LABS

General Water Quality
Blagg Engineering, Inc.

Project ID:	Rowland GC 1	Date Reported:	07/01/96
Sample ID:	MW - 5	Date Sampled:	06/14/96
Laboratory ID:	3944	Time Sampled:	10:10
Sample Matrix:	Water	Date Received:	06/14/96

Parameter		Analytical Result	Units
General	Lab pH	7.9	s.u.
	Lab Conductivity @ 25° C	1,760	µmhos/cm
	Total Dissolved Solids @ 180°C	1,080	mg/L
	Total Dissolved Solids (Calc)	972	mg/L
Anions	Total Alkalinity as $CaCO_3$	573	mg/L
	Bicarbonate Alkalinity as $CaCO_3$	573	mg/L
	Carbonate Alkalinity as $CaCO_3$	NA	mg/L
	Hydroxide Alkalinity as $CaCO_3$	NA	mg/L
	Chloride	200	mg/L
	Sulfate	49.4	mg/L
	Nitrate + Nitrite - N	NA	
	Nitrate - N	NA	
	Nitrite - N	NA	
Cations	Total Hardness as $CaCO_3$	617	mg/L
	Calcium	199	mg/L
	Magnesium	29.0	mg/L
	Potassium	< 5.0	mg/L
	Sodium	150	mg/L
Data Validation			Acceptance Level
	Cation/Anion Difference	1.98	+/- 5 %
	TDS (180):TDS (calculated)	1.1	1.0 - 1.2

Reference U.S.E.P.A. 600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1983.
Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Review

ANAITAS
ENVIRONMENTAL LABS

July 1, 1996

Bob O'Neill
Blagg Engineering, Inc.
PO Box 87
Bloomfield, NM 87413

Dear Mr. O'Neill:

Enclosed are the results for the analysis of the samples received June 14, 1996. The samples were from the Rowland GC 1 site. Analyses for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) and general water quality parameters were performed on the samples, as per the accompanying chain of custody form.

Analysis was performed on the samples according to EPA Method 602, using a Hewlett-Packard 5890 gas chromatograph equipped with an OI Analytical purge and trap (model 4560) and a photoionization detector. Detectable levels of btex analytes were found in the samples, as reported.

Water parameters were determined for the samples according to the appropriate methodologies as outlined in Standard Methods for the Examination of Water and Wastewater, 18th edition, 1992.

Quality control reports appear at the end of the analytical package and can be identified by title. Should you have any questions regarding the analysis, feel free to call.

Sincerely,

Denise A. Bohemier
Lab Director

807 SOUTH CARLTON • FARMINGTON, NM 87401• (505) 326-2395 PH • 326-2486 FAX

PURGEABLE AROMATICS

Quality Control Report

Method Blank Analysis

Sample Matrix:	Water	Report Date:	07/01/96
Lab ID:	MB35242	Date Analyzed:	06/26/96

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	99	88 - 110%
Bromofluorobenzene	100	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

Purgeable Aromatics

Duplicate Analysis

Lab ID:	3944Dup	Report Date:	07/01/96
Sample Matrix:	Water	Date Sampled:	06/14/96
Preservative:	Cool, $HgCl_2$	Date Received:	06/14/96
Condition:	Intact	Date Analyzed:	06/27/96

Target Analyte	Original Conc. (ug/L)	Duplicate Conc. (ug/L)	Acceptance Range (ug/L)
Benzene	25.4	22.0	18.2 - 29.1
Toluene	623	611	505 - 729
Ethylbenzene	944	923	615 - 1,250
m,p-Xylenes	6,940	6,820	NE
o-Xylene	1,630	1,600	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Duplicate acceptance range not established by the EPA.

	Surrogate	Percent Recovery	Acceptance Limits
Quality Control:	Trifluorotoluene	118	88 - 110%
	Bromofluorobenzene	108	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments: High toluene-d8 recovery is due to matrix interference at the d8 retention time.

Analyst

Review

Purgeable Aromatics

Matrix Spike Analysis

Lab ID:	3940Spk	Report Date:	07/01/96
Sample Matrix:	Water	Date Sampled:	06/14/96
Preservative:	Cool, $HgCl_2$	Date Received:	06/14/96
Condition:	Intact	Date Analyzed:	06/26/96

Target Analyte	Spike Added (ug/L)	Original Conc. (ug/L)	Spiked Sample Conc. (ug/L)	% Recovery	Acceptance Limits (%)
Benzene	10	ND	9.84	98%	39 -150
Toluene	10	ND	9.83	95%	46 - 148
Ethylbenzene	10	ND	9.83	98%	32 - 160
m,p-Xylenes	20	ND	19.6	97%	NE
o-Xylene	10	ND	9.88	98%	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Spike acceptance range not established by the EPA.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	95	88 - 110%
Bromofluorobenzene	98	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

General Water Quality

Quality Control Report

Blagg Engineering, Inc.

Report Date: 7/1/96

Parameter	Analytical Result	Certified Value	Acceptance Range	Units
Laboratory pH	9.07	9.09	8.89 - 9.29	s.u.
Conductivity	1263	1220	1040 - 1400	µmhos/cm
Total Dissolved Solids	830	913	794 - 1030	mg/L
Total Alkalinity	191	180	160 - 200	mg/L
Chloride	140	138	128 - 148	mg/L
Sulfate	115	124	107 - 141	mg/L
Total Hardness	269	254	218 - 290	mg/L
Calcium	59.8	54.6	47.0 - 62.2	mg/L
Magnesium	NA	NA	NA	mg/L
Potassium	120	123	105 - 141	mg/L
Sodium	170	173	147 - 199	mg/L

Reference: U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983. Standard Methods For The Examination Of Water And Wastewater, 18th ed., 1992.

Comments:

Review

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ANAITAS ENVIRONMENTAL LABS

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CHAIN OF CUSTODY

Page 1 of 1

PROJECT MANAGER:
Anaitas Lab I.D.:

Company: BLAGG
Address:

Phone: 632-1199
Fax:

Bill To: SAME
Company:
Address:

Sample ID	Date	Time	Matrix	Lab ID	Petroleum Hydrocarbons (418.1)	Gasoline / Diesel (mod. 8015)	Gasoline (GRO)	Aromatic HCs BTEX/MTBE (602 / 8020)	Chlorinated Hydrocarbons (8010)	SDWA Volatiles (502.1 / 503.1)	Chlorinated Pesticides / PCBs (608 / 8080)	Herbicides (615 / 8150)	Volatiles GC/MS (624 / 8240 / 8260)	Base / Neutral / Acid GC/MS (625 / 8270)	Polynuclear Aromatic Hydrocarbons (8100)	TCLP Extraction	Other (specify):	Cation / Anion	Specific Cations (specify):	Specific Anions (specify):	BOD / Fecal / Total Coliform	Solids: TDS / TSS / SS	Nutrients: NH4+ / NO2− / NO3− / TKN	Oil and Grease	Other (specify):	Priority Pollutants	RCRA Metals (Total)	RCRA Metals TCLP (1311)	Other (specify):
MW-1	6-14	0830	WATER					✓										✓											
MW-2	"	0850	"					✓										✓											
MW-3	"	0915	"					✓										✓											
MW-4	"	0940	"					✓										✓											
MW-5	"	1010	"					✓										✓											

ORGANIC ANALYSES | WATER ANALYSES | METALS | COMMENTS

Project Information	Sample Receipt
Proj. #:	No. Containers:
Proj. Name: AMOCO	Custody Seals: Y / N / NA
P. O. No:	Received Intact:
Shipped Via: DEL'D	Received Cold:

Required Turnaround Time (Prior Authorization Required for Rush)

ROWLAND GC 1

Sampled By:	Relinquished By:	Relinquished By:
Signature: PEO	Signature: PEO	Signature:
Date: 6-14-96	Date: 6-14-96	Date:
Company: BEI	Company: BEI	Company:
Time: —	Time: 1035	Time:
Received By:	**Received By:**	**Received By:**
Signature:	Signature:	Signature:
Date:	Date:	Date: 6/14/96
Company:	Company:	Company: Anaitas
Time:	Time:	Time: 12:35

Please Fill Out Thoroughly.

Shaded areas for lab use only.

White/Yellow: Anaitas
Pink: Client

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 5115

ROWLAND GC # 1 - SEPARATOR PIT
UNIT P, SEC. 25, T30N, R12W

LABORATORY (S) USED : ENVIROTECH, INC.

Date : June 24, 1997

Filename : 06-24-97.WK3

SAMPLER : N J V

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING	pH TIME	CONDUCT (umhos)	VOLUME PURGED (gal.)	FREE PRODUCT (ft)
1	-	-	-	-	-	-	-	-	-
2	101.22	86.27	14.95	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-
4	100.70	86.68	14.02	19.00	0905	6.9	6,800	2.50	-
5	97.65	87.38	10.27	15.00	0930	7.0	2,600	2.40	-
6	101.85	86.30	15.55	25.00	0825	7.6	5,100	4.75	-

NOTES : Volume of water purged from well prior to sampling: V = pi X r2 X h X 7.48 gal./ft3) X 3 (wellbores).

Ideally a minimum of three (3) wellbore volumes:

1.25 " well diameter = 0.19 gallons per foot of water (or 24 oz.).

2 bails per foot - small teflon bailer.

3 bails per foot - 3 / 4 " teflon bailer.

2.00 " well diameter = 0.49 gallons per foot of water.

4.00 " well diameter = 1.95 gallons per foot of water.

Comments or note well diameter if not standard 2 ".

Pulled up casing on MW #4 1.13 ft. - 5 / 7 /97 (previous well elev. = 99.57 ft.). Used new survey (conducted on 1 / 25 / 99) #'s for MW #'s 5 & 6 .

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Blagg / Amoco	Project #:	04034-10
Sample ID:	MW #4	Date Reported:	06-26-97
Chain of Custody:	5115	Date Sampled:	06-24-97
Laboratory Number:	B494	Date Received:	06-24-97
Sample Matrix:	Water	Date Analyzed:	06-25-97
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**44.7**	**1**	**0.2**
Toluene	**0.5**	**1**	**0.2**
Ethylbenzene	**0.4**	**1**	**0.2**
p,m-Xylene	**0.8**	**1**	**0.2**
o-Xylene	**2.2**	**1**	**0.1**
Total BTEX	**48.6**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**96 %**
	Bromofluorobenzene	**99 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **Rowland GC #1.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Blagg / Amoco	Project #:	04034-10
Sample ID:	MW #5	Date Reported:	06-26-97
Chain of Custody:	5115	Date Sampled:	06-24-97
Laboratory Number:	B495	Date Received:	06-24-97
Sample Matrix:	Water	Date Analyzed:	06-25-97
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**58.8**	**10**	**1.8**
Toluene	**2.5**	**10**	**1.7**
Ethylbenzene	**2.8**	**10**	**1.5**
p,m-Xylene	**5,120**	**10**	**2.2**
o-Xylene	**1,170**	**10**	**1.0**
Total BTEX	**6,350**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**96 %**
	Bromofluorobenzene	**98 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **Rowland GC #1.**

Analyst

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PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Blagg / Amoco	Project #:	04034-10
Sample ID:	MW #6	Date Reported:	06-26-97
Chain of Custody:	5115	Date Sampled:	06-24-97
Laboratory Number:	B496	Date Received:	06-24-97
Sample Matrix:	Water	Date Analyzed:	06-25-97
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**ND**	**1**	**0.2**
Toluene	**0.6**	**1**	**0.2**
Ethylbenzene	**0.5**	**1**	**0.2**
p,m-Xylene	**3.7**	**1**	**0.2**
o-Xylene	**1.7**	**1**	**0.1**
Total BTEX	**6.5**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**98 %**
	Bromofluorobenzene	**99 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **Rowland GC #1.**

Analyst

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Blagg / Amoco	Project #:	04034-10
Sample ID:	MW #6	Date Reported:	06-26-97
Laboratory Number:	B496	Date Sampled:	06-24-97
Sample Matrix:	Water	Date Received:	06-24-97
Preservative:	Cool	Date Analyzed:	06-25-97
Condition:	Cool & Intact	Chain of Custody:	5115

Parameter	Analytical Result	Units		Units
pH	**7.21**	s.u.		
Conductivity @ 25° C	**16,850**	umhos/cm		
Total Dissolved Solids @ 180C	**8,400**	mg/L		
Total Dissolved Solids (Calc)	**8,390**	mg/L		
SAR	**23.9**	ratio		
Total Alkalinity as CaCO3	**298**	mg/L		
Total Hardness as CaCO3	**1,490**	mg/L		
Bicarbonate as HCO3	**298**	mg/L	4.88	meq/L
Carbonate as CO3	**<1**	mg/L	0.00	meq/L
Hydroxide as OH	**<1**	mg/L	0.00	meq/L
Nitrate Nitrogen	**0.8**	mg/L	0.01	meq/L
Nitrite Nitrogen	**<0.001**	mg/L	0.00	meq/L
Chloride	**278**	mg/L	7.84	meq/L
Fluoride	**3.26**	mg/L	0.17	meq/L
Phosphate	**2.3**	mg/L	0.07	meq/L
Sulfate	**5,250**	mg/L	109.31	meq/L
Calcium	**477**	mg/L	23.80	meq/L
Magnesium	**73.2**	mg/L	6.02	meq/L
Potassium	**4.8**	mg/L	0.12	meq/L
Sodium	**2,120**	mg/L	92.22	meq/L
Cations			122.17	meq/L
Anions			122.29	meq/L
Cation/Anion Difference			**0.10%**	

Reference: U.S.E.P.A., 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
Standard Methods For The Examination of Water And Waste Water", 18th ed., 1992.

Comments: **Rowland GC #1.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

QUALITY ASSURANCE / QUALITY CONTROL

DOCUMENTATION

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	QA/QC	Project #:	N/A
Sample ID:	Laboratory Blank	Date Reported:	06-26-97
Laboratory Number:	06-25-BTEX.BLANK	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	06-25-97
Condition:	N/A	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	**ND**	**0.2**
Toluene	**ND**	**0.2**
Ethylbenzene	**ND**	**0.2**
p,m-Xylene	**ND**	**0.2**
o-Xylene	**ND**	**0.1**

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**97 %**
	Bromofluorobenzene	**99 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples B494 - B503.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Duplicate	Date Reported:	06-26-97
Laboratory Number:	B494	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	HgCl and Cool	Date Analyzed:	06-25-97
Condition:	Cool and Intact	Analysis Requested:	BTEX-8020

Parameter	Sample Result (ug/L)	Duplicate Result (ug/L)	Percent Diff.	Det. Limit (ug/L)	Dilution Factor
Benzene	**44.7**	**43.9**	**1.8%**	**0.2**	**1**
Toluene	**0.5**	**0.5**	**0.0%**	**0.2**	**1**
Ethylbenzene	**0.4**	**0.4**	**0.0%**	**0.2**	**1**
p,m-Xylene	**0.8**	**0.8**	**0.0%**	**0.2**	**1**
o-Xylene	**2.2**	**2.2**	**0.0%**	**0.1**	**1**

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria:	Parameter	Maximum Difference
	8020 Compounds	**30 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples B494 - B503.**

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Spike	Date Reported:	06-26-97
Laboratory Number:	B494	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	Cool	Date Analyzed:	06-25-97
Condition:	Cool and Intact		

Parameter	Sample Result (ug/L)	Spike Added (ug/L)	Spiked Sample Result (ug/L)	Det. Limit (ug/L)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	**44.7**	**50.0**	**94.4**	**0.2**	**100%**	**39-150**
Toluene	**0.5**	**50.0**	**50.4**	**0.2**	**100%**	**46-148**
Ethylbenzene	**0.4**	**50.0**	**50.3**	**0.2**	**100%**	**32-160**
p,m-Xylene	**0.8**	**100**	**100**	**0.2**	**100%**	**46-148**
o-Xylene	**2.2**	**50.0**	**52.6**	**0.1**	**101%**	**46-148**

ND - Parameter not detected at the stated detection limit.

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples B494 - B503.**

Analyst

Review

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CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
BLAGG/AMOCO	ROWLAND GC #1

Sampler: (Signature)	Chain of Custody Tape No.
Nelson Velez	04034-10

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX (8020)	ANION/ CATION					Remarks
												ANION/CATION - PRESERV. COOL
MW #4	6/24/97	0905	B494	WATER	2	✓						BTEX PRESERV. - COOL + $HgCl_2$
MW #5	6/24/97	0930	B495	WATER	2	✓						
MW #6	6/24/97	0825	B496	WATER	3	✓	✓					
				Samples received cool & intact - DA								

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	6/24/97	1537	Dawn L. Duncan	6-24-97	1537
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

BLAGG ENGINEERING, INC.

MONITOR WELL SAMPLING DATA

CLIENT : AMOCO PRODUCTION CO.

CHAIN-OF-CUSTODY # : 6038

ROWLAND GC #1 - SEPARATOR PIT
UNIT P, SEC. 25, T30N, R12W

LABORATORY (S) USED : ENVIROTECH, INC.

Date : *June 26, 1998*

Filename : *06-26-98.WK3*

SAMPLER : N J V

PROJECT MANAGER : N J V

WELL #	WELL ELEV. (ft)	WATER ELEV. (ft)	DEPTH TO WATER (ft)	TOTAL DEPTH (ft)	SAMPLING TIME	pH	CONDUCT (umhos)	VOLUME PURGED (gal.)	FREE PRODUCT (ft)
1	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-
3	101.68	86.26	15.42	-	-	-	-	-	-
4R	98.07	86.55	11.52	19.09	0915	6.7	1,700	4.25	-
5	97.65	87.31	10.34	15.00	0945	6.9	1,900	2.25	-
6	101.85	85.97	15.88	-	-	-	-	-	-

NOTES : Volume of water purged from well prior to sampling: V = pi X r2 X h X 7.48 gal./ft3) X 3 (wellbores).

(i.e. 2" MW r = (1/12) ft. h = 1 ft.) (i.e. 4" MW r = (2/12) ft. h = 1 ft.)

Ideally a minimum of three (3) wellbore volumes:

1.25 " well diameter = 0.19 gallons per foot of water (or 24 oz.).

2 bails per foot - small teflon bailer.

3 bails per foot - 3 / 4 " teflon bailer.

2.00 " well diameter = 0.49 gallons per foot of water.

4.00 " well diameter = 1.95 gallons per foot of water.

Comments or note well diameter if not standard 2 ".

MW # 4 destroyed during revamp of surface equipment . Drilled MW # 4R 6 / 19 / 98 .

Tot. Leng. = 20 ft., 10 ft. screen inveral, top of casing approx. 0.91 ft. above ground surface .

TD @ 19.09 ft. below ground surface . Resurvey site on January 25, 1999 .

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Blagg / AMOCO	Project #:	04034-10
Sample ID:	MW # 4R	Date Reported:	06-30-98
Chain of Custody:	6038	Date Sampled:	06-26-98
Laboratory Number:	D519	Date Received:	06-26-98
Sample Matrix:	Water	Date Analyzed:	06-29-98
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**13.4**	**1**	**0.2**
Toluene	**ND**	**1**	**0.2**
Ethylbenzene	**ND**	**1**	**0.2**
p,m-Xylene	**0.6**	**1**	**0.2**
o-Xylene	**ND**	**1**	**0.1**
Total BTEX	**14.0**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**97 %**
	Bromofluorobenzene	**97 %**

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA December 1996.

Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: **Rowland GC #1.**

Analyst

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Blagg / AMOCO	Project #:	04034-10
Sample ID:	MW # 5	Date Reported:	06-30-98
Chain of Custody:	6038	Date Sampled:	06-26-98
Laboratory Number:	D520	Date Received:	06-26-98
Sample Matrix:	Water	Date Analyzed:	06-29-98
Preservative:	HgCl2 & Cool	Analysis Requested:	BTEX
Condition:	Cool & Intact		

Parameter	Concentration (ug/L)	Dilution Factor	Det. Limit (ug/L)
Benzene	**1,270**	**10**	**1.8**
Toluene	**89.0**	**10**	**1.7**
Ethylbenzene	**41.4**	**10**	**1.5**
p,m-Xylene	**2,060**	**10**	**2.2**
o-Xylene	**1,140**	**10**	**1.0**
Total BTEX	**4,600**		

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**100 %**
	Bromofluorobenzene	**100 %**

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA December 1996.

Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: **Rowland GC #1.**

Analyst

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CHAIN OF CUSTODY RECORD

6038

Client / Project Name	Project Location	ANALYSIS / PARAMETERS
BLAGG / AMOCO	ROWLAND GC #1	

Sampler: NJV

Client No.: 04034-10

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX (8021)						Remarks
												BOTH SAMPLES - PRESERV - $HgCl_2$ & COOL
MW # 4R	6/26/98	0915	0519	WATER	2	✓						
MW # 5	6/26/98	0945	0520	WATER	2	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	6/26/98	1152	Brenda L. Quinn	6-26-98	1152
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

Rel COC's 6036 → 6039

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Sample Receipt	Y	N	N/A
Received Intact	✓		
Cool - Ice/Blue Ice	✓		

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	N/A	Project #:	N/A
Sample ID:	06-29-BTEX QA/QC	Date Reported:	06-30-98
Laboratory Number:	D517	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	06-29-98
Condition:	N/A	Analysis:	BTEX

Calibration and Detection Limits (ug/L)	I-Cal RF:	C-Cal RF:	%Diff. Accept. Range 0 - 15%	Blank Conc	Detect. Limit
Benzene	2.4176E-01	2.4200E-01	0.10%	ND	1.8
Toluene	4.9646E-02	4.9795E-02	0.30%	ND	1.7
Ethylbenzene	4.1020E-02	4.1350E-02	0.81%	ND	1.5
p,m-Xylene	2.6433E-02	2.6620E-02	0.70%	ND	2.2
o-Xylene	3.0648E-02	3.0833E-02	0.60%	ND	1.0

Duplicate Conc. (ug/L)	Sample	Duplicate	%Diff.	Accept Limit
Benzene	5.7	5.7	0.0%	0 - 30%
Toluene	5.2	5.3	1.9%	0 - 30%
Ethylbenzene	9.9	10.1	2.0%	0 - 30%
p,m-Xylene	50.3	50.9	1.2%	0 - 30%
o-Xylene	5.5	5.5	0.0%	0 - 30%

Spike Conc. (ug/L)	Sample	Amount Spiked	Spiked Sample	% Recovery	Accept Limits
Benzene	5.7	50.0	55.4	99%	39 - 150
Toluene	5.2	50.0	54.9	99%	46 - 148
Ethylbenzene	9.9	50.0	59.4	99%	32 - 160
p,m-Xylene	50.3	100.0	147.3	98%	46 - 148
o-Xylene	5.5	50.0	55.2	99%	46 - 148

ND - Parameter not detected at the stated detection limit.

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.
Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: **QA/QC for samples D517 - D523.**

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ENVIROTECH Inc.

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C4923
94923

FIELD REPORT: CLOSURE VERIFICATION

JOB No: 92140
PAGE No: 1 of 1

LOCATION: LEASE: ROLAND WELL: 6C 1 QD:
SEC: 25 TWP: 30N RNG: 12W BM: NM CNTY: SAN JUAN ST: NM PIT: PROD
CONTRACTOR: BILL MOSS
EQUIPMENT USED: TRACKHOE

DATE STARTED: 8/2/93
DATE FINISHED: 8/2/93

ENVIRONMENTAL SPECIALIST: NV

SOIL REMEDIATION: QUANTITY: 16 X 15 X 13
DISPOSAL FACILITY: CROUCH MESA COMPOST
LAND USE: RANGE & RESIDENTIAL
SURFACE CONDITIONS: UNKNOWN

FIELD NOTES & REMARKS: PIT LOCATED APPROXIMATELY 60 YARDS N10°W FROM WELLHEAD.
DEPTH TO GROUNDWATER: 13'
NEAREST WATER SOURCE: <750 FT.
NEAREST SURFACE WATER: <100 FT.

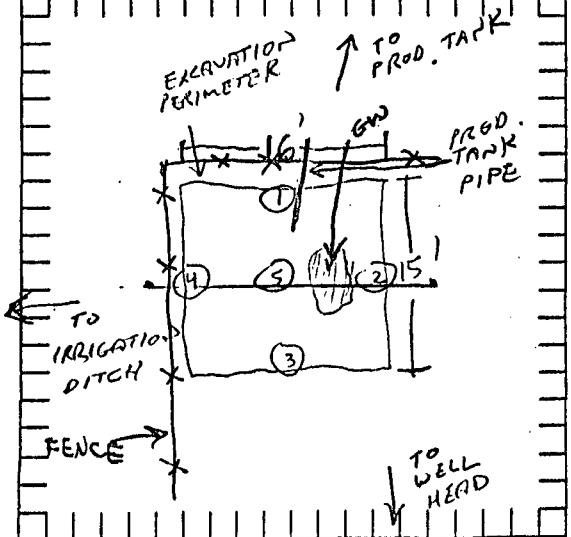
DK. YELLOWISH BROWN TO MEDIUM DK. GRAY SAND, NON-COHESIVE, SLIGHTLY MOIST, LOOSE TO STIFF, AND STRONG ODOR ON ALL BUT ④ @ 9'. GROUNDWATER CONTAINED A SLIGHT SHEEN ON ITS SURFACE.

FIELD 418.1 CALCULATIONS

SAMPLE I.D.	LAB No:	WEIGHT (g)	mL. FREON	DILUTION	READING	CALC. ppm

SCALE
0 FEET

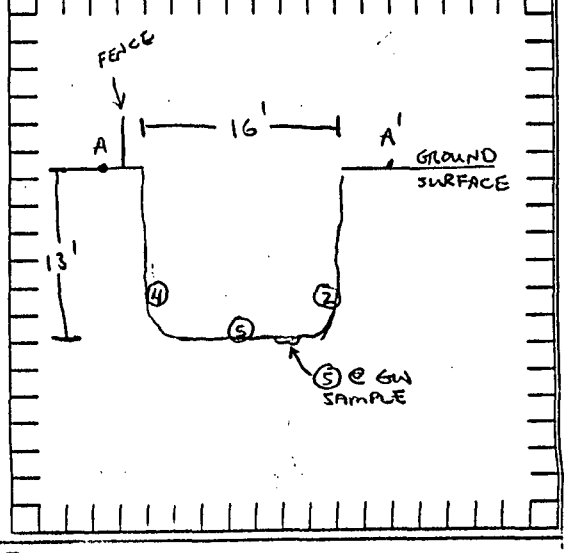
PIT PERIMETER



OVM RESULTS

SAMPLE ID	FIELD HEADSPACE PID (ppm)
① @ 9'	1511
② @ 9'	1403
③ @ 8'	1675
④ @ 9'	20.6
⑤ @ 13'	1654
⑤ @ GW (13')	
BTEX SAMPLE	

PIT PROFILE



TRAVEL NOTES: CALLOUT: 7/30/93 ONSITE: 8/2/93

ENVIROTECH LABS

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Amoco	Project #:	92140
Sample ID:	5 @ GW (13')	Date Reported:	08-04-93
Laboratory Number:	5816	Date Sampled:	08-02-93
Sample Matrix:	Water	Date Received:	08-02-93
Preservative:	HgCl & Cool	Date Analyzed:	08-03-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	183	0.2
Toluene	1.1	0.4
Ethylbenzene	0.3	0.2
p,m-Xylene	2.1	0.4
o-Xylene	32.3	0.3

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	93 %
Bromofluorobenzene	87 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: Roland GC #1 Production Pit C4923

Analyst

Review

2880

CHAIN OF CUSTODY RECORD

C4925

Client/Project Name	Project Location	ANALYSIS/PARAMETERS
Amoco 92140	PROD. PIT Roland GC #1	
Sampler: (Signature) Nelson Velez	Chain of Custody Tape No.	

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX (8020)						Remarks
(5) 2 GW (13')	3/2/93	1040	5816	WATER	2	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	8/2/93	1555	[signature]	8-2-93	1555
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

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san juan repro Form 578-81

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C4924
94924

FIELD REPORT: CLOSURE VERIFICATION

JOB No: 92140
PAGE No: 1 of 1

LOCATION: LEASE: ROLAND WELL: GC #1 QD: (P) SE/4 SE/4
SEC: 25 TWP: 30N RNG: 12W BM: NM CNTY: SAN JUAN ST: NM PIT: SEP.
CONTRACTOR: BILL MOSS
EQUIPMENT USED: TRACKHOE

DATE STARTED: 8/2/93
DATE FINISHED: 8/2/93
ENVIRONMENTAL SPECIALIST: NV

SOIL REMEDIATION: QUANTITY: 26 X 30 X 16'
DISPOSAL FACILITY: CROUCH MESA COMPOST
LAND USE: RANGE & RESIDENTIAL
SURFACE CONDITIONS: UNKNOWN

FIELD NOTES & REMARKS: PIT LOCATED APPROXIMATELY 47 YARDS N10°E FROM WELLHEAD.
DEPTH TO GROUNDWATER: 16'
NEAREST WATER SOURCE: < 750 FT.
NEAREST SURFACE WATER: < 100 FT.

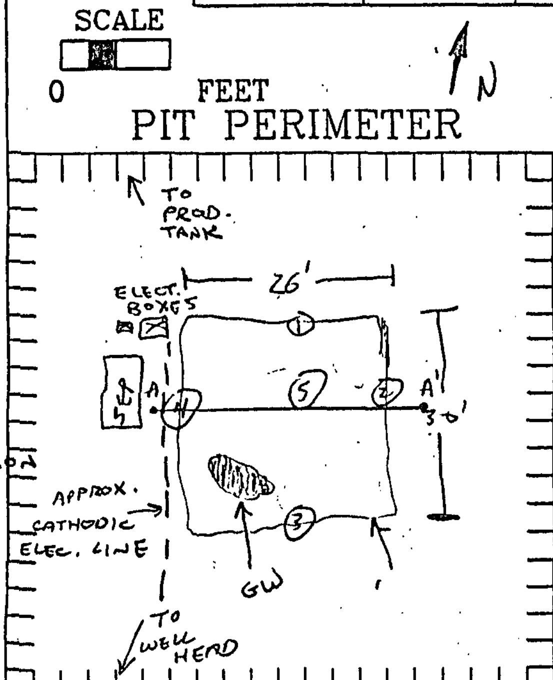
DK. YELLOWISH BROWN TO MEDIUM LIGHT GRAY (WEST SIDEWALL) SAND, NON-COHESIVE, SLIGHTLY MOIST, LOOSE TO HARD. GROUNDWATER CONTAINED A SLIGHT SHEEN ON ITS SURFACE AND SLIGHT HYDROCARBON ODOR.

FIELD 418.1 CALCULATIONS

SAMPLE I.D.	LAB No:	WEIGHT (g)	mL. FREON	DILUTION	READING	CALC. ppm

SCALE
0 FEET

PIT PERIMETER

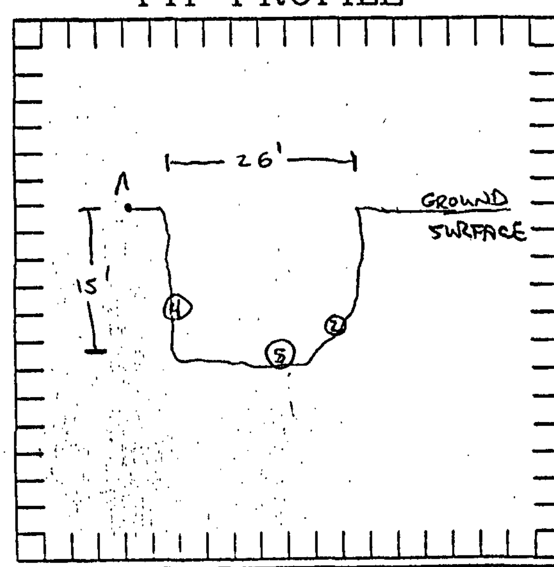


OVM RESULTS

SAMPLE ID	FIELD HEADSPACE PID (ppm)
① @ 11'	3.5
② @ 13'	33.8
③ @ 12'	2.5
④ @ 11'	1503
⑤ @ 15'	28.7
⑤ @ GW (16')	BTEX
	SAMPLE

2881

PIT PROFILE



TRAVEL NOTES: CALLOUT: 7/30/93 ONSITE: 8/2/93

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EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Amoco	Project #:	92140
Sample ID:	5 @ GW (16')	Date Reported:	08-04-93
Laboratory Number:	5817	Date Sampled:	08-02-93
Sample Matrix:	Water	Date Received:	08-02-93
Preservative:	HgCl & Cool	Date Analyzed:	08-03-93
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	158	0.4
Toluene	4.6	0.8
Ethylbenzene	ND	0.4
p,m-Xylene	64	0.8
o-Xylene	77	0.6

SURROGATE RECOVERIES:

Parameter	Percent Recovery
Trifluorotoluene	87 %
Bromofluorobenzene	97 %

Method: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1986

ND - Parameter not detected at the stated detection limit.

Comments: Roland GC #1 Separator Pit C4924

Analyst

Review

2881

CHAIN OF CUSTODY RECORD

C4924

Client/Project Name	Project Location	ANALYSIS/PARAMETERS
Amoco 92140	SEP. PIT ROLAND GC #1	
Sampler: (Signature) Nelson Velez	Chain of Custody Tape No.	

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX (8020)						Remarks
(5) @ GW(16')	8/2/93	1140	5817	WATER	2	✓						

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Nelson Velez	8/2/93	1556	Sheri D. Quinn	8-2-93	1556
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

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