GW - 49-0

MONITORING REPORTS

YEAR(S):

2003

GW-49

Prepared for:

El Paso Field Services
614 Reilly Avenue
Farmington, New Mexico 87401

FINAL
2003 BLANCO NORTH FLARE PIT
PILOT AIR SPARGING SYSTEM REPORT

SAN JUAN COUNTY, NEW MEXICO

October 2003

Prepared by:

MWH
1475 Pine Grove Road, Suite 109
P.O. Box 774018
Steamboat Springs, Colorado 80477
(970) 879-6260

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICIES

LIST OF ACRONYMS

AS	Air Sparging
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
cfm	cubic feet per minute
EPFS	El Paso Field Services
mg/L	milligrams per liter
NMOCD	New Mexico Oil Conservation Division
NMWQCC	New Mexico Water Quality Control Commission
psi	pounds per square inch

1.0 INTRODUCTION

This *2003 Blanco North Flare Pit Air Sparging System Report* has been prepared for El Paso Field Services (EPFS) to document the performance of the air sparging (AS) system and status of the free-product removal activities at the Blanco Plant North Flare Pit site (Site). This report includes free-product removal data, construction details of the AS system, operation and monitoring data, and groundwater analytical results collected over the period of AS system operation. An evaluation of the AS system and recommendations for future activities are also included in this report.

The purpose of these activities is groundwater remediation downgradient of the North Flare Pit. Constituents of potential concern at the site include free-phase hydrocarbons (i.e., free-product), benzene, ethylbenzene, toluene and total xylenes (BTEX). Regulatory drivers for groundwater remediation at this site include New Mexico Oil Conservation Division's (NMOCD) guidelines and the New Mexico Water Quality Control Commission's (NMWQCC) regulations.

The remediation activities that have been conducted at the Site are described in *the Work Plan for the Blanco North Flare Pit, July 2002* (Work Plan) (MWH, 2002) and *the Blanco North Flare Pit Work Plan Update Technical Memorandum, June 2003* (Work Plan Update) (MWH, 2003). The Work Plan summarizes available information related to the Site, including a summary of previous site activities and investigations, a description of the geology/hydrogeology of the area and historic groundwater quality data. Therefore these discussions will not be reiterated in this report.

2.0 REMEDIAL ACTIVITIES

2.1 AIR SPARGING SYSTEM OPERATION

As described in the Work Plan (MWH, 2002), EPFS proposed AS in the vicinity of the impacted groundwater to remediate dissolved-phase hydrocarbon contamination and reduce BTEX concentrations to below NMWQCC standards. On December 16, 2002 a new AS well, SW-1, was installed approximately 25 feet upgradient (north) of monitoring well MW-26 as shown on Figure 1, *Blanco Plant Site Layout.* The AS well was drilled through unconsolidated sediments to a depth of approximately 66 feet below ground surface (bgs) and into sandstone bedrock to a total boring depth of 75.5 feet bgs. The well was constructed of two-inch diameter PVC casing with a five-foot long, 0.01-inch slotted well screen. The well screen was installed at the base of the boring from 70.2 to 75.2 feet bgs. The borehole was then backfilled with 10/20 silica sand pack around the screen to 67.5 feet bgs, a hydrated bentonite chip seal to 60.8 feet bgs, and grouted to the surface. The water level in MW-26 is typically between 62 and 64 feet below top of casing, which is indicative of the final water level in the new AS well. The geologic borelog and monitoring well installation report is attached in Appendix A.

The AS system was instrumented and prepared for operation and testing during January and February 2003. An AS system operation test was performed in February 2003 and based in part on the results of the test, the Work Plan Update was prepared and submitted to NMOCD on June 6, 2003, as an addendum to the Work Plan, to outline the operation, monitoring and maintenance plan for the AS system and product removal activities. Operation of the AS system was delayed during skimmer installation and initiation of free-product removal in April and May 2003, as described further below. AS system operation was initiated on June 5, 2003, following baseline groundwater sampling (as described in Section 2.3). The system has been continuously operating since start-up, with the exception of minor periods of down-time due to system failure, and scheduled shut-downs for the purpose of groundwater monitoring.

Air injection has been conducted on a 12-hour off/on cycle with 5 to 8 cubic feet per minute (cfm) of air injection into the well at 14 to 16 pounds per square inch (psi) of pressure. During the initial phase of operation, weekly maintenance checks on the skimmer and AS systems were conducted. Free-product accumulation was monitored, air pressure measurements were measured at each well head using magnehelic gages, and field parameters (including water levels, pH, temperature, specific conductance and dissolved oxygen) were monitored. After the first six weeks of operation, maintenance visits were reduced to bi-weekly. Following each visit, a field report was prepared that summarized all operation and monitoring data and reported any problems. Field operation and monitoring reports are included in Appendix B, and selected data are summarized in Table 2.1, *AS System Operation and Monitoring Data (February 2003 – September 2003).* As shown in this table, the air pressure and dissolved oxygen content data indicate that there has been good communication between the AS well (SW-1) and wells MW-26 and MW-19.

2.2 FREE-PRODUCT REMOVAL

During drilling and installation of the AS well, free-product was discovered in well MW-26. The nearby monitoring wells were checked for the presence of free-product; none was encountered in any of the other existing wells or the new AS well. In December 2002, a total of approximately 4.5 gallons of water/free-product was hand bailed from the well. On April 22, 2003, approximately 2 feet of free-product was measured, and in mid-April a skimmer pump was installed in MW-26 for free-product removal. Between April and June 2003, the skimmer pump removed an additional 3.1 gallons of free-product. A summary of free-product recovery is presented in Table 2.2, *Free Product Recovery Data (MW-26).*

2.3 GROUNDWATER REMEDIATION BY AIR SPARGING

In June 2003, prior to AS system start-up, baseline groundwater monitoring was conducted at each of the six monitoring wells in the North Flare Pit area (which includes MW-2, MW-19, MW-23, MW-24, MW-26 and MW-27). Groundwater samples were collected from each of the monitoring wells again in August 2003 and September 2003 to evaluate the effectiveness of the AS system on groundwater hydrocarbon remediation. Forty-eight hours prior to sample collection the AS system was shut–down to ensure natural groundwater conditions were being evaluated. During each sampling event, groundwater levels and field parameters (pH, temperature, specific conductance and dissolved oxygen) were measured, and samples were analyzed for BTEX concentrations. Samples were not collected from MW-2 or MW-24 during any of the sampling rounds because the wells were dry or bailed dry. Samples were not collected from MW-26 during the first two sampling rounds because free-product was present during June and the well bailed dry in August; a sample was collected from MW-26 in September. Analytical results from these three sampling rounds are presented with historic data in Table 2.3, *Groundwater Monitoring Analytical Data*, and laboratory analytical reports are attached in Appendix C. Benzene concentrations in groundwater for each of the sampling events are presented on site maps in Figures 2 through 4, *Benzene Concentrations in Groundwater.* These maps also present the groundwater flow direction based on water levels measured during each event.

As shown in the data table and presented on the maps, groundwater BTEX concentrations in all of the monitoring wells decreased significantly between the June (baseline) and August sampling events, over the first two months of AS system operation. Analytical results from the September event were generally similar to the August results. The largest decreases in concentrations were seen in MW-19, where the benzene concentration was reduced from 10,100 milligrams per liter (mg/L) in June, to 2,000 mg/L in August (an 80% reduction in concentration), and in MW-26 where free-product was present in June and the benzene concentration declined to 538 mg/L in September. These wells were also the locations where physical effects of the AS system (air flow at the well heads) were most pronounced. BTEX concentration decreases were also observed at MW-23 and MW-27 over this period. These data results indicate that the AS system has been very effective for groundwater remediation at the Site.

3.0 RECOMMENDATIONS FOR FUTURE ACTIVITIES

EPFS recommends continued operation of the AS system with bi-weekly or monthly operation and monitoring visits. Groundwater sampling will continue on a quarterly basis until four consecutive rounds of groundwater samples indicate BTEX concentrations below NMWQCC standards or until levels reach steady-state values. The groundwater monitoring schedule for 2003/2004 is presented in Table 3.1, *Groundwater Monitoring Schedule*. The next quarterly groundwater sampling event is scheduled for the 4th Quarter 2003. Results of the groundwater monitoring will be transmitted in an annual report, tentatively scheduled for submission to NMOCD in October 2004.

4.0 REFERENCES

MWH, 2002. *Work Plan for the Blanco North Flare Pit.* Prepared for El Paso Field Services. July 2002.

MWH, 2003. *Blanco North Flare Pit Work Plan Update Technical Memorandum.* Prepared for El Paso Field Services. June 2003.

Tables

MWH

TABLES

TABLE 2.1
AS SYSTEM OPERATION AND MONITORING DATA (FEBRUARY 2003 - SEPTEMBER 2003)
BLANCO NORTH FLARE PIT - SAN JUAN COUNTY, NEW MEXICO

	Depth to Water (ft bgs)					
Date	MW-2	MW-19	MW-23	MW-24	MW-26	MW-27
2/3/03	dry	63.64	nm	nm	64.55/63.02	64.05
6/2/03	dry	63.90	57.12	66.38	pump in well	64.41
6/5/03	dry	62.42	57.03	66.96	pump in well	64.48
6/6/03	dry	62.34	57.14	66.97	pump in well	64.44
6/9/03	dry	62.31	57.03	66.81	pump in well	64.41
6/16/03	dry	62.47	57.09	66.74	pump in well	64.46
6/23/03	dry	62.31	56.99	66.71	pump in well	64.45
7/2/03	dry	62.75	57.06	66.68	pump in well	64.50
7/10/03	dry	62.45	57.08	66.68	65.38	64.50
7/15/03	dry	62.75	57.08	66.81	64.35	64.74
7/29/03	dry	62.71	57.06	66.83	64.46	64.68
8/7/03	dry	65.00	57.13	67.09	65.26	64.75
8/21/03	dry	64.84	57.12	67.09	64.59	64.78
9/10/03	dry	64.79	57.04	67.08	64.55	64.81
9/25/03	dry	63.95	57.12	67.07	64.55	64.89

	Dissolved Oxygen (mg/L)					
Date	MW-2	MW-19	MW-23	MW-24	MW-26	MW-27
2/3/03	dry	nm	nm	nm	nm	nm
6/2/03	dry	nm	nm	nm	pump in well	nm
6/5/03	dry	nm	nm	nm	pump in well	nm
6/6/03	dry	nm	nm	nm	pump in well	nm
6/9/03	dry	1.60	1.85	1.51	pump in well	0.88
6/16/03	dry	1.54	1.89	1.34	pump in well	0.80
6/23/03	dry	2.72	0.94	1.54	pump in well	1.44
7/2/03	dry	nm	nm	nm	pump in well	nm
7/10/03	dry	2.98	0.94	1.50	4.44	1.17
7/15/03	dry	1.29	0.75	2.09	6.89	0.96
7/29/03	dry	1.41	0.64	1.55	6.16	0.94
8/7/03	dry	0.60	1.42	nm	0.49	1.00
8/21/03	dry	0.91	1.11	nm	2.23	0.59
9/10/03	dry	1.10	0.64	nm	2.02	0.86
9/25/03	dry	1.10	1.12	1.71	0.50	1.01

	Induced Air Pressure at Well (inches H2O)					
Date	MW-2	MW-19	MW-23	MW-24	MW-26	MW-27
2/3/03	dry	3.80	nm	nm	5.50	0.02
6/2/03	dry	NA	nm	nm	pump in well	nm
6/5/03	dry	4.50	0.00	0.00	pump in well	0.00
6/6/03	dry	5.80	0.00	0.00	pump in well	0.00
6/9/03	dry	6.10	0.00	0.09	pump in well	0.07
6/16/03	dry	6.00	0.00	0.10	pump in well	0.07
6/23/03	dry	6.15	0.00	0.09	pump in well	0.05
7/2/03	dry	7.40	0.00	0.10	pump in well	0.10
7/10/03	dry	5.20	0.00	0.02	>10	0.04
7/15/03	dry	6.10	0.00	0.04	>10	0.07
7/29/03	dry	6.60	0.00	0.09	>10	0.05
8/7/03	dry	0.00	0.00	0.00	0.00	0.00
8/21/03	dry	3.60	0.00	0.07	6.80	0.06
9/10/03	dry	6.40	0.00	0.03	<10	0.90
9/25/03	dry	3.10	0.00	0.06	3.90	0.04

dry - well was dry
nm - not measured
bgs - below ground surface

TABLE 2.2
FREE PRODUCT RECOVERY DATA (MW-26)
BLANCO NORTH FLARE PIT - SAN JUAN COUNTY, NEW MEXICO

Date	Product thickness in MW-26 (feet)	Depth to product in drum (ft BTOD)	Volume of product removed (gal) Incremental	Cummulative	
12/17/2002	1.39	na	2	2	(water and product)
12/18/2002	1.39	na	2.5	4.5	(water and product)
2/3/2003	1.53	na	**Total collected by bailing =4.5 gallons of water/product**		
2/6/2003	1.33	na	**Skimmer system installed during week 23 Apr 2003.**		
4/22/2003	1.98	nm	0.81	0.81	
4/28/2003	nm	2.57	0.82	1.63	
5/6/2003	0.03	nm	0.00	1.63	
5/12/2003	0.36	nm	0.23	1.86	
5/16/2003	nm	2.54	0.00	1.86	
5/19/2003	nm	2.54	0.00	1.86	
5/23/2003	nm	2.53	0.20	2.06	
5/27/2003	nm	2.525	0.10	2.17	
6/5/2003	nm	2.505	0.41	2.57	
6/6/2003	nm	2.50	0.10	2.67	
6/9/2003	nm	2.50	0.00	2.67	
6/16/2003	nm	2.48	0.41	3.08	
6/23/2003	nm	2.48	0.00	3.08	
7/2/2003	nm	2.48	**Skimmer system down - pump has not cycled since 7/1/03.**		
7/10/2003	0		**Total collected by Skimmer system = 3.08 gallons of product**		
7/15/2003	0				
7/29/2003	0				
8/7/2003	0				
8/21/2003	0				
9/10/2003	0				
9/25/2003	0	**Total Product Recovery in MW-26 (bailed/skimmer pump) = 7.58 gallons**			

TOC = Top of Casing
BTOD = Below Top of Drum
nm = not measured
na = not applicable

TABLE 2.3
GROUNDWATER MONITORING ANALYTICAL DATA
BLANCO NORTH FLARE PIT - SAN JUAN COUNTY, NEW MEXICO

			Analytical Parameters			
Monitoring Well	Sample Date	Static Water Level (ft BTOC)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Total Xylenes (ug/l)
	NMWQCC Standard:		10	750	750	620
MW-2	6/18/91		<0.5	<0.5	0.7	0.9
	2/23/93		<0.5	<0.5	<0.5	<0.5
	6/8/93		<2.0	<2.0	<2.0	<2.0
	9/29/93		6.2	<2.0	<2.0	<2.0
	2/10/94		<2.0	<2.0	<2.0	<2.0
	5/13/94		<2.0	<2.0	<2.0	<2.0
	8/22/94		<2.0	<2.0	<2.0	<2.0
	11/9/00	dry	Well Dry - No Sample Collected			
	3/25/01	dry	Well Dry - No Sample Collected			
	6/2/03	dry	Well Dry - No Sample Collected			
	8/4/03	dry	Well Dry - No Sample Collected			
	9/3/03	dry	Well Dry - No Sample Collected			
MW-19	6/19/91		8,600	210	<25.0	4,200
	2/25/93		14,000	450	3,900	5,100
	6/10/93		9,580	159	928	1,087
	11/13/00	63.45	7,200	<25	3,500	88
	3/26/01	63.37	12,000	<50	4,500	110
	5/30/02	63.54	12,000	<50	4,300	140
	6/2/03	63.90	10,100	<10	3,900	<30
	8/4/03	62.75	2,000	<10	304	<30
	9/3/03	65.06	3,580	<1.0	1,020	<3.0
MW-20	9/26/92		<1.0	<1.0	<1.0	<1.0
	2/24/93		<0.5	<0.5	<0.5	<0.5
	6/10/93		<2.0	<2.0	<2.0	<2.0
	9/29/93		<2.0	<2.0	<2.0	<2.0
	1/27/94		<2.0	<2.0	<2.0	<2.0
	5/13/94		<2.0	<2.0	<2.0	<2.0
	8/22/94		<2.0	<2.0	<2.0	<2.0
	11/13/00	41.00	Well Damaged - No Sample Collected.			
	6/2/03	NA	Well Damaged and abandoned in 2002.			
MW-23	9/26/92		2,770	221	7,690	6,090
	2/1/93		2,900	3,500	190	4,100
	2/25/93		2,900	190	3,500	4,100
	6/8/93		1,680	30	1,850	2,906
	9/29/93		2,133	216	1,807	3,823
	2/10/94		2,090	151	1,150	2,660
	5/13/94		3,530	255	852	2,150
	8/22/94		3,270	212	353	1,176
	11/13/00	57.02	3,700	<25	840	1,400
	3/26/01	57.07	7,200	<25	520	1,300
	5/30/02	57.08	9,300	<50	360	1,500
	6/2/03	57.12	8,920	<10	337	1,450
	8/4/03	57.06	2,250	<10	100	337
	9/3/03	57.11	3,860	7.8	208	768
MW-24	9/26/92		2,650	95	<50	1,340
	2/23/93		1,300	71	<12.5	600
	6/10/93		59	15	7	95
	9/29/93		1,040	63	8	918
	2/10/94		490	44	<2.0	395
	5/13/94		1,390	69	<2.0	898
	8/22/94		836	60	<2.5	154
	11/13/00	65.06	200	<1	5	22
	3/26/01	65.00	1,500	<5.0	18	35
	5/30/02	65.65	2,100	13	29	<25
	6/2/03	66.38	Well Bailed Dry - No Sample Collected			
	8/4/03	66.91	Well Bailed Dry - No Sample Collected			
	9/3/03	dry	Well Dry - No Sample Collected			
MW-26	2/25/93		11,000	860	9,900	10,000
	6/10/93		12,180	470	7,504	4,959
	3/26/01	62.36	6,400	100	280	1,900
	5/30/02	63.68	6,200	50	270	1,300
	6/2/03	NA	Free-Product Recovery Pump in Well - No Sample Collected			
	8/4/03	65.19	Well Bailed Dry - No Sample Collected			
	9/4/03	65.00	538	9.6	139	466
MW-27	2/26/93		9,100	470	5,700	4,900
	6/10/93		8,970	376	137	5,406
	9/30/93		13,200	402	420	3,100
	2/2/94		9,740	212	209	1,750
	5/14/94		10,100	358	180	4,500
	11/13/00	63.67	4,400	4,700	12,000	60,000
	3/26/01	63.38	420	27	260	1,600
	5/30/02	63.54	420	13	170	1,100
	6/2/03	64.41	192	<25	328	1,480
	8/4/03	63.72	116	<10	145	697
	9/3/03	64.8	137	17	274	1,240

Notes:

1. Shaded data indicate exceedance of New Mexico Water Quality Control Commission's (NMWQCC) standards.
2. All detected concentrations are shown in bold type.

< Analyte detected below the reporting limit (RL). Value shown is the RL.

BTOC = Below Top of Casing
NA = Not Applicable

TABLE 3.1
GROUNDWATER MONITORING SCHEDULE
BLANCO NORTH FLARE PIT - SAN JUAN COUNTY, NEW MEXICO
EL PASO FIELD SERVICES

Monitoring Well	Monitoring Schedule	Analyses
North Flare Pit Area		
MW-2	Quarterly	Field Parameters, BTEX
MW-19	Quarterly	Field Parameters, BTEX
MW-23	Quarterly	Field Parameters, BTEX
MW-24	Quarterly	Field Parameters, BTEX
MW-26	Quarterly	Field Parameters, BTEX
MW-27	Quarterly	Field Parameters, BTEX

Notes:

1. **Field Parameters include temperature, pH, dissolved oxygen and specific conductance.**

2. **The next quarterly sampling event is scheduled for 4th Quarter 2003.**

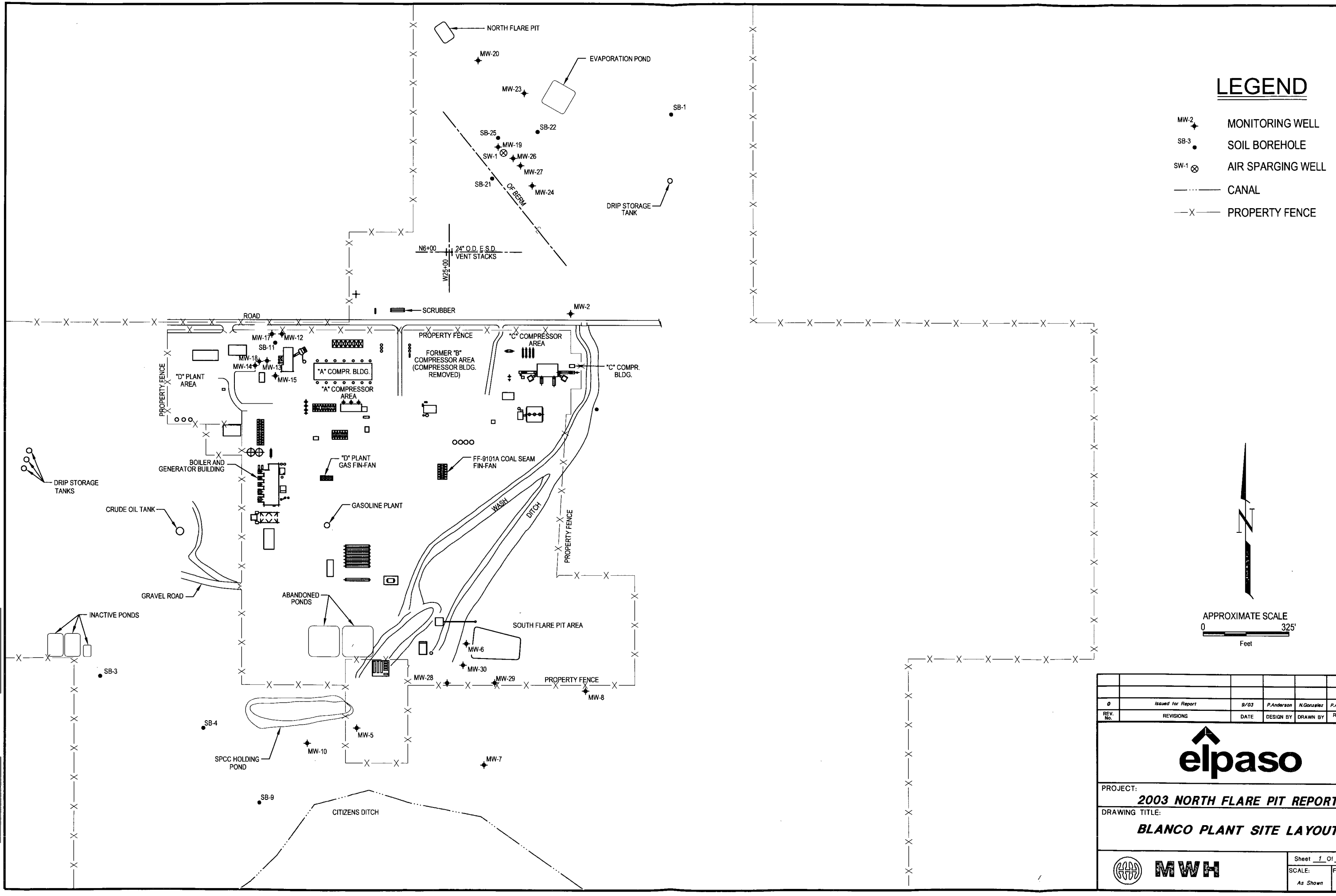
3. **Monitoring well MW-20 was damaged and abandoned in 2002.**

BTEX: Benzene, Toluene, Ethylbenzene and Total Xylenes.

Figures

MWH

FIGURES



LEGEND

- MW-2 — MONITORING WELL
- SB-3 — SOIL BOREHOLE
- SW-1 — AIR SPARGING WELL
- CANAL
- PROPERTY FENCE

N

APPROXIMATE SCALE
0 325'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	9/03	P.Anderson	N.Gonzalez	P.Anderson

elpaso

PROJECT: *2003 NORTH FLARE PIT REPORT*

DRAWING TITLE: ***BLANCO PLANT SITE LAYOUT***

MWH

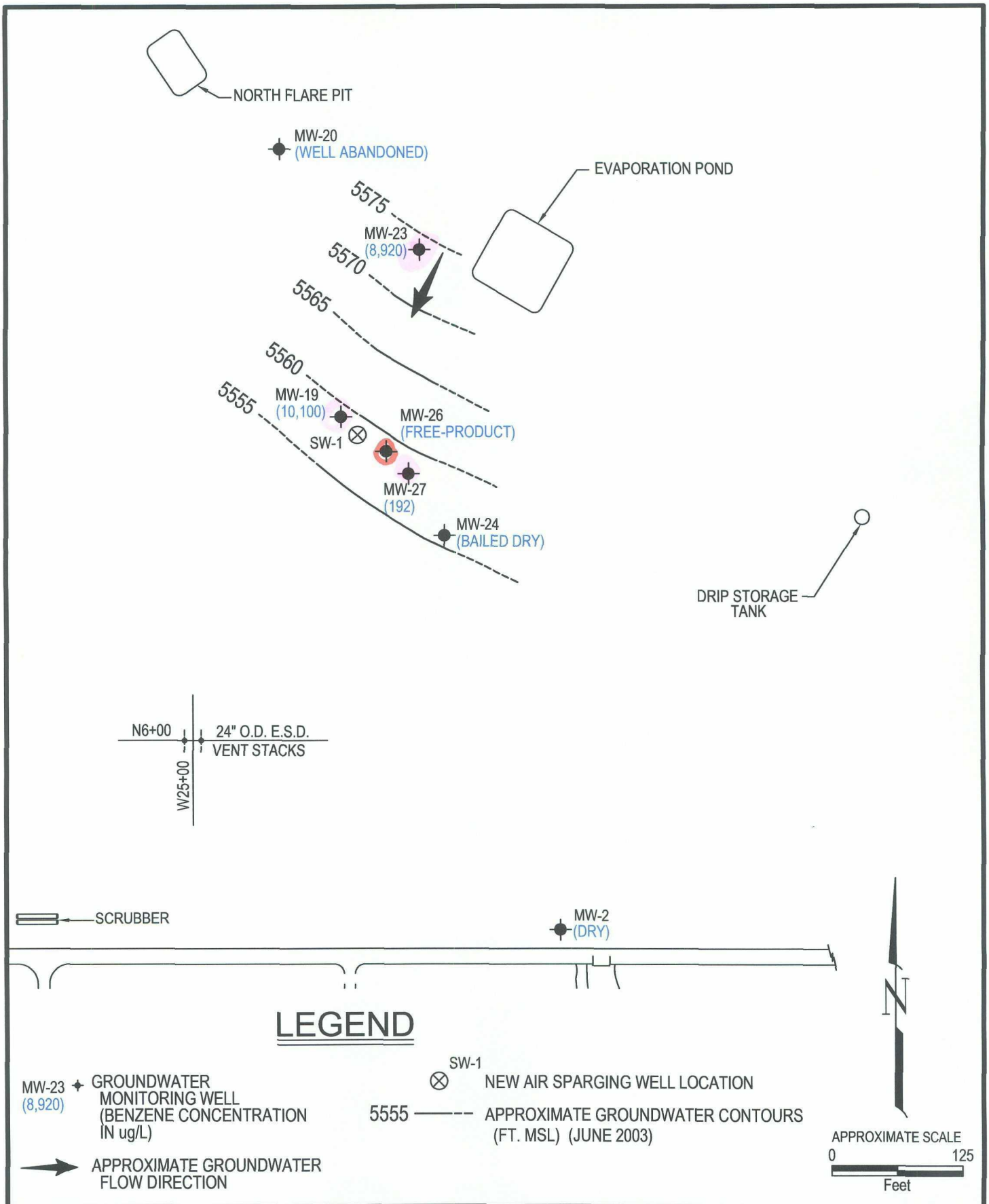
Sheet 1 Of 1 Sheets

SCALE: *As Shown*

FIGURE No. *1*

PROJECT NUMBER: *1003803.01601*

AutoCAD FILE: *Nflare_Location Map*



REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Issued for Report	9/03	P.Anderson	N.Gonzalez	P.Anderson
0	Issued for Review	7/03	P.Anderson	N.Gonzalez	P.Anderson

MWH

PROJECT No.: 1003803.011801

AutoCAD FILE: NFlareSpargeLoc-BENZ 6-03

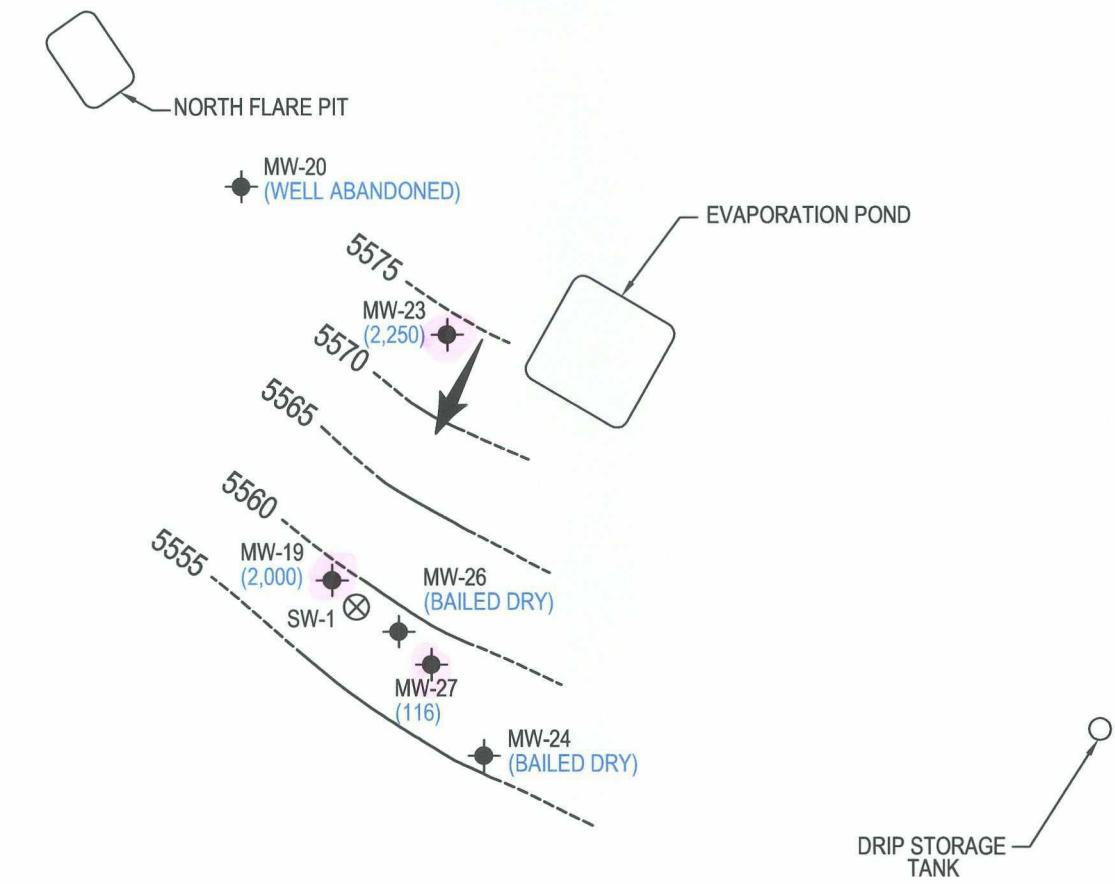
SCALE: As Shown

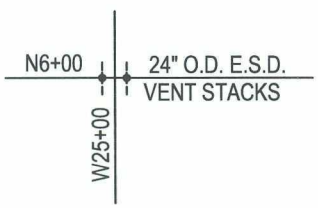
FIGURE No: 2

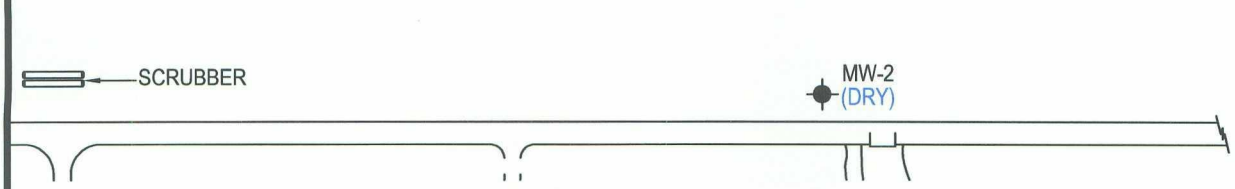
elpaso

NORTH FLARE PIT

BENZENE CONCENTRATIONS IN GROUNDWATER, JUNE 2003







LEGEND

MW-23 (2,250) — GROUNDWATER MONITORING WELL (BENZENE CONCENTRATION IN ug/L)

SW-1 — AIR SPARGING WELL LOCATION

5555 — APPROXIMATE GROUNDWATER CONTOURS (FT. MSL) (AUGUST 2003)

APPROXIMATE GROUNDWATER FLOW DIRECTION

N

APPROXIMATE SCALE
0 125
Feet

REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
1	Issued for Report	9/03	P.Anderson	N.Gonzalez	P.Anderson
0	Issued for Review	8/03	P.Anderson	N.Gonzalez	P.Anderson

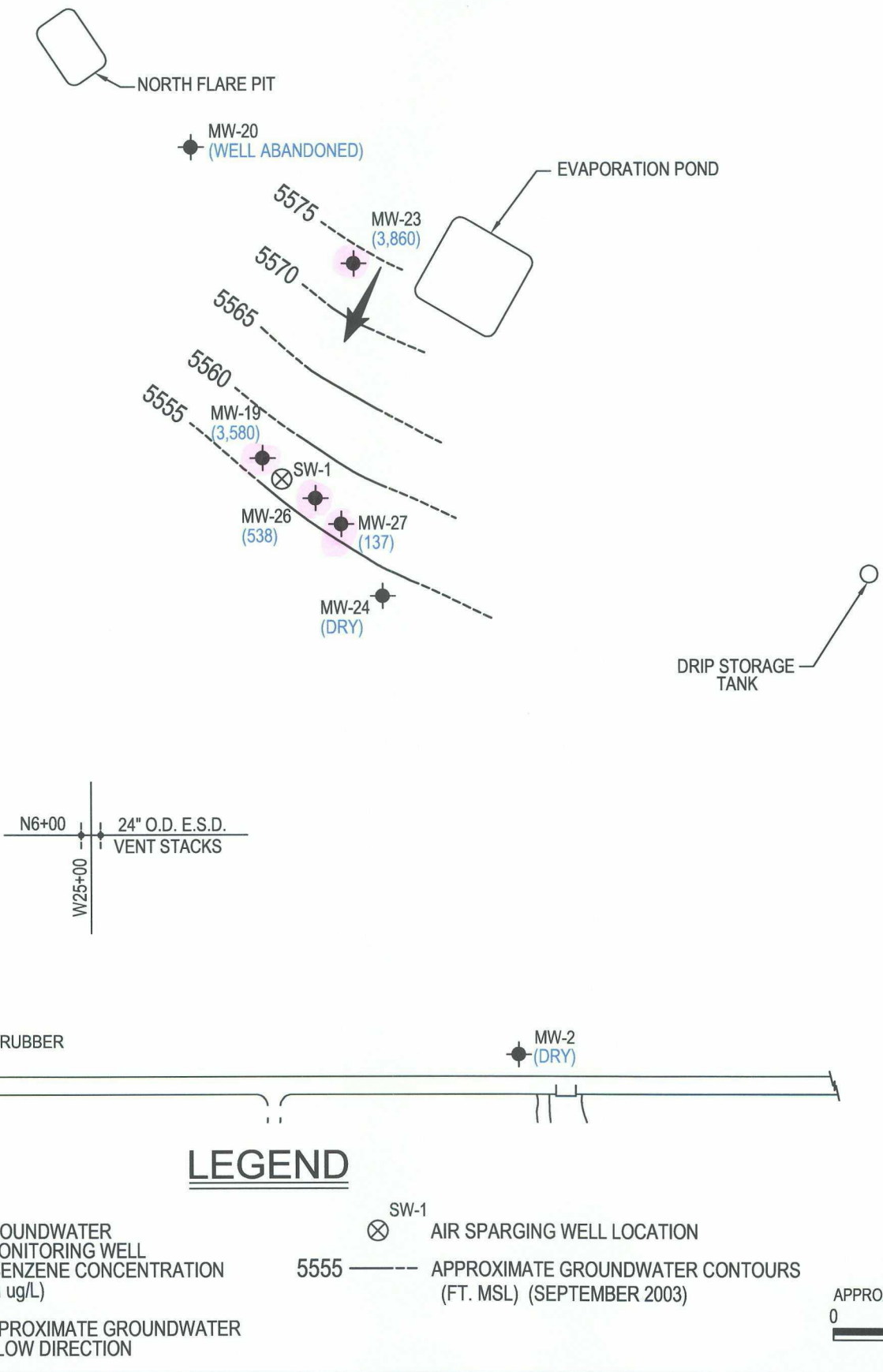
MWH

PROJECT No.: 1003803.011801
AutoCAD FILE: NFlareSpargeLoo-BENZ 8-03
SCALE: As Shown
FIGURE No: 3

elpaso

NORTH FLARE PIT

BENZENE CONCENTRATIONS IN GROUNDWATER, AUGUST 2003



REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	9/03	P.Anderson	N.Gonzalez	P.Anderson

MWH

PROJECT No.: 1003803.011801

AutoCAD FILE: NFlareSpargeLoo-BENZ 9-03

SCALE: As Shown

FIGURE No: 4

elpaso

NORTH FLARE PIT

BENZENE CONCENTRATIONS IN GROUNDWATER, SEPTEMBER 2003

Appendix A

MWH

APPENDIX A
SW-1 Geologic Borelog and Well Installation Report

Note: Information used to produce this well log obtained from AE Schmidt Environmental.

BOREHOLE NUMBER: **SW-1** SHEET 1 OF 1

BORING LOCATION: *Blanco North Flare Pit, Bloomfield, N.M.* SURFACE ELEVATION: ~5620

DRILLING COMPANY: *Envirotec* DATE/TIME STARTED: *12/16/02*

EQUIPMENT: *Hollow Stem Auger* DATE/TIME FINISHED: *12/16/02*

WATER DEPTH: *Approx. 60 ft. bgs (based on nearby wells)* LOGGED BY: *M. Nee (AESE)*

ELEV. / DEPTH	SOIL PROFILE: SOIL DESCRIPTION	USCS CLASS	GRAPHIC	WELL DESCRIPTION	WELL CONSTRUCTION
0	*GROUND SURFACE.*				4.9' / 0
5	*TOPSOIL. ORGANIC-RICH SILT AND CLAY.*	OM		5'	
20	*CLAYEY SILT. MODERATE YELLOWISH-BROWN (10YR 5/4), UNCONSOLIDATED CLAYEY-SILT WITH VERY-FINE SAND. APPROXIMATELY 30:30:40 SAND, SILT, CLAY CONTENT.*	ML		20'	
25	*SAND. MODERATE YELLOWISH-BROWN (10 YR 5/4), VERY-FINE TO MEDIUM SAND WITH MINOR SILT.*	SM		25'	
60.8	▼				60.8
66	*CLAY. CLAY WITH SILT AND VERY-FINE SAND. CLAY IS STIFF.*	CL		66'	67.5
					70.2
75.5	*SANDSTONE. LITHOLOGY CHANGE BASED ON DRILLING CONDITIONS.*	BEDROCK		75.5'	75.5
	END OF BORING @ 75.5 ft. bgs BOREHOLE LOGGED BASED ON CUTTINGS				

Note: Strong hydrocarbon odor while pulling augers from borehole.

Note: Well completed as an air sparge well. There was 0.04 feet of water in well at end of day.

LEGEND

▼ APPROXIMATE FINAL WATER LEVEL BASED ON NEARBY WELLS

WELL CONSTRUCTION DETAILS

CASING MATERIAL: *2" Diameter Schedule 40 PVC*
SCREEN MATERIAL: *2" Schedule 40 PVC, 10 Slot*
FILTER TYPE: *10x20 Silica Sand*
BENTONITE TYPE: *3/8" Bentonite Chips*
GROUT TYPE: *Portland Quickgel*
SURFACE CASING WITH CAP: *Yes* LOCK: *Yes*
LENGTH OF STICKUP: *Approx. 4.9 ft.*

CONCRETE
SAND
BENTONITE

REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	10/03	P.Anderson	N.Gonzalez	P.Anderson

MWH

PROJECT No.: 1003803.011801
AutoCAD FILE: SW-1 BORELOG
SCALE: N/A
FIGURE No:

elpaso *NORTH FLARE PIT*

SW-1, AIR SPARGE WELL

(11)

MONITORING WELL INSTALLATION RECORD

Borehole #
Well # SW-1
Page 1 of 1

AE Schmidt Environmental
906 San Juan Blvd. Ste. D
Farmington, New Mexico 87401
(505) 566-9116 FAX (505) 566-9120

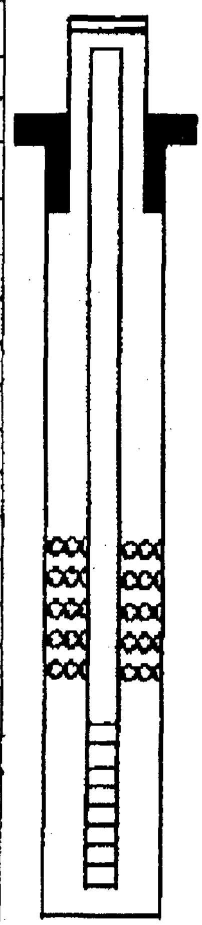
Project Name Air Sparge Well Blanco
Project Number [illegible] Cost Code
Project Location Blanco Blvd, Bloomfield

Elevation ≈ 5620
Well Location ≈10' S of MW-19 SW-1
GWL Depth ≈64' BGS @ MW-26
Installed By NEE, ASE Padilla, Envirotech
Date/Time Started 12-16-02 0907 hrs
Date/Time Completed 12-16-02 1615 hrs

12/16/02

On-Site Geologist MJN
Personnel On-Site
Contractors On-Site Envirotech K. Padilla 1 Helper
Client Personnel On-Site SP ≈ Beasley L. Valencia

Depths in Reference to Ground Surface		
Item	Material	Depth (feet)
Top of Protective Casing	NA	NA
Bottom of Protective Casing	NA	NA
Top of Permanent Borehole Casing	NA	NA
Bottom of Permanent Borehole Casing	NA	NA
Top of Concrete	NA	NA
Bottom of Concrete	NA	NA
Top of Grout	10 [illegible] Portland type [illegible]	0
Bottom of Grout	3% [illegible] gel	-40.5
Top of Well Riser	2" Diameter flush thread	+5
Bottom of Well Riser	"	-70.2
Top of Well Screen	10 slot PVC 2" diam sch 40	-70.2
Bottom of Well Screen		-75.2
Top of Peltonite Seal	10 gal 3/8 pellets, 1 bag 3/8 chips	-60.8
Bottom of Peltonite Seal		-67.5
Top of Gravel Pack	#20 silica sand	-67.5
Bottom of Gravel Pack		-75.5
Top of Natural Cave-In	[illegible]	-40.5
Bottom of Natural Cave-In	bentonite	-60.8
Top of Groundwater	Measured at end of day	-75.16
Total Depth of Borehole		-75.5



Top of Protective Casing
Top of Riser 4.9
Ground Surface 0
Top of Seal -60.8
Top of Gravel Pack -67.5
Top of Screen -70.2
Bottom of Screen -75.2
Bottom of Borehole -75.5

Comments: Well completed as an air sparge well
0.04 feet of water in well @ end of day
well has not been completed

Geologist Signature [signature]

TD = 75.5 bgs
screen: 70.2 - 75.2 bgs

(12)

RECORD OF SUBSURFACE EXPLORATION

AE Schmidt Environmental
AESE
906 San Juan Boulevard, Suite D
Farmington, New Mexico 87401
(505) 564 9128 Fax (505) 564 9120

Page 1 of 2

Project Name: Air Sparge Well, Blanco Plant
Project Number: 6200213 Phase
Project Location: Blanco Plant, Bloomfield, NM

Elevation: ≈ 5620
Borehole Location: S 10' E of MW-B SW-1
GWL Depth: ≈ 26' bgs [illegible]
Logged By: [illegible] AESE
Drilling By: R Padilla, Enviro[illegible]
Date/Time Started: 12-16-02 [illegible]
Date/Time Completed: 12-16-02 [illegible]

Well Logged By: NEB AESE
Personnel On-Site:
Contractors On-Site: R Padilla, [illegible] Enviro[illegible]
Client Personnel On-Site: S [illegible], [illegible] L. Velasde
Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID by Envirotech

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: PID BZ	BH	S	Drilling Conditions & Blow Counts
0		NA	NA	0-5 Topsoil organic rich silt and clay			NA	NA	NA	Logged on cuttings
5				5-20 Clayey Silt mod yllsh brn 10yr 5/4 unconsolidated. very fine sand increasing @ 10' 15' approximately 30%, 30%, 30% sand, silt, clay		5				
20				20-25 Sand mod yllsh brn 10 yr 5/4 very fine to medium moderately well sorted unconsolidated minor silt. Clay at 25' with silt and very fine sand. clay balling up, clay is stiff moderately well consolidated	CL	20 / 25				
40										

Comments: Borehole Logged on cuttings

Geologist Signature [signature]

1/3/03\Drilling

RECORD OF SUBSURFACE EXPLORATION

AE Schmidt Environmental
AESE
906 San Juan Boulevard, Suite D
Farmington, New Mexico 87401
(505) 566-1118 FAX (505) 566-9120

Project Name: Arch Bluff well, Blanco Plant
Project Number: ________ Phase
Project Location: Blanco Plant, Bloomfield, N.M.

12-16-02 SW-1

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: PID BZ	BH	S	Drilling Conditions & Blow Counts
40		NA	NA	Still in clay, silty	CL		NA	NA	NA	Logged on cuttings
45										
50										
55										
60										
65				Sandstone sub. Drill cuttings are still clay w/sand @ 69' bgs color change to dark grey		66				
70										
75						75.5				TD
80										
85										
90										

Comments: Sandstone encountered @ approx 66' BGS according to driller based on drilling conditions. Strong HC odor after retrieval of Augers

Geologist Signature [signature]

1/3/09\Drillog

Appendix B

MWH

APPENDIX B
AS System Operation and Monitoring Reports

Blanco North Data
December 17, 2002

	Depth to water	Depth to Product	Product Thickness	Volume removed	TD of well	Comments
MW-24	65.94		0	0.5 gal H20	67.208	Sheen HC smell water cloudy meduim gray. A density difference can be seen on top of bailer.
MW-27	63.89		0	1.5 gal H2O	69.28	Sheen water clear began with a septic odor changed to a sweet smell as water removed.
MW-26	64.36	62.97	1.39	0.75 gal H2O and 2 gal of Product	67.87	Product in well, product is a deep orange/red color, smell is similar to condensate. After well bailed dry three distint liquid layers seen, red/orange product on the top with an inch layer of black grey emulsion, with clear water on the bottom.
SP1	approximately 0.27 feet of water in well		0	NA		Product smell on probe.
MW-19	63.34		0	1.5 gal H2O	67.33	Water light grey color with a stong sulfur (rotten egg) odor.
MW-23	56.74		0	8.5 gal H2O	66.845	Water lhad a light grey color with no odor.

Blanco North Data
December 18, 2002

	Depth to water	Depth to Product	Product Thickness	Volume removed	TD of well	Comments
MW-24	66.59		0	0	67.208	No product or sheen
MW-27	63.96		0	0	69.28	Sheen water clear began with a septic odor changed to a sweet smell as water removed.
MW-26	64.36	62.97	1.39	2 1/2 gallons	67.87	Bailed 2 1/2 gallons of water a product. Water gray in color. Bailed 1 gallon of product color was copper/reddish.
SP1	79.34		0	0	80.2	Brownish color feels oily
MW-19	63.57		0	1/2 gallon	67.33	No product or sheen sweet smell
MW-23	56.24		0	0	66.845	No product

AESE
906 San Juan Blvd., Suite D,
Farmington, NM 87401
(505) 566-9116

Memo

To: Marc Greeley, Lynn Benally

From: Martin Nee

CC: File

Date: 2/3/03

Re: Blanco North

1/22/03, AESE visited Blanco North to prepare a one-day pilot test to investigate communication between the newly installed sparge well and surrounding monitoring wells MW-26, 27, and 19. Well casing sizes were verified and the distance from the compressor house to the wells was measured. We looked at the existing compressor as a source of sparge air. The existing compressor is not an oil-less model and it has been drained of oil and tagged out-of-service.

A 30A 240V receptacle will need to be installed to run the oil-less compressor.

Static water in the sparge well was 68.465 feet beneath top of casing and total depth 80.18. No product was present.

1/24/03 AESE contacted David Nichols and delivered a key to the compressor shed to him at Blanco so he could wire the compressor for a pilot test at the new sparge well. AESE also placed the sparge compressor in the shed.

1/31/03 Traveled to Jaquez to pick up magnehelic gauges for pilot test at Blanco. Dropped off magnehelic gauges and checked to make sure compressor was operational. Also purchased hardware for pilot test.

2/3/03 1130 hrs, arrived at site to conduct limited pilot test. Objective is to determine if communication can be established between SW-1(sparge well 1) and nearby monitoring wells MW- 19, 27, and 26. Compressor was plumbed to SW-1 and preparations made for pilot test.

1257 hrs, water levels were measured as follows

MW-19 63.64 feet beneath top of well casing (fbtoc)

10/09/03

MW-26 64.55 water, 63.02 product fbtoc

MW-27 64.05 fbtoc

SW-1 68.396 fbtoc.

Water was bailed from SW-1 so the compressor would not have to push the water in the well into the formation. Approximately 3.0 gallons of water were removed. Final water level measurement indicated a depth of water at 76.80 fbtoc, td is 80.18 fbtoc.

The compressor was started at 1345 hrs and a flow rate of 12 scfm was measured while vented to the atmosphere. Flow was directed to SW-1 and the flow rate dropped to 5 scfm and remained constant throughout the test.

Pressure readings from monitoring wells were recorded as follows:

1350 hrs	MW-19	0.75 inches H_2O
1354 hrs	MW-26	1.25 inches H_2O
1358 hrs	MW-27	0.01 inches H_2O
1442 hrs	MW-27	0.02 inches H_2O
1444 hrs	MW-26	5.5 inches H_2O strong hydrocarbon vapors from well
1446 hrs	MW-19	3.8 inches H_2O
1500 hrs	Ended test	

Conclusion

Good communication between SW-1, MW-26 and MW-19.

AESE
906 San Juan Blvd., Suite D,
Farmington, NM 87401
(505) 566-9116

Memo

To: Marc Greeley, Lynn Benally

From: Martin Nee

CC: File

Date: 2/7/03

Re: Blanco North 2/6/03 pilot

1145 hrs, water levels were measured as follows

MW-19 63.61 feet beneath top of well casing (fbtoc)

MW-26 64.31 water, 62.98 product fbtoc

MW-27 64.06 fbtoc

SW-1 75.725 fbtoc.

1208 hrs

The compressor was started and a flow rate of 11 scfm was measured while vented to the atmosphere. Flow was directed to SW-1 and the flow rate dropped to 5 scfm and remained constant throughout the test.

1238 hrs

MW-19	62.56 fbtoc	
MW-26	64.23 fbtoc water	62.65 fbtoc product
MW-27	64.055 fbtoc	

1248 hrs turned off sparge and checked water levels

MW-19	62.55 fbtoc	
MW-26	64.17 fbtoc water	62.56 fbtoc product
MW-27	64.09 fbtoc	
SW-1	76.87 fbtoc	

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Lynn Benally

From: Martin Nee

CC: File

Date: May 2, 2003

Re: Blanco North

4/17/03	Moved meter house from SJRP to Blanco. Moved Overpac from Jaquez to Blanco. Picked up system from EP lab and Delivered to Blanco. Prepared to install system.
4/22/03	Met with electrician and discussed site wiring. Inventoried Xitech equipment and reviewed installation procedures. Mounted timer in meter house and installed shutoff and overflow controller in drum. Made equipment and materials list to complete installation. Depth to product from TOC 63.20 ', Depth to water from TOC 65.18 '
4/23/03	Picked up nitrogen bottle. Installed anchor post to secure nitrogen bottle. Attached air and product lines to pump and installed pump. Installed nitrogen bottle. Attached gas lines from tank to timer and from timer to pump. Installed product line from pump to tank. Set system to operate 3 cycles per day 3 minutes per cycle. Ran pump through three cycles. Initial cycle pumped product and water. The two following cycles pumped only product. Center of pump is set at the product/water interface approximately 65.18' BTOC. pressure to pump is set at 65 psi and the tank has 2400 psi.
4/24/03	System had not pumped because the timer was set to pump one cycle per day and a day had not passed. Reset the timer to pump 3 cycles per day. Measured water levels at MW-25 64.27', SW-1 67.58', MW-19 63.71' . All measurements are from top of casing. 0.04' of product have been recovered in drum. TD of 55 gallon plastic drum is 2.7' Therefore there is 20.37 g/ft. We recovered approximately .81 gallons of product.
4/25/03	Site visit revealed water in product lines. Called Xitech and discussed the water being pumped. Following discussion, the pump height was raised one foot and the pump cycled manually. The pump still pumped some water with the product. Following further discussion with Xitech the pump was pulled and the float and product tube inspected. A shipping retainer clip was removed from the pump float and the pump was reinstalled. The pump was cycled and pumped air only indicating the absence of product.
4/28/03	System operating. Can see product in lines. The depth to product in the drum is 2.57 feet beneath the top of the drum. The pump pressure is set at 65 psi and the tank pressure is at 2400 psi. The pump operated 28 minutes since the last visit and is set to run 3cycles per day at 3 minutes per cycle.
5/2/03	System operating. Can see product in lines. The product thickness in the drum is 0.08 feet, (2.63 - 2.55) feet beneath the top of the drum. There are approximately 20.37 gallons per foot of drum. Therefore, we have pumped approximately 1.63 gallons of product. The pump pressure is set at 65 psi and the tank pressure is at 2200 psi. The pump operated 34 minutes since the last visit. I cycled pump manually and it pumped only air, which indicates there is not product in the well at this time. I do not know when the last time the pump ran. I reset the timer to pump one 5 minute cycle per day and recommend that the pump is pulled soon and the well allowed to recover overnight and the pump reset.

Site Visit

Martin J. Nee
PO Box 3861
Farmington, NM 87499-3861
(505)334-2791 (505)320-9675cell

Project Name_	**San Juan Basin Ground Water**	**Project No.**	**30001.0**
Project Manager	**MJN**		
Client Company	**MWH**	**Date**	**5/6/03**
Site Name	**Blanco**		

Well	Time	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Volume Removed
MW-26	**1017**	**64.95**	**94.97**	**0.03**	**0**
.					

Comments

No product has been pumped since last visit. Pulled pump to check product thicknees. There is only 3 hundredths of a foot in the well. Replaced pump and cycled manually. Product in the line did not move. The pump should have at least pumped air. Checked manual and everything checked out. Called Xitech and tried pumping at a higher pressure. Still no movement of the product in the lines. Xitech stated there is a problem in the logic valve in the pump head and will have to send pump back. Xitech will ship out pump same day they receive it. MWH LB approved returning pump. Shipped pump to Xitech. Tank pressure at 2100 psi. Pump pressure at 65 psi. System is shut in.

Martin J. Nee Date: May 6, 2003

Signature: _____ _____

J:\2450162-El Paso\New Mexico\Blanco Flare Pits\2003 North Flare Pit\Blanco site visit 5-6-03.doc

Site Visit

Martin J. Nee
PO Box 3861
Farmington, NM 87499-3861
(505)334-2791 (505)320-9675cell

Project Name_	**San Juan Basin Ground Water**	**Project No.**	**30001.0**
Project Manager	**MJN**		
Client Company	**MWH**	**Date**	**5/12/03**
Site Name	**Blanco**		

Well	Time	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Volume Removed
MW-26	**1318**	**63.54**	**63.90**	**.36**	**.23**

Comments

Received pump from xitech and installed at MW-26. Measured water level. There is .23 gallons of product in the well. Measured the distance from the top of casing to the center of pump 63.9 feet. Installed pump and cycled. The system pumped product. Set the timer to cycle once perday for 5 minutes. Pump pressure is at 65 psi and the tank pressure read 2200 psi.

Signature: Martin J. Nee Date: May 12, 2003

Memo

To: Pam Anderson, Lynn Benally
From: Martin Nee
CC: File
Date: June 5, 2003
Re: Blanco North

5/16/03	Pump set at 65 psi, tank at 2000 psi. 15 minutes of pumping had elapsed since last visit. Depth to product in drum is 2.54 beneath top of drum. Reset timer and cycled pump and it pumped product until froth came out. Did not appear to pump much product maybe a couple of ounces.
5/19/03	Pump set at 65 psi, tank at slightly less than 2000 psi. 20 minutes of pumping had elapsed since last visit. Depth to product in drum is 2.54 beneath top of drum. Reset timer and cycled pump and it pumped product until froth. System looks good.
5/23/03	Pump set at 65 psi, tank at 1950 psi. 26 minutes of pumping had elapsed since last visit. Depth to product in drum is 2.53 beneath top of drum. Reset timer and cycled pump and it pumped product until froth. System looks good.
5/27/03	Pump set at 65 psi, tank at 1900 psi. 20 minutes of pumping had elapsed since last visit. Depth to product in drum is 2.525 beneath top of drum. Reset timer. System looks good. Collected water level data.
6/2/03	Sample MW-24, MW-27, MW-19, MW-23, MW-8, attempted to sample MW-5 but it did not recover.
6/3/03	Sampled MW-14, MW-12, MW-13, MW-15, MW-29, MW-6, MW-30, MW-28
6/5/03	'0730 hrs arrived at site and installed pressure gauge and tested. Did not work. Shoveled dirt from inside compressor building. Water level in sparge well is 67.83' BTOC. TD is 80.25. 0800 hrs; STP, LB, and PA arrive at site. Toured site. Cycled product pump. Appeared all product pumped. Pulled product pump and verified no product in well. Bailed approximately 2.5 gallons water from sparge well. 0930 hrs; started sparge well. Flow to atmosphere is 12 scfm. Directed air to well. Flow dropped to 5 scfm. Consensus is to check system this afternoon, put air hose through building, tape all fittings, and return this afternoon for water levels and pressure readings at wells. 1030 -1100 hrs; leave site and pick up drill for air hose.. 1400 hrs; traveled to Jaquez and pick up magnehelic gauges and return to site. 1501 hrs; DTW MW-23 57.03', 0.0 " H2O, DTW MW-24 66.96', 0.0 " H2O, DTW MW-27 64.48', 0.004 " H2O, DTW MW-19 62.42', 4.5 " H2O with very strong vapors in well vault when opened. High winds made low-pressure readings at distant wells almost impossible. Flow at SW-1 is 6 scfm. Shut down system and installed hose through wall, taped fittings, and installed new pressure gauge. Tested gauge. System pressure at approximately 20 psi needle on gauge vibrates severely. May have to buy oil filled pressure gauge. Set timer on sparge system to start at 0000 hrs and turn off at 1200 hrs daily. Will conduct site visit June 6 am. Product recovery tank pressure at 1750 psi, pump pressure at 65 psi. Depth to product beneath top of drum (BTOD) is 2.505 '. 35 minutes of pump time had elapsed since last visit. Reset counter on timer. 1700 hrs leave site.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: June 6, 2003

Re: Blanco North

6/6/03 0730 hrs, arrived at site. Flow is at 7 scfm. System pressure is at 32 psi. Water levels and well pressures were as follows; DTW MW-23 57.14', 0.0 " H2O, DTW MW-24 66.97', 0.0 " H2O, DTW MW-27 64.44', 0.00 " H2O, DTW MW-19 62.34', 5.8 " H2O with very strong vapors in well vault when opened. Product recovery system: Tank pressure is1650 psi and pump pressure is 65 psi. System cycled at 0827 hrs and pumped all product off. Product was measured in the drum at 2.50 feet beneath top of drum. Product was measured at 2.505 BTOD on 6/5/03 indicating 0.005 feet of additional product in the drum. This is approximately 12 ounces.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: June 9, 2003

Re: Blanco North

6/9/03 0928 hrs, arrived at site. Flow is at 7.5 scfm. System pressure is at 82 psi. Water levels and well pressures were as follows;

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.03	7.13	17.8	>20,000	1.85	0.0
MW-24	66.805	6.98	21.0	16,910	1.51	0.09
MW-27	64.41	7.01	20.2	14,770	0.88	0.07
MW-19	62.31	7.30	20.4	>20,000	1.60	6.1

Product Recovery

Depth to product in drum is 2.50 feet beneath top of drum, the same measurement as on 6/6. Pump time since 6/6 was 15 minutes. Pump pressure is set at 65 psi. Tank Pressure is 1,650 psi. Cycled pump and no product was produced.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: June 16, 2003

Re: Blanco North

6/16/03 1000 hrs, arrived at site. Flow is at 7.5 scfm. The pressure gauge on the compressor is broken due to vibration of compressor. It needs to be replaced with a more expensive liquid filled gauge. Water levels and well pressures were as follows;

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.085	7.14	18.7	>20,000	1.89	0.0
MW-24	66.74	6.94	20.0	14,020	1.34	0.1
MW-27	64.46	7.03	19.4	13,520	0.80	0.07
MW-19	62.47	7.53	20.9	>20,000	1.54	6.0

Product Recovery

Depth to product in drum is 2.48 feet beneath top of drum, an increase of .02 feet of product since 6/9. This is approximately equal to 0.41 gallons at 20.37 gallons per foot. Pump time since 6/9 was 31 minutes. Pump pressure is set at 65 psi. Tank Pressure is 1,575 psi. Cycled pump and no product was produced.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: June 23, 2003

Re: Blanco North

6/23/03 0945 hrs, arrived at site. Flow is at 7.5 scfm. The pressure gauge on the compressor remains broken. It needs to be replaced with a more expensive liquid filled gauge following MWH approval. Water levels and well pressures were as follows;

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	56.99	7.08	19.4	>20,000	0.94	0.0
MW-24	66.71	6.93	20.0	7,390	1.54	0.09
MW-27	64.445	6.50	18.9	6,770	1.44	0.05
MW-19	62.31	6.99	20.1	>20,000	2.72	6.15

Product Recovery

Depth to product in drum is still 2.48 feet beneath top of drum, there was no increase since last week. Pump time since 6/16 was 31 minutes. Pump pressure is set at 65 psi. Tank Pressure is 1,400 psi. Cycled pump and no product was produced.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: July 2, 2003

Re: Blanco North

7/1/03 1045 arrived at site. The meter house for the nitrogen tank and product pump controller has been up-ended by the wind. Lynn will come out and help upright it on 7-2.

7/2/03 0754 hrs. arrived at site and installed the new pressure gauge. System pressure is 16 psi. The previous pressure reading of 82 psi on June 9 may have been due to the defective gauge.

Reset the meter house and reconnected the nitrogen. The wiring to the controller was torn from the conduit when the meter house tipped over so the product recovery system is not operating. Contacted David Nichols at El Paso to repair the wiring. He will try to get to it this week Turned the electricity to the product recovery system off and staked down the meter house. The membrane in the DO meter is broken and no measurements could be collected. The membrane will be replaced this week.

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.06	6.45	19.9	>20,000		0.0
MW-24	66.68	6.33	22.6	7320		0.1
MW-27	64.50	6.65	21.4	6710		0.1
MW-19	62.75	7.36	21.9	>20,000		7.4

Product Recovery

Depth to product in drum is still 2.48 feet beneath top of drum, there was no increase since last week. Pump time since 6-23 was 36 minutes. Pump pressure is set at 65 psi. Tank Pressure is 1,400 psi. Will check product thickness in MW-26 before restarting the system.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: July 10, 2003

Re: Blanco North

7/10/03 0634 hrs. The wiring has not been repaired yet so I pulled the product pump from MW-26 and collected monitoring data. Surprisingly there was no product on the well!

I have left the pump out so we could record a good static reading next week. Today's data is as follows:

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.08	6.54	15.9	>20,000	0.94	0.0
MW-24	66.68	6.46	16.5	6380	1.50	.02
MW-27	64.50	6.60	16.6	6090	1.17	.04
MW-19	62.45	7.34	18.7	>20,000	2.98	5.2
MW-26	65.38*	7.80	17.9	10330	4.44	>10

No Product Recovery - System has been down.

*Pump had been pulled – water level may not be static.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: July 15, 2003

Re: Blanco North

7/15/03 0902 hrs. O&M site visit. The product recovery pump wiring has not been repaired but it may not be necessary as there was no product found in MW-26 today

Well	Depth to Water from TOC Feet	pH	Temp F	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.075	6.47	19.5	>20,000	0.75	0.0
MW-24	66.81	6.42	22.2	6710	2.09	.04
MW-27	64.735	6.59	20.3	6910	0.96	.07
MW-19	62.75	7.03	21.6	>20,000	1.29	6.1
MW-26	64.35	7.87	19.1	12050	6.89	>10

No Product Recovery

System pressure was at 16 psi. System flow was 8 scfm. Everything looks good.

J:\2450162-El Paso\New Mexico\Blanco Flare Pits\2003 North Flare Pit\O&M Reports\Blanco North 7-15-03.doc

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: July 29, 2003

Re: Blanco North

7/29/03 0738 hrs. O&M site visit. MW-26 remains product free.

Well	Depth to Water from TOC Feet	pH	Temp C	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.06	7.16	17.5	>20,000	0.64	0.0
MW-24	66.83	6.67	18.1	6470	1.55	.09
MW-27	64.68	6.80	18.2	6100	0.94	.05
MW-19	62.705	7.10	19.9	>20,000	1.41	6.6
MW-26	64.46	7.79	17.5	17240	6.16	>10

No Product Recovery

System pressure was at 16 psi. System flow was 8 scfm. Everything looks good.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson, Lynn Benally

From: Martin Nee

CC: File

Date: August 7, 2003

Re: Blanco North

8/7/03 0745 hrs. O&M site visit. MW-26 remains product free.

Well	Depth to Water from TOC Feet	pH	Temp C	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.13	6.78	18.3	>20,000	1.42	0.0
MW-24	67.09	6.69	21.7	8460	na	0.0
MW-27	64.75	6.73	20.9	6990	1.00	0.0
MW-19	65.00	6.80	21.2	>20,000	0.60	0.0
MW-26	65.26	7.15	19.3	12940	0.49	0.0

No Product Recovery. System has been off since before groundwater sampling.

0943 Started the air sparge system. System pressure rose to 42 psi. Probably high because the sparge well had water in it and it had to be pushed out into the aquifer. Flow was at 5 scfm. There was only 0.1 feet of water in MW-24 and I was able to recover 3oz, not enough to sample for DO.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson

From: Martin Nee

CC: File

Date: August 21, 2003

Re: Blanco North

8/21/03 0745 hrs. O&M site visit. MW-26 remains product free.

Well	Depth to Water from TOC Feet	pH	Temp C	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.115	6.83	21.3	>20,000	1.11	0.0
MW-24	67.09					0.07
MW-27	64.78	6.81	23.7	7040	0.59	0.055
MW-19	64.84	7.09	25.1	>20,000	0.91	3.6
MW-26	64.585	7.63	21.9	13460	2.23	6.8

No Product Recovery. System has been off since before groundwater sampling. No product in MW-26.

0943 System operating at 8 scfm and 14 psi.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson

From: Martin Nee

CC: File

Date: September 10, 2003

Re: Blanco North

9/10/03 0847hrs. O&M site visit. MW-26 remains product free.

Well	Depth to Water from TOC Feet	pH	Temp C	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.04	6.90	21.2	>20,000	0.64	0.0
MW-24	67.08					0.03
MW-27	64.81	6.57	23.1	6990	0.86	0.9
MW-19	64.79	7.06	21.6	>20,000	1.10	6.4
MW-26	64.55	7.27	21.1	15920	2.02	<10

No Product Recovery. System has been off since before groundwater sampling. No product in MW-26. The site received approximately 1" of rain on 9/9/03. The system was off September 1 through September 9, 2003. It cycled one time before this O&M.

1120 System operating at 6.5 scfm and 16 psi.

Martin Nee
PO Box 3861
Farmington, NM 87401-3861
(505) 334-2791
mjn@martinnee.com

Memo

To: Pam Anderson

From: Martin Nee

CC: File

Date: September 25, 2003

Re: Blanco North

9/25/03 0917 hrs. O&M site visit. MW-26 remains product free.

Well	Depth to Water from TOC Feet	pH	Temp C	Conductivity umhos/cm	Do mg/L	Pressure Inches Water
MW-23	57.12	6.99	18.5	>20,000	1.12	0.0
MW-24	67.07	6.71	18.1	5870	1.71	0.06
MW-27	64.885	6.91	19.0	7030	1.01	0.04
MW-19	63.95	6.97	19.3	>20,000	1.10	3.1
MW-26	64.55	7.34	20.1	13920	0.50	3.9

Pressures appears lower than usual at MW-19 & 26. The system timer was at 3:30 AM which means the power had been off at some time and the system was only running for 3.5 hrs before O&M.

System operating at 8.0 scfm and 15 psi.

Appendix C

MWH

APPENDIX C
Groundwater Analytical Data Reports

Groundwater Monitoring Field Data Reports

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-19 Development ☐ Sampling ☒

Project Manager MJN Date 6-2-03 Start Time 1003 Weather 80s Sunny

Depth to Water 63.77 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 353 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Sabilization of Indicator Parameters ☒ Other or building

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
3.53 x 10	.56 x 3		1.96 G / 216 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
	6.83	>20K	21.6				24	clear
	6.81	18540	19.8				48	HC odor
1021	6.78	18530	18.2				78	
	6.89	>20K	18.8				102	water is grey
	6.82	>20K	18.9				118	
	6.85	18820	18.9				128	almost dry
1038	6.89	>20K	19.2				134	wells dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1038	6.89	>20K	19.2					134	

COMMENTS:

INSTRUMENTATION: pH Meter ☒ ____ Temperature Meter ☒ ____

DO Monitor ☐ ____ Other ☐ ____

Conductivity Meter ☒ ____

Water Disposal Kutz

Sample ID Blanco MW-19 Sample Time 1419 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ____ ☐ ____ ☐ ____ ☐ ____ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB 020603BD

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-23 Development ☐ Sampling ☒

Project Manager MJN Date 6-2-03 Start Time 1048 Weather 80s Sunny Windy

Depth to Water 57.01 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 9.84 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☐ Sabilization of Indicator Parameters ☒ Other on bailing

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
9.84 x 0.65	6.4 x 3		19.9

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1058	7.03	>20K	21.4				1	water is gray & cloudy
	6.94	>20K	20.8				2	
	6.90	19,350	19.1				3	turned to dark gray
	7.13	>20K	19.5				8	well is almost dry
1130	7.24	>20K	19.9				85	light gray well is dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1130	7.24	>20K	19.9					85	

COMMENTS: _____

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal Kutz

Sample ID Blanco MW-23 Sample Time 1431 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB 020603TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 300210 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-24 Development ☐ Sampling ☑

Project Manager MTN Date 6.2.03 Start Time 0800 Weather 80s

Depth to Water 66.40 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 0.81 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☑ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☑ Sabilization of Indicator Parameters ☒ Other on bailing

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
0.81 x .65	.53x3		1.58G (202 oz)

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. ~~(gal.)~~ oz	Comments/ Flow rate
	6.88	3380	16.5				16	Very Very dark grey
	6.93	3960	19.2				28	Strong HC/Benz.
	6.93	4056	19.3				40	odor
0846	7.02	4120	20.5				70	well is dry
								well is dry no water
								to sample will
								return later in day

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0846	7.02	4120	20.5					70oz	See below

COMMENTS: Returned @ 1342 hrs to collect sample. The well was still dry No sample.

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal Lutz

Sample ID Na Sample Time Na BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB _____

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001-0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-27 Development ☐ Sampling ☒

Project Manager MTN Date 6-2-03 Start Time 0900 Weather 80s Sunny

Depth to Water 64.41 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 4.78 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Sabilization of Indicator Parameters ☒ Other or bail dry

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
4.87 x .16	.789 x 3	99 x 3	297 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
0904	7.17	4500	17.5				32	milky
	7.12	6050	19.0				84	strong HC odor
	7.11	6270	18.6				118	milky
0918	7.05	6850	18.4				152	
	7.13	7250	18.3				180	well is boiling down
	7.17	6960	18.4				204	
	7.20	6410	18.5				219	
	7.26	6270	18.4				231	
0935	7.27	6290	18.6				239	well has boiled dry well return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0935	7.27	6290	18.6					239	

COMMENTS: Appeared to be oil on water level probe. There was none in bailer.

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal Kate

Sample ID Blanco MW-27 Sample Time 1353 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB 020603TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: Bloomfield NFP Client: MWH

Location: BNFP Well No: MW-27 Development ☐ Sampling ☒

Project Manager MJN Date 8/4/03 Start Time [illegible] Weather 80s clear

Depth to Water 6.372 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 5.56 Well Dia. 2

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Sabilization of Indicator Parameters ☒ Other ~~or~~ bail dry

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
5.56 x .16	.89 x 3		2.67 g 342 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
0902	6.67	6280	192				30	clear HC odor
	6.64	6990	190				64	
	6.68	7030	190				98	
	6.70	7410	196				156	grey ml/kg
0917	6.73	7300	193				180	
	6.76	7200	193				196	well is bailing down
	6.82	7170	193				204	
0925	6.91	7310	195				208	well has bailed dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0925	6.91	7310	195				0	208	

COMMENTS: No preservation due to Rxn of HCl & groundwater

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal RUTZ

Sample ID BNFP MW-27 Sample Time 0930 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB 040803TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: BlancoNFP Client: MWH

Location: BNFP Well No: MW-24 Development ☐ Sampling ☒

Project Manager MJN Date 8/4/03 Start Time 0825 Weather 80s

Depth to Water 66.91 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 0.3 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☐ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☐ Sabilization of Indicator Parameters ☐ Other _____

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
.37 x .65	.2 x 3		.59 / 74.88 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. ~~(gal.)~~ OZ	Comments/ Flow rate
0833	6.56	6000	22.1				8	grey w/ black flocks
	6.56	5560	19.7				14	
0840	6.61	5250	19.2				20	
0843	6.65	5450	18.8				25	well is dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0843	6.65	5450	18.8					25oz	

COMMENTS: Well did not recover in approx 5 hrs

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal Kutz

Sample ID BNFP MW-24 Sample Time NA BTEX ☐ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB _____

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: Blanco NFP Client: MWH

Location: BNFP Well No: MW-19 Development ☐ Sampling ☒

Project Manager MTN Date 8-4-03 Start Time 0954 Weather 80s

Depth to Water 62.75 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 4.55 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Sabilization of Indicator Parameters ☒ Other 2x bail dry

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
4.55 x .16	.73 x 3		2-18

Time (military)	~~pH~~ SC	~~sc~~ pH (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1001	>20,000	7.09	21.8				36	
1006	>20000	6.98	21.4				42	
	>20000	6.86	21.3				50	grey HC odor
	>20000	6.82	21.2				64	
1036	>20000	6.84	21.4				76	
1041	>20000	6.88	21.4				84	
	>20000	6.84	21.1				90	well has bailed dry
1045	>20000	6.94	21.5				96	will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1045	6.94	>20000	21.5					96	

COMMENTS: No preservative do to RXN of HCL w/ ground water

INSTRUMENTATION: pH Meter ☒ ____ Temperature Meter ☒ ____

DO Monitor ☐ ____ Other ☐ ____

Conductivity Meter ☒ ____

Water Disposal Kurtz

Sample ID BNFP MW-19 Sample Time 1307 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ____ ☐ ____ ☐ ____ ☐ ____ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB 040803TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: Bloomfield NEP Client: MWH

Location: Bloomfield NEP Well No: MW-23 Development ☐ Sampling ☒

Project Manager MJN Date 10/5/2 Start Time _____ Weather 90s clear

Depth to Water 52.06 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 9.79 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Sabilization of Indicator Parameters ☒ Other orbisldy

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
9.79 x .65	6.36 x 3		19.09 229.04

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1101	6.71	>20K	21.5				2	clear gray
	6.66	>20,000	20.3				4	
	6.69	>20,000	19.8				6	
1119	6.73	>20,000	20.1				8.8	well is bailing down
1134	7.23	>20,000	20.4				9.8	well has bailed dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1134	7.23	>20,000	20.4					9.8	

COMMENTS: No preservative heavy fizzing due to RXN HCL & groundwater

INSTRUMENTATION: pH Meter ☒ _____ Temperature Meter ☒ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☒ _____

Water Disposal Kutz

Sample ID BNFP MW-23 Sample Time 1150 BTEX ☒ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB 040803TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: Blanco NEP Client: MWH

Location: BNEP Well No: MW-26 Development ☐ Sampling ☑

Project Manager MJN Date 8-4-03 Start Time 1100 Weather 90s

Depth to Water 65.19 Depth to Product ____ Product Thickness ____ Measuring Point ____

Water Column Height 2.48 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☐ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☐ Sabilization of Indicator Parameters ☐ Other ____

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
2.48 x .65			

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1205	7.34	13300	22.2				104	1st bailer clear at top grey @ bottom
	7.46	13810	20.8				130	grey
	7.63	14140	20.9				142	grey opaque
	7.56	13140	21.3				150	well is bailing down
1230	7.59	13180	21.4				154	well has bailed dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1230	7.59	13180	21.4					154	

COMMENTS: well did not recover No sample collected

INSTRUMENTATION: pH Meter ☒ ____ Temperature Meter ☒ ____

DO Monitor ☐ ____ Other ☐ ____

Conductivity Meter ☒ ____

Water Disposal Kutz

Sample ID BNEP MW-26 Sample Time N? BTEX ☐ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ____ ☐ ____ ☐ ____ ☐ ____ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB ____

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: 30001.0 Project Name: Blanco NFP Client: MWH/EL Paso

Location: Blanco NFP Well No: MW-27 Development **Sampling**

Project Manager MJN Date 9/3/03 Start Time 1003 Weather Cloudy 70s

Depth to Water 64.80 Depth to Product na Product Thickness na Measuring Point TOC

Water Column Height 4.48 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer x Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal **X** stabilization of Indicator Parameters **X** Other or bail dry

Water Volume in Well			
Gal/ft x ft of water	Gallons	Ounces	Gal/**oz** to be removed
4.48 x .16	0.72 x 3	91.75 x 3	275.00

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (ounces)	Comments/ Flow rate
012	**6.86**	**6640**	**20.7**				**32**	**trace product**
	6.70	**6540**	**20.3**				**64**	**HC odor, clear**
	6.71	**7170**	**19.7**				**93**	**Gray, strong HC odor**
	6.76	**6990**	**19.4**				**108**	
027	**6.78**	**7030**	**19.4**				**136**	
037	**7.01**	**6830**	**19.5**				**174**	**Well is dry**

Final: Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow Rate
1037	**7.01**	**6830**	**19.5**					**174**	**Well is dry**

COMMENTS: Well bailed dry, returned to sample 1.5 hrs later.

INSTRUMENTATION: pH Meter **X** _____ Temperature Meter **x**

DO Monitor _____ Other _____

Conductivity Meter **X** _____

Water Disposal Kutz Sample ID Blanco NFP MW-27 Sample Time 1201

BTEX VOCs Alkalinity TDS Cations Anions Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus

MS/MSD _____ BD _____ BD Name/Time _____ TB 030903tb01

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: 30001.0 Project Name: Blanco NFP Client: MWH/EL Paso

Location: Blanco NFP Well No: MW-26 Development **Sampling**

Project Manager MJN Date 9/3/03 Start Time 0821 Weather Cloudy 70s

Depth to Water 65.00 Depth to Product na Product Thickness na Measuring Point TOC

Water Column Height 2.67 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer x Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal **X** stabilization of Indicator Parameters **X** Other or bail dry

Gal/ft x ft of water	Water Volume in Well		**Gal**/oz to be removed
	Gallons	Ounces	
2.67 x .65	1.74 x 3		5.21

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
0826	7.36	10140	20.3				0.44	top bailer clear bottom grey
	7.46	10230	19.4				0.80	grey, sheen, old hc odor
	7.43	10890	18.9				1.05	as above
	7.42	9910	18.8				1.21	
	7.49	10330	18.8				1.34	
0845	7.53	10240	18.8				1.45	
	7.51	10190	18.8				1.67	
	7.51	10220	18.8				1.69	
	7.53	10010	18.8				1.71	
0849	7.49	10220	18.8				1.80	well is dry

Final: Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow Rate
0849	7.49	10220	18.8					1.80	well is dry

COMMENTS: Well bailed dry, returned to sample 4hrs later and well had not recovered enough. Collected sample 9/4/03

INSTRUMENTATION: pH Meter **X** _____ Temperature Meter **x**

DO Monitor _____ Other _____

Conductivity Meter **X** _____

Water Disposal Kutz Sample ID Blanco NFP MW-26 Sample Time 0750 9/4/03

BTEX VOCs Alkalinity TDS Cations Anions Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus

MS/MSD _____ BD _____ BD Name/Time _____ TB 030903tb01

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: 30001.0 Project Name: Blanco NFP Client: MWH/EL Paso

Location: Blanco NFP Well No: MW-19 Development **Sampling**

Project Manager MJN Date 9/3/03 Start Time 0902 Weather Cloudy 70s

Depth to Water 65.06 Depth to Product na Product Thickness na Measuring Point TOC

Water Column Height 2.24 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer x Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal **X** stabilization of Indicator Parameters **X** Other or bail dry

	Water Volume in Well		
Gal/ft x ft of water	Gallons	Ounces	Gal/**oz** to be removed
2.24 x .16	1.74 x 3	45.88 x 3	137.63

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (ounces)	Comments/ Flow rate
0933	**6.90**	**17760**	**22.1**				**28**	**gray, old HC odor**
	6.99	**17620**	**21.4**				**42**	**gray, slight sheen**
	6.95	**17040**	**21.1**				**50**	**gray**
	6.95	**17640**	**21.1**				**58**	
0947	**6.94**	**17530**	**20.9**				**64**	
	6.96	**17490**	**20.5**				**68**	**gray, slight HC odor**
0952	**7.01**	**17280**	**20.7**				**70**	**well has bailed dry**

Final: Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow Rate
0952	**7.01**	**17280**	**20.7**					**70**	**well has bailed dry**

COMMENTS: Well bailed dry, returned to sample 2hrs later.

INSTRUMENTATION: pH Meter **X** _____ Temperature Meter **x**

DO Monitor _____ Other _____

Conductivity Meter **X** _____

Water Disposal Kutz Sample ID Blanco NFP MW-19 Sample Time 1145

BTEX VOCs Alkalinity TDS Cations Anions Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus

MS/MSD _____ BD _____ BD Name/Time _____ TB 030903tb01

WELL DEVELOPMENT AND SAMPLING LOG

Project No.: 30001.0 Project Name: Blanco NFP Client: MWH/EL Paso

Location: Blanco NFP Well No: MW-23 Development **Sampling**

Project Manager MJN Date 9/3/03 Start Time 1052 Weather Cloudy 70s

Depth to Water 57.11 Depth to Product na Product Thickness na Measuring Point TOC

Water Column Height 9.74 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer x Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal **X** stabilization of Indicator Parameters **X** Other or bail dry

	Water Volume in Well		
Gal/ft x ft of water	Gallons	Ounces	**Gal**/oz to be removed
9.74 x .65	6.33 x 3		18.99

Time (military)	pH (su)	SC (umhos/cm)	Temp (°C)	ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gallons)	Comments/ Flow rate
059	**6.82**	**>20,000**	**19.2**				**1**	**Clear**
	6.85	**>20,000**	**19.8**				**4**	**Gray**
120	**6.89**	**>20,000**	**19.2**				**7.69**	**Well is bailing down**
130	**7.08**	**>20,000**	**19.2**				**8.47**	**Well has bailed down**

Final: Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow Rate
1130	**7.08**	**>20,000**	**19.2**					**8.47**	**Well has bailed down**

COMMENTS:

INSTRUMENTATION: pH Meter **X** _____ Temperature Meter **x**

DO Monitor _____ Other _____

Conductivity Meter **X** _____

Water Disposal Kutz Sample ID Blanco NFP MW-23 Sample Time 1135

BTEX VOCs Alkalinity TDS Cations Anions Nitrate Nitrite Ammonia TKN NMWQCC Metals Total Phosphorus

MS/MSD _____ BD _____ BD Name/Time _____ TB 030903tb01

Groundwater Analytical Report – June 2003

Gulf Coast
ACCUTEST
Laboratories

06/09/03

Technical Report for

Montgomery Watson

EPFS San Juan Basin GS

San Juan Basin Blanco

Accutest Job Number: T4439

Report to:

El Paso

scott.pope@elpaso.com

Total number of pages in report: 13

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Sample Summary

Montgomery Watson

Job No: T4439

EPFS San Juan Basin GS
Project No: San Juan Basin Blanco

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
T4439-1	06/02/03	07:00	MN	06/03/03	AQ	Trip Blank Water	020603TB01
T4439-2	06/02/03	13:53	MN	06/03/03	AQ	Water	BLANCO MW-27
T4439-3	06/02/03	14:19	MN	06/03/03	AQ	Water	BLANCO MW-19
T4439-4	06/02/03	14:50	MN	06/03/03	AQ	Water	BLANCO MW-23

Accutest Laboratories

Report of Analysis

Client Sample ID:	020603TB01		
Lab Sample ID:	T4439-1	Date Sampled:	06/02/03
Matrix:	AQ - Trip Blank Water	Date Received:	06/03/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005235.D	1	06/04/03	JH	n/a	n/a	GKK275
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	117%		64-121%
98-08-8	aaa-Trifluorotoluene	99%		71-121%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-27		
Lab Sample ID:	T4439-2	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005250.D	25	06/05/03	JH	n/a	n/a	GKK276
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	192	25	ug/l	
108-88-3	Toluene	ND	25	ug/l	
100-41-4	Ethylbenzene	328	25	ug/l	
1330-20-7	Xylenes (total)	1480	75	ug/l	
95-47-6	o-Xylene	298	25	ug/l	
	m,p-Xylene	1190	50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	110%		64-121%
98-08-8	aaa-Trifluorotoluene	93%		71-121%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-19		
Lab Sample ID:	T4439-3	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005237.D	10	06/04/03	JH	n/a	n/a	GKK275
Run #2	KK005253.D	100	06/05/03	JH	n/a	n/a	GKK276
Run #3	KK005255.D	200	06/05/03	JH	n/a	n/a	GKK276

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	10100 [a]	200	ug/l	
108-88-3	Toluene	ND	10	ug/l	
100-41-4	Ethylbenzene	3900 [a]	200	ug/l	
1330-20-7	Xylenes (total)	ND	30	ug/l	
95-47-6	o-Xylene	ND	10	ug/l	
	m,p-Xylene	ND	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
460-00-4	4-Bromofluorobenzene	103%	114%	113%	64-121%
98-08-8	aaa-Trifluorotoluene	95%	90%	79%	71-121%

(a) Result is from Run# 3

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-23		
Lab Sample ID:	T4439-4	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005239.D	10	06/04/03	JH	n/a	n/a	GKK275
Run #2	KK005254.D	250	06/05/03	JH	n/a	n/a	GKK276

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	8920 [a]	250	ug/l	
108-88-3	Toluene	ND	10	ug/l	
100-41-4	Ethylbenzene	337	10	ug/l	
1330-20-7	Xylenes (total)	1450	30	ug/l	
95-47-6	o-Xylene	ND	10	ug/l	
	m,p-Xylene	1450	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	97%	118%	64-121%
98-08-8	aaa-Trifluorotoluene	89%	95%	71-121%

(a) Result is from Run# 2

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Blank Spike Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK275-BS	KK005233.D	1	06/04/03	JH	n/a	n/a	GKK275

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-1, T4439-3, T4439-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	20	19.7	99	74-119
100-41-4	Ethylbenzene	20	19.7	99	82-115
108-88-3	Toluene	20	19.5	98	77-116
1330-20-7	Xylenes (total)	60	59.6	99	79-115
95-47-6	o-Xylene	20	20.0	100	78-114
	m,p-Xylene	40	39.6	99	79-116

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	114%	64-121%
98-08-8	aaa-Trifluorotoluene	100%	71-121%

Blank Spike Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK276-BS	KK005247.D	1	06/05/03	JH	n/a	n/a	GKK276

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-2, T4439-3, T4439-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	20	20.9	105	74-119
100-41-4	Ethylbenzene	20	21.1	106	82-115
108-88-3	Toluene	20	20.5	103	77-116
1330-20-7	Xylenes (total)	60	62.4	104	79-115
95-47-6	o-Xylene	20	20.5	103	78-114
	m,p-Xylene	40	42.0	105	79-116

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	121%	64-121%
98-08-8	aaa-Trifluorotoluene	92%	71-121%

Method Blank Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK275-MB	KK005234.D	1	06/04/03	JH	n/a	n/a	GKK275

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-1, T4439-3, T4439-4

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	124%* [a]	64-121%
98-08-8	aaa-Trifluorotoluene	104%	71-121%

(a) High bias.

Method Blank Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK276-MB	KK005248.D	1	06/05/03	JH	n/a	n/a	GKK276

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-2, T4439-3, T4439-4

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	118%	64-121%
98-08-8	aaa-Trifluorotoluene	91%	71-121%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T4439-2MS	KK005251.D	25	06/05/03	JH	n/a	n/a	GKK276
T4439-2MSD	KK005252.D	25	06/05/03	JH	n/a	n/a	GKK276
T4439-2	KK005250.D	25	06/05/03	JH	n/a	n/a	GKK276

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-2, T4439-3, T4439-4

CAS No.	Compound	T4439-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	192		500	687	99	709	103	3	64-124/16
100-41-4	Ethylbenzene	328		500	808	96	842	103	4	64-123/14
108-88-3	Toluene	ND		500	533	107	553	111	4	64-120/13
1330-20-7	Xylenes (total)	1480		1500	2880	93	3010	102	4	66-118/18
95-47-6	o-Xylene	298		500	765	93	795	99	4	65-119/20
	m,p-Xylene	1190		1000	2110	92	2210	102	5	66-120/14

CAS No.	Surrogate Recoveries	MS	MSD	T4439-2	Limits
460-00-4	4-Bromofluorobenzene	114%	118%	110%	64-121%
98-08-8	aaa-Trifluorotoluene	91%	97%	93%	71-121%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T4439
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T4439-4MS	KK005240.D	10	06/04/03	JH	n/a	n/a	GKK275
T4439-4MSD	KK005241.D	10	06/04/03	JH	n/a	n/a	GKK275
T4439-4	KK005239.D	10	06/04/03	JH	n/a	n/a	GKK275

The QC reported here applies to the following samples: Method: SW846 8021B

T4439-1, T4439-3, T4439-4

CAS No.	Compound	T4439-4 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	7760		200	8140	190* [a]	8120	180* [a]	0	64-124/16
100-41-4	Ethylbenzene	337		200	502	83	537	100	7	64-123/14
108-88-3	Toluene	ND		200	155	78	188	94	19*	64-120/13
1330-20-7	Xylenes (total)	1450		600	1950	83	2030	97	4	66-118/18
95-47-6	o-Xylene	ND		200	162	81	195	98	18	65-119/20
	m,p-Xylene	1450		400	1780	83	1830	95	3	66-120/14

CAS No.	Surrogate Recoveries	MS	MSD	T4439-4	Limits
460-00-4	4-Bromofluorobenzene	105%	105%	97%	64-121%
98-08-8	aaa-Trifluorotoluene	99%	96%	89%	71-121%

(a) Outside control limits due to high level in sample relative to spike amount.

CHAIN OF CUSTODY

ACCUTEST Laboratories

10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 836557901566 | Bottle Order Control #
Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: MWH/El Paso
Address: 614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 505 599 2178
Sampler's Name: Martin Nee

Project Information

Project Name: San Juan Basin Blanco
Street:
City: State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis

BTEX

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MeOH	ENCORE	BTEX	LAB USE ONLY
1	020603TB01		6-2-03	0900	MN	WQ	2	1				2				X	
2	Blanco MW-27		6-2-3	1353	MN	WG	2					2				X	
3	Blanco MW-19		6-2-3	1419	MN	WG	2					2				X	
4	Blanco MW-23		6-2-3	1450	MN	WG	2					2				X	

Turnaround Time (Business Days)

- [x] 10 Day STANDARD — Approved By: / Date:
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

Rinsed VOAs w/ sample water due to Rxn w/ HCl & CaCO3

TAT

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by	Relinquished by	Date Time:	Received by
1	1630	1	2	6-3-03 0845	2
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☐	On Ice X Cooler Temp. 5.0°C

Groundwater Analytical Report – August 2003

Gulf Coast
ACCUTEST
Laboratories

08/20/03

Technical Report for

Montgomery Watson

Blanco North

Accutest Job Number: T5038

Report to:

MWH

Pamela.J.Anderson@us.mwhglobal.com

Total number of pages in report: 10

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Accutest Laboratories

Sample Summary

Montgomery Watson

Job No: T5038

Blanco North

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
T5038-1	08/04/03	07:00	MJN	08/05/03	AQ	Trip Blank Water	040803TB01
T5038-2	08/04/03	09:30	MJN	08/05/03	AQ	Water	MW-27
T5038-3	08/04/03	11:50	MJN	08/05/03	AQ	Water	MW-23
T5038-4	08/04/03	13:07	MJN	08/05/03	AQ	Water	MW-19

Accutest Laboratories

Report of Analysis

Client Sample ID:	040803TB01		
Lab Sample ID:	T5038-1	Date Sampled:	08/04/03
Matrix:	AQ - Trip Blank Water	Date Received:	08/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005602.D	1	08/11/03	BC	n/a	n/a	GKK299
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	99%		64-121%
98-08-8	aaa-Trifluorotoluene	102%		71-121%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	MW-27		
Lab Sample ID:	T5038-2	Date Sampled:	08/04/03
Matrix:	AQ - Water	Date Received:	08/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005606.D	10	08/11/03	BC	n/a	n/a	GKK299
Run #2	KK005607.D	25	08/11/03	BC	n/a	n/a	GKK299

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	116	10	ug/l	
108-88-3	Toluene	ND	10	ug/l	
100-41-4	Ethylbenzene	145	10	ug/l	
1330-20-7	Xylenes (total)	697	30	ug/l	
95-47-6	o-Xylene	134	10	ug/l	
	m,p-Xylene	563	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	110%	108%	64-121%
98-08-8	aaa-Trifluorotoluene	138% [b]	131% [a]	71-121%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.
(b) Outside control limits due to matrix interference.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	MW-23		
Lab Sample ID:	T5038-3	Date Sampled:	08/04/03
Matrix:	AQ - Water	Date Received:	08/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005604.D	10	08/11/03	BC	n/a	n/a	GKK299
Run #2	KK005605.D	25	08/11/03	BC	n/a	n/a	GKK299

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	2250 [a]	25	ug/l	
108-88-3	Toluene	ND	10	ug/l	
100-41-4	Ethylbenzene	99.8	10	ug/l	
1330-20-7	Xylenes (total)	337	30	ug/l	
95-47-6	o-Xylene	ND	10	ug/l	
	m,p-Xylene	337	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	98%	95%	64-121%
98-08-8	aaa-Trifluorotoluene	96%	94%	71-121%

(a) Result is from Run# 2

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	MW-19		
Lab Sample ID:	T5038-4	Date Sampled:	08/04/03
Matrix:	AQ - Water	Date Received:	08/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005603.D	10	08/11/03	BC	n/a	n/a	GKK299
Run #2	KK005617.D	25	08/12/03	BC	n/a	n/a	GKK299

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	2000 [a]	25	ug/l	
108-88-3	Toluene	ND	10	ug/l	
100-41-4	Ethylbenzene	304	10	ug/l	
1330-20-7	Xylenes (total)	ND	30	ug/l	
95-47-6	o-Xylene	ND	10	ug/l	
	m,p-Xylene	ND	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	103%	107%	64-121%
98-08-8	aaa-Trifluorotoluene	99%	112%	71-121%

(a) Result is from Run# 2

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Blank Spike Summary

Job Number: T5038
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK299-BS	KK005600.D	1	08/11/03	BC	n/a	n/a	GKK299

The QC reported here applies to the following samples: Method: SW846 8021B

T5038-1, T5038-2, T5038-3, T5038-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	20	21.0	105	74-119
100-41-4	Ethylbenzene	20	19.9	100	82-115
108-88-3	Toluene	20	19.9	100	77-116
1330-20-7	Xylenes (total)	60	60.3	101	79-115
95-47-6	o-Xylene	20	20.2	101	78-114
	m,p-Xylene	40	40.1	100	79-116

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	101%	64-121%
98-08-8	aaa-Trifluorotoluene	101%	71-121%

Method Blank Summary

Job Number: T5038
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK299-MB	KK005601.D	1	08/11/03	BC	n/a	n/a	GKK299

The QC reported here applies to the following samples: Method: SW846 8021B

T5038-1, T5038-2, T5038-3, T5038-4

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	102%	64-121%
98-08-8	aaa-Trifluorotoluene	100%	71-121%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T5038
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T5038-2MS	KK005608.D	25	08/11/03	BC	n/a	n/a	GKK299
T5038-2MSD	KK005609.D	25	08/11/03	BC	n/a	n/a	GKK299
T5038-2	KK005606.D	10	08/11/03	BC	n/a	n/a	GKK299
T5038-2	KK005607.D	25	08/11/03	BC	n/a	n/a	GKK299

The QC reported here applies to the following samples: Method: SW846 8021B

T5038-1, T5038-2, T5038-3, T5038-4

CAS No.	Compound	T5038-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	116		500	625	102	616	100	1	64-124/16
100-41-4	Ethylbenzene	145		500	623	96	599	91	4	64-123/14
108-88-3	Toluene	ND		500	548	110	535	107	2	64-120/13
1330-20-7	Xylenes (total)	697		1500	2170	98	2080	92	4	66-118/18
95-47-6	o-Xylene	134		500	619	97	595	92	4	65-119/20
	m,p-Xylene	563		1000	1550	99	1490	93	4	66-120/14

CAS No.	Surrogate Recoveries	MS	MSD	T5038-2	T5038-2	Limits
460-00-4	4-Bromofluorobenzene	104%	98%	110%	108%	64-121%
98-08-8	aaa-Trifluorotoluene	123%* [a]	120%	138%* [b]	131%* [a]	71-121%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.
(b) Outside control limits due to matrix interference.

CHAIN OF CUSTODY # 040803MNP1

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 855603757077 | Bottle Order Control #
Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: El Paso / MWH
Address: 614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 505 599 2178
Sampler's Name: MJ Nee

Project Information

Project Name: Blanco North Flare Pit
Street:
City: State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis

BTEX

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL Other Solid
WP - Wipe
LAB USE ONLY

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	BTEX	LAB USE ONLY
1	040803TBQ1		8-4-03	0700	MN	WQ	1	1								X	REF
2	MW-27		8-4-03	0980	MN	WG	2	X				2				X	
3	MW-23		8-4-03	1150	MN	WG	2					2				X	
4	MW-19		8-4-03	1307	MN	WG	2					2				X	

Turnaround Time (Business Days)

- [x] 10 Day *STANDARD*
- [ ] 5 Day *RUSH*
- [ ] 3 Day *EMERGENCY*
- [ ] 2 Day *EMERGENCY*
- [ ] 1 Day *EMERGENCY*
- [ ] *Other*

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

T5038

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received by:
1		8-4-03 1440	1
2	Relinquished by	Date Time: 0830 8-5-03	Received by:
3	Relinquished by:	Date Time:	Received by:
4	Relinquished by:	Date Time:	Received by:
5	Relinquished by:	Date Time:	Received by:

Custody Seal # | Preserved where applicable [ ] | On Ice [X] | Cooler Temp. 4-8 °C

ACCUTEST

SAMPLE RECEIPT LOG

JOB #: T8038　　DATE/TIME RECEIVED: 8-5-03 0830

CLIENT: El Paso/MWH　　INITIALS: EJ

Condition/Variance (Circle "Y" for yes and "N" for no. If "N" is circled, see variance for explanation):

1. Y N Sample received in undamaged condition.
2. Y N Samples received within temp. range.
3. Y N Sample received with proper pH.
4. Y N Sample received in proper containers.
5. Y N Sample volume sufficient for analysis.
6. Y N Sample received with chain of custody.
7. Y N Chain of Custody matches sample IDs on containers.
8. Y N Custody seal received intact and tamper evident on cooler.
9. Y N Custody seal received intact and tamper evident on bottles.

SAMPLE or FIELD ID	BOTTLE #	DATE SAMPLED	MATRIX	VOLUME	LOCATION	PRESERV.	PH
1	1	8-4-03	L	1X 40mL	VREF	1,2,3,4,5,6	U, <2, >12, NA
2	1-2	↓	↓	2X 40mL	↓	1,2,3,4,5,6	U, <2, >12, NA
3	↓	↓	↓	↓	↓	1,2,3,4,5,6	U, <2, >12, NA
4	↓	↓	↓	↓	↓	1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA

LOCATION: WI: Walk-In　VR: Volatile Refrig.　SUB: Subcontract　EF: Encore Freezer

PRESERVATIVES: 1: None 2: HCL 3: HNO3 4: H2SO4 5: NAOH 6: Other

Comments: VOA Vials are not Preserved.

pH of waters checked excluding volatiles

pH of soils N/A

Delivery method: Courier: FED-EX　　COOLER TEMP: 4.8°C　　COOLER TEMP: ______

Tracking#: SEE ATTACHED　　COOLER TEMP: ______　　COOLER TEMP: ______

Method of sample disposal: (circle one) Accutest disposal　Hold　Return to Client

Form: SM012

DATA VALIDATION WORKSHEET

Analytical Method/Analytes: SW-846 8021B (BTEX) **Sample Collection Date(s):** 08/04/03

Laboratory: Accutest **MWH Job Number:** EPC-SJRB (Blanco North)

Batch Identification: T5038 **Matrix:** Water

MS/MSD Parent(s)[a]: T5038-02 **Field Replicate Parent(s):** None

Validation Complete: Brian Lyttas 8-15-03 (Date/Signature)

Foot Notes	Site ID	Sample ID	Lab. ID	Hits (Y/N)	Quals.	Comments
None	Trip Blank	040803TB01	T5038-01	N		
1,2	Blanco North	MW-27	T5038-02	Y		Benzene @ 116 µg/l Ethylbenzene @ 145 µg/l Xylenes (total) @ 697 µg/l o-Xylene @ 134 µg/l m,p-Xylene @ 563 µg/l
None	Blanco North	MW-23	T5038-03	Y		Benzene @ 2250 µg/l Ethylbenzene @ 99.8 µg/l Xylenes (total) @ 337 µg/l m,p-Xylene @ 337 µg/l
None	Blanco North	MW-19	T5038-04	Y		Benzene @ 2000 µg/l Ethylbenzene @ 304 µg/l

DATA VALIDATION WORKSHEET
(Page 2 of 2)

Analytical Method: SW-846 8021B (BTEX) **MWH Job Number:** EPC-SJRB (Blanco North)

Laboratory: Accutest **Batch Identification:** T5038

Validation Criteria								
Sample ID	**040803TB 01**	**Blanco North MW-27**	**Blanco North MW-23**	**Blanco North MW-19**				
Lab ID	**T5038-01**	**T5038-02**	**T5038-03**	**T5038-04**				
Holding Time	A	A	A	A				
Analyte List	A	A	A	A				
Reporting Limits	A	A	A	A				
Trip Blank	A	A	A	A				
Equipment Rinseate Blanks	N/A	N/A	N/A	N/A				
Field Duplicate/Replicate	N/A	N/A	N/A	N/A				
Surrogate Spike Recovery	A	A[1]	A	A				
Initial Calibration	N	N	N	N				
Initial Calibration Verification (ICV)	N	N	N	N				
Continuing Calibration Verification (CCV)	N	N	N	N				
Laboratory Control Sample (LCS)	A	A	A	A				
Laboratory Control Sample Duplicate (LCSD)	N	N	N	N				
Method Blank	A	A	A	A				
Matrix Spike/Matrix Spike Dup. (MS/MSD)	N/A	A[2]	N/A	N/A				
Retention Time Window	N	N	N	N				
Injection Time(s)	N	N	N	N				
Hardcopy vs. Chain-of-Custody	A	A	A	A				
EDD vs. Hardcopy	N	N	N	N				
EDD vs. Chain of Custody	N	N	N	N				

(a) List QC batch identification if different than Batch ID
A indicates validation criteria were met
A/L indicates validation criteria met based upon Laboratory's QC Summary Form
X indicates validation criteria were not met
N indicates data review were not a project specific requirement
N/A indicates criteria are not applicable for the specified analytical method or sample
N/R indicates data not available for review

NOTES:

1) Surrogate percent recovery outside acceptance criteria for aaa-Trifluorotoluene @ 138% (71-121) and confirmed outside acceptance criteria by reanalysis @ 131%. Only one surrogate outside acceptance criteria, no data qualified.
2) Matrix spike surrogate percent recoveries outside acceptance criteria for aaa-Trifluorotoluene @ 123% (71-121). Only one surrogate outside acceptance criteria, data quality not affected.

CHAIN OF CUSTODY # 040803MN#1

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 855603757077 | Bottle Order Control #
Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: El Paso / MWH
Address: 614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 505 599 2178
Sampler's Name: MJ Nee

Project Information

Project Name: Blanco North Flare Pit
Street:
City: State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis

BTEX

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	LAB USE ONLY
1	040803TBΦ1		8-4-03	0700	MN	WQ	1	1								X VOA
2	MW-27		8-4-03	0980	MN	WQ	2	X				2				X
3	MW-23		8-4-03	1150	MN	WQ	2					2				X
4	MW-19		8-4-03	1307	MN	WQ	2					2				X

Turnaround Time (Business Days)

- [x] 10 Day *STANDARD*
- [ ] 5 Day *RUSH*
- [ ] 3 Day *EMERGENCY*
- [ ] 2 Day *EMERGENCY*
- [ ] 1 Day *EMERGENCY*
- [ ] Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

T5038

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received by:	Relinquished by	Date Time:	Received by:
1	8-4-03 1440	1	2	8-5-03 0830	2
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☐	On Ice X Cooler Temp. 4-8 °C

Groundwater Analytical Report – September 2003

Gulf Coast
ACCUTEST
Laboratories

09/11/03

Technical Report for

Montgomery Watson

Blanco North

040903mn01

Accutest Job Number: T5289

Report to:

Total number of pages in report: 14

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Sample Summary

Montgomery Watson

Job No: T5289

Blanco North
Project No: 040903mn01

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
T5289-1	09/03/03	11:35	MJN	09/05/03	AQ	Water	BLANCO NFP MW-23
T5289-2	09/03/03	11:45	MJN	09/05/03	AQ	Water	BLANCO NFP MW-19
T5289-3	09/03/03	12:01	MJN	09/05/03	AQ	Water	BLANCO NFP MW-27
T5289-4	09/03/03	07:50	MJN	09/05/03	AQ	Water	BLANCO NFP MW-26
T5289-5	09/03/03	07:00	MJN	09/05/03	AQ	Water	030903TB01

Report of Analysis

Client Sample ID:	BLANCO NFP MW-23		
Lab Sample ID:	T5289-1	Date Sampled:	09/03/03
Matrix:	AQ - Water	Date Received:	09/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK005678.D	1	09/06/03	BC	n/a	n/a	GKK304
Run #2 [a]	KK005679.D	25	09/06/03	BC	n/a	n/a	GKK304
Run #3 [a]	KK005696.D	50	09/07/03	BC	n/a	n/a	GKK305

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	3860 [b]	50	ug/l	
108-88-3	Toluene	7.8	1.0	ug/l	
100-41-4	Ethylbenzene	208 [c]	25	ug/l	
1330-20-7	Xylenes (total)	768 [c]	75	ug/l	
95-47-6	o-Xylene	ND [c]	25	ug/l	
	m,p-Xylene	768 [c]	50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
460-00-4	4-Bromofluorobenzene	126% [d]	99%	101%	64-121%
98-08-8	aaa-Trifluorotoluene	172% [d]	99%	104%	71-121%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Result is from Run# 3
(c) Result is from Run# 2
(d) Outside control limits due to matrix interference.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BLANCO NFP MW-19		
Lab Sample ID:	T5289-2	Date Sampled:	09/03/03
Matrix:	AQ - Water	Date Received:	09/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK005680.D	1	09/06/03	BC	n/a	n/a	GKK304
Run #2 [a]	KK005681.D	25	09/06/03	BC	n/a	n/a	GKK304
Run #3 [a]	KK005697.D	50	09/07/03	BC	n/a	n/a	GKK305

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	3580 [b]	50	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	1020 [c]	25	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
460-00-4	4-Bromofluorobenzene	134% [d]	102%	98%	64-121%
98-08-8	aaa-Trifluorotoluene	131% [d]	98%	95%	71-121%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Result is from Run# 3
(c) Result is from Run# 2
(d) Outside control limits due to matrix interference.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BLANCO NFP MW-27		
Lab Sample ID:	T5289-3	Date Sampled:	09/03/03
Matrix:	AQ - Water	Date Received:	09/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	KK005685.D	1	09/06/03	BC	n/a	n/a	GKK304
Run #2 [a]	KK005698.D	10	09/07/03	BC	n/a	n/a	GKK305

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	137 [b]	10	ug/l	
108-88-3	Toluene	17.4	1.0	ug/l	
100-41-4	Ethylbenzene	274 [b]	10	ug/l	
1330-20-7	Xylenes (total)	1240 [b]	30	ug/l	
95-47-6	o-Xylene	243 [b]	10	ug/l	
	m,p-Xylene	995 [b]	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	167% [c]	104%	64-121%
98-08-8	aaa-Trifluorotoluene	425% [c]	115%	71-121%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Result is from Run# 2
(c) Outside control limits due to matrix interference.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO NFP MW-26		
Lab Sample ID:	T5289-4	Date Sampled:	09/03/03
Matrix:	AQ - Water	Date Received:	09/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005687.D	1	09/06/03	BC	n/a	n/a	GKK304
Run #2	KK005701.D	10	09/07/03	BC	n/a	n/a	GKK305

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	538 [a]	10	ug/l	
108-88-3	Toluene	9.6	1.0	ug/l	
100-41-4	Ethylbenzene	139 [a]	10	ug/l	
1330-20-7	Xylenes (total)	466 [a]	30	ug/l	
95-47-6	o-Xylene	98.5 [a]	10	ug/l	
	m,p-Xylene	367 [a]	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	185% [b]	103%	64-121%
98-08-8	aaa-Trifluorotoluene	242% [b]	109%	71-121%

(a) Result is from Run# 2
(b) Outside control limits due to matrix interference.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	030903TB01		
Lab Sample ID:	T5289-5	Date Sampled:	09/03/03
Matrix:	AQ - Water	Date Received:	09/05/03
Method:	SW846 8021B	Percent Solids:	n/a
Project:	Blanco North		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	KK005695.D	1	09/07/03	BC	n/a	n/a	GKK305
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

Purgeable Aromatics

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	101%		64-121%
98-08-8	aaa-Trifluorotoluene	101%		71-121%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Blank Spike Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK304-BS	KK005676.D	1	09/06/03	BC	n/a	n/a	GKK304

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
100-41-4	Ethylbenzene	20	22.0	110	82-115
108-88-3	Toluene	20	21.7	109	77-116
1330-20-7	Xylenes (total)	60	67.3	112	79-115
95-47-6	o-Xylene	20	22.4	112	78-114
	m,p-Xylene	40	44.9	112	79-116

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	103%	64-121%
98-08-8	aaa-Trifluorotoluene	102%	71-121%

Blank Spike Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK305-BS	KK005693.D	1	09/07/03	BC	n/a	n/a	GKK305

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4, T5289-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	20	21.3	107	74-119
100-41-4	Ethylbenzene	20	21.6	108	82-115
108-88-3	Toluene	20	21.4	107	77-116
1330-20-7	Xylenes (total)	60	64.9	108	79-115
95-47-6	o-Xylene	20	21.2	106	78-114
	m,p-Xylene	40	43.6	109	79-116

CAS No.	Surrogate Recoveries	BSP	Limits
460-00-4	4-Bromofluorobenzene	106%	64-121%
98-08-8	aaa-Trifluorotoluene	106%	71-121%

Method Blank Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK304-MB	KK005677.D	1	09/06/03	BC	n/a	n/a	GKK304

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4

CAS No.	Compound	Result	RL	Units	Q
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	99%	64-121%
98-08-8	aaa-Trifluorotoluene	102%	71-121%

Method Blank Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GKK305-MB	KK005694.D	1	09/07/03	BC	n/a	n/a	GKK305

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4, T5289-5

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	0.91	1.0	ug/l	J
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
95-47-6	o-Xylene	ND	1.0	ug/l	
	m,p-Xylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
460-00-4	4-Bromofluorobenzene	100%	64-121%
98-08-8	aaa-Trifluorotoluene	104%	71-121%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T5289-2MS [a]	KK005682.D	25	09/06/03	BC	n/a	n/a	GKK304
T5289-2MSD [a]	KK005683.D	25	09/06/03	BC	n/a	n/a	GKK304
T5289-2 [a]	KK005680.D	1	09/06/03	BC	n/a	n/a	GKK304
T5289-2 [a]	KK005681.D	25	09/06/03	BC	n/a	n/a	GKK304

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4

CAS No.	Compound	T5289-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
100-41-4	Ethylbenzene	1020 [b]		500	1480	92	1420	80	4	64-123/14
108-88-3	Toluene	ND		500	557	111	540	108	3	64-120/13
1330-20-7	Xylenes (total)	ND		1500	1740	116	1660	111	5	66-118/18
95-47-6	o-Xylene	ND		500	573	115	555	111	3	65-119/20
	m,p-Xylene	ND		1000	1170	117	1110	111	5	66-120/14

CAS No.	Surrogate Recoveries	MS	MSD	T5289-2	T5289-2	Limits
460-00-4	4-Bromofluorobenzene	100%	101%	134%* [c]	102%	64-121%
98-08-8	aaa-Trifluorotoluene	101%	97%	131%* [c]	98%	71-121%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Result is from Run #2.
(c) Outside control limits due to matrix interference.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T5289
Account: MWHSLCUT Montgomery Watson
Project: Blanco North

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T5289-3MS [a]	KK005699.D	10	09/07/03	BC	n/a	n/a	GKK305
T5289-3MSD [a]	KK005700.D	10	09/07/03	BC	n/a	n/a	GKK305
T5289-3 [a]	KK005698.D	10	09/07/03	BC	n/a	n/a	GKK305

The QC reported here applies to the following samples: Method: SW846 8021B

T5289-1, T5289-2, T5289-3, T5289-4, T5289-5

CAS No.	Compound	T5289-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	137		200	372	118	365	114	2	64-124/16
100-41-4	Ethylbenzene	274		200	511	119	501	114	2	64-123/14
108-88-3	Toluene	20.0		200	277	129*	270	125*	3	64-120/13
1330-20-7	Xylenes (total)	1240		600	1890	108	1910	112	1	66-118/18
95-47-6	o-Xylene	243		200	460	109	469	113	2	65-119/20
	m,p-Xylene	995		400	1430	109	1440	111	1	66-120/14

CAS No.	Surrogate Recoveries	MS	MSD	T5289-3	Limits
460-00-4	4-Bromofluorobenzene	102%	105%	104%	64-121%
98-08-8	aaa-Trifluorotoluene	120%	124%* [b]	115%	71-121%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.
(b) Outside control limits due to matrix interference.

CHAIN OF CUSTODY

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 935603757114
Bottle Order Control #
Accutest Quote #
Accutest Job #

Client / Reporting Information

Company Name: MWH / El Paso
Address: 614 Reilly
City: Farmington State: NM Zip: 87401
Project Contact: Scott Pope E-mail:
Phone #: 505 599 2124
Sampler's Name: MJN

Project Information

Project Name: Blanco North Flare Pit (NFP)
Street:
City State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis

BTEX

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

LAB USE ONLY

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	BTEX
	Blanco NFP MW-23		9-3-03	1135	MN	WG	2	2								X
	Blanco NFP MW-29	MN	9-3-03	1145	MN	WG	2		2							X
	Blanco NFP MW-27		9-3-03	1201	MN	WG	2		2							X
	Blanco NFP MW-26		9-4-03	0750	MN	WG	2	2								X
	030903TRIP1		9-3-03	0700	MN	WQ	1									X

T5289

Turnaround Time (Business Days)

- [X] 10 Day *STANDARD* — Approved By: / Date:
- [ ] 5 Day *RUSH*
- [ ] 3 Day *EMERGENCY*
- [ ] 2 Day *EMERGENCY*
- [ ] 1 Day *EMERGENCY*
- [ ] Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
1	9/4/03	1	2		2
3	1200	3	4		4
5	9/5 1000	5	Custody Seal #	Preserved where applicable ☐	On Ice ☒ Cooler Temp. 3.7°C

ACCUTEST.

SAMPLE RECEIPT LOG

JOB #: _____ DATE/TIME RECEIVED: 9/5/03 1000

CLIENT: MWH | EL PASO INITIALS: KS

Condition/Variance (Circle "Y" for yes and "N" for no. If "N" is circled, see variance for explanation):

1. (Y) N Sample received in undamaged condition.
2. (Y) N Samples received within temp. range.
3. Y (N/A) Sample received with proper pH.
4. (Y) N Sample received in proper containers.
5. (Y) N Sample volume sufficient for analysis.
6. (Y) N Sample received with chain of custody.
7. (Y) N Chain of Custody matches sample IDs on containers.
8. (Y) N/A Custody seal received intact and tamper evident on cooler.
9. Y (N/A) Custody seal received intact and tamper evident on bottles.

SAMPLE or FIELD ID	BOTTLE #	DATE SAMPLED	MATRIX	VOLUME	LOCATION	PRESERV.	PH
1	1	9/3/03	↓	VOA's	VREF	1,2,3,4,5,6	U, <2, >12, NA
2 KS 1	2	↓	↓	↓	↓	1,2,3,4,5,6	U, <2, >12, NA
3 KS 2	1					1,2,3,4,5,6	U, <2, >12, NA
4 KS 2	2					1,2,3,4,5,6	U, <2, >12, NA
5 KS 3	1					1,2,3,4,5,6	U, <2, >12, NA
3	2	↓		↓		1,2,3,4,5,6	U, <2, >12, NA
4	1	9/4/03				1,2,3,4,5,6	U, <2, >12, NA
4	2	↓ KS				1,2,3,4,5,6	U, <2, >12, NA
5	1	9/3/03 ↓	↓		↓	1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA

LOCATION: WI: Walk-In VR: Volatile Refrig. SUB: Subcontract EF: Encore Freezer

PRESERVATIVES: 1: None 2: HCL 3: HNO3 4: H2SO4 5: NAOH 6: Other

pH of waters checked excluding volatiles

pH of soils N/A

Comments: _____

Delivery method: Courier: FedEX

Tracking#: 835607757114

COOLER TEMP: 3.7°C COOLER TEMP: _____

COOLER TEMP: _____ COOLER TEMP: _____

Method of sample disposal: (circle one) Accutest disposal Hold Return to Client

Form: SM012

DATA VALIDATION WORKSHEET

Analytical Method/Analytes: SW-846 8021B (BTEX) **Sample Collection Date(s):** 09/03/03

Laboratory: Accutest **MWH Job Number:** EPC-SJRB (Blanco North)

Batch Identification: T5289 **Matrix:** Water

MS/MSD Parent(s)[a]: T5289-2 & 3 **Field Replicate Parent(s):** None

Validation Complete: Brian Buttars 9-11-03 (Date/Signature)

Foot Notes	Site ID	Sample ID	Lab. ID	Hits (Y/N)	Data Qualifiers	Comments
1,5	Blanco North	MW-23	T5289-01	Y	B J	Benzene @ 3860 µg/l Toluene @ 7.8 µg/l Ethylbenzene @ 208 µg/l Xylenes (total) @ 768 µg/l m,p-Xylene @ 768 µg/l
2,5	Blanco North	MW-19	T5289-02	Y	B	Benzene @ 3580 µg/l Ethylbenzene @ 1020 µg/l
3,5,6,7	Blanco North	MW-27	T5289-03	Y	B J	Benzene @ 137 µg/l Toluene @ 17.4 µg/l Ethylbenzene @ 274 µg/l Xylenes (total) @ 1240 µg/l o-Xylene @ 243 µg/l m,p-Xylene @ 995 µg/l
4,5	Blanco North	MW-26	T5289-04	Y	B J	Benzene @ 538 µg/l Toluene @ 9.6 µg/l Ethylbenzene @ 139 µg/l Xylenes (total) @ 466 µg/l o-Xylene @ 98.5 µg/l m,p-Xylene @ 367 µg/l
None	Trip Blank	030903TB01	T5289-05	N		

DATA VALIDATION WORKSHEET
(Page 2 of 3)

Analytical Method: SW-846 8021B (BTEX) **MWH Job Number:** EPC-SJRB (Blanco North)

Laboratory: Accutest **Batch Identification:** T5289

Validation Criteria								
Sample ID	**Blanco North MW-23**	**Blanco North MW-19**	**Blanco North MW-27**	**Blanco North MW-26**	**030903TB 01**			
Lab ID	**T5289-01**	**T5289-02**	**T5289-03**	**T5289-04**	**T5289-05**			
Holding Time	A	A	A	A	A			
Analyte List	A	A	A	A	A			
Reporting Limits	A	A	A	A	A			
Trip Blank	A	A	A	A	A			
Equipment Rinseate Blanks	N/A	N/A	N/A	N/A	N/A			
Field Duplicate/Replicate	N/A	N/A	N/A	N/A	N/A			
Surrogate Spike Recovery	A[1]	A[2]	A[3]	A[4]	A			
Initial Calibration	N	N	N	N	N			
Initial Calibration Verification (ICV)	N	N	N	N	N			
Continuing Calibration Verification (CCV)	N	N	N	N	N			
Laboratory Control Sample (LCS)	A	A	A	A	A			
Laboratory Control Sample Duplicate (LCSD)	N	N	N	N	N			
Method Blank	A[5]	A[5]	A[5]	A[5]	A[5]			
Matrix Spike/Matrix Spike Dup. (MS/MSD)	N/A	A	A[6,7]	N/A	N/A			
Retention Time Window	N	N	N	N	N			
Injection Time(s)	N	N	N	N	N			
Hardcopy vs. Chain-of-Custody	A	A	A	A	A			
EDD vs. Hardcopy	N	N	N	N	N			
EDD vs. Chain of Custody	N	N	N	N	N			

(a) List QC batch identification if different than Batch ID
A indicates validation criteria were met
A/L indicates validation criteria met based upon Laboratory's QC Summary Form
X indicates validation criteria were not met
N indicates data review were not a project specific requirement
N/A indicates criteria are not applicable for the specified analytical method or sample
N/R indicates data not available for review

NOTES:

1) Surrogate percent recoveries from Run #1 outside acceptance criteria for 4-Bromofluorobenzene @ 126% (64-121) and aaa-Trifluorotoluene @ 172% (71-121), indicating a possible high bias. Qualify associated analyte hits with "J" flags to indicate that the data are estimated and potentially biased high.

2) Surrogate percent recoveries from Run #1 outside acceptance criteria for 4-Bromofluorobenzene @ 134% (64-121) and aaa-Trifluorotoluene @ 131% (71-121), indicating a possible high bias. Associated analytes not detected, no data qualified.

3) Surrogate percent recoveries from Run #1 outside acceptance criteria for 4-Bromofluorobenzene @ 167% (64-121) and aaa-Trifluorotoluene @ 425% (71-121), indicating a possible high bias. Qualify associated analyte hits with "J" flags to indicate that the data are estimated and potentially biased high.

DATA VALIDATION WORKSHEET

4) Surrogate percent recoveries from Run #1 outside acceptance criteria for 4-Bromofluorobenzene @ 185% (64-121) and aaa-Trifluorotoluene @ 242% (71-121), indicating a possible high bias. Qualify associated analyte hits with "J" flags to indicate that the data are estimated and potentially biased high.

5) Benzene detected in the method blank (GKK305-MB) @ 0.91 µg/l. Qualify associated sample hits greater than five times the amount detected in the method blank (5 x 0.91 µg/l = 4.55 µg/l) with "B" flags to indicate that the analyte was detected in an associated blank. Qualify associated sample hits less than five times the amount detected in the method blank (5 x 0.91 µg/l = 4.55 µg/l) with "UB" flags to indicate that the analyte is considered not detected due to associated blank contamination.

6) Matrix spike duplicate sample (MSD) surrogate percent recovery outside acceptance criteria for aaa-Trifluorotoluene @ 124% (71-121). Only one surrogate outside acceptance criteria, data quality not affected.

7) Matrix spike and matrix spike duplicate sample (MS/MSD) percent recoveries for Toluene are outside acceptance criteria @ 129% and 125% (64-120), indicating a possible high bias. Qualify associated sample hits with "J" flags to indicate that the data are estimated and potentially biased high.

CHAIN OF CUSTODY # 040903 MW01

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL: 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 835603757114 | Bottle Order Control #
Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: MWH / El Paso
Address: 614 Reilly
City: Farmington State: NM Zip: 87401
Project Contact: Scott Pope E-mail:
Phone #: 505 599 2124
Sampler's Name: MJN

Project Information

Project Name: Blanco North Flare Pit (NFP)
Street:
City: State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis

BTEX

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	BrCOBE	BTEX	LAB USE ONLY
	Blanco NFP MW-23		9-3-03	1135	MN	WG	2	2								X	
	Blanco NFP MW-#9	MW	9-3-03	1145	MN	WG	2	2								X	
	Blanco NFP MW-27		9-3-03	1201	MN	WG	2	2								X	
	Blanco NFP MW-26		9-4-03	0750	MN	WG	2	2								X	
	030903TB01		9-3-03	0700	MN	WQ	1									X	

T5289

GW-49

Prepared for:

EL PASO NATURAL GAS COMPANY

elpaso

614 Reilly Avenue
Farmington, New Mexico 87401

2003 GROUNDWATER REPORT FOR THE BLANCO PLANT SOUTH FLARE PIT AND D PLANT AREAS

San Juan County, New Mexico

August 2003

Prepared by:

MWH
P.O. Box 774018
Steamboat Springs, Colorado 80477
(970) 879-6260

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

CHC	Chlorinated Hydrocarbons
DCA	Dichloroethane
DCB	Dichlorobenzene
DCE	Dichloroethene
EPNG	El Paso Natural Gas Company
MWH	MWH Americas, Inc.
NMOCD	New Mexico Oil Conservation Division
NMWQCC	New Mexico Water Quality Control Commission
PCE	Tetrachloroethene
TCE	Trichloroethene

1.0 INTRODUCTION

This *Draft 2003 Annual Groundwater Report for the Blanco Plant South Flare Pit and D Plant Areas* (Report) has been prepared on behalf of El Paso Natural Gas Company (EPNG) to report the results of the 2003 annual groundwater sampling event at the Blanco Plant site. In addition, results of the chlorinated hydrocarbon sampling in the D Plant area from 2002 are also presented. This work has been performed according to the proposed actions outlined in the *Groundwater Nitrate Report for the Blanco Plant South Flare Pit and D Plant Areas, April 2003* (Nitrate Report) (MWH, 2003), which are as follows:

- All groundwater monitoring wells on the Blanco Plant and in the North Flare Pit area will be sampled annually and analyzed for nitrate+nitrite concentrations.

- Groundwater samples from monitoring wells in the D Plant Area (MW-12, MW-13, MW-14 and MW-15) will be analyzed for chlorinated hydrocarbon compounds.

- The results of the nitrate and chlorinated hydrocarbon groundwater sampling will be reported to NMOCD in annual groundwater monitoring reports.

This work was initiated, pursuant to a New Mexico Oil Conservation Division (NMOCD) letter dated May 3, 2002, regarding remediation activities at EPNG's Blanco Plant. The regulatory driver for groundwater remediation at this site is the New Mexico Water Quality Control Commission's (NMWQCC) nitrate standard of 10 mg/L. The *Groundwater Nitrate Work Plan for Blanco South Flare Pit and D Plant Areas* (the Work Plan) (MWH, 2002) was submitted to NMOCD in July 2002 and was conditionally approved by NMOCD in a letter dated February 21, 2003.

The Blanco Plant is located in San Juan County, New Mexico, approximately 1.5 miles northeast of the town of Bloomfield, New Mexico on San Juan County Road 4900. Figure 1.1, *Blanco Plant Site Layout*, presents the Blanco Plant site layout and location of the D Plant and South Flare Pit. The map also shows the location of the North Flare Pit area.

Section 2.0 of this report summarizes historical information related to groundwater nitrate at the site, including a description of previous investigations and a description of the geology/hydrogeology of the area. Section 3.0 presents the results of the groundwater sampling investigation in 2003, and Section 4.0 discusses continued activities at the site.

2.0 SITE BACKGROUND

2.1 PREVIOUS INVESTIGATIONS OF GROUNDWATER NITRATE

An initial assessment of site hydrogeology and groundwater resources of the Blanco Plant area was conducted by Bechtel Environmental in 1989 (Bechtel, 1989). Six monitoring wells were installed and sampled during this investigation. High nitrate concentrations were identified in wells MW-2 (290 ppm) and MW-6 (51 ppm) at that time. It was concluded in this study that "the high concentration of nitrate in the upgradient well (MW-2) could not have been due to plant operations".

As part of a groundwater study by K.W. Brown & Associates, Inc (K.W. Brown, 1990) to investigate the extent of contamination resulting from a leaking underground storage tank in the D Plant Area, the source of elevated nitrate in groundwater was further investigated. Monitoring well, MW-19, was installed upgradient of MW-2. Sampling results from this investigation indicated high nitrate concentrations in MW-2 (200 ppm), MW-19 (90 ppm), MW-14 (210 ppm) and MW-15 (89 ppm). Inspection of the plant area at that time did not find a source for potential nitrate contamination.

Historic and recent groundwater nitrate data from several rounds of groundwater sampling (1991 – 2003) at the site (including North Flare Pit wells) are presented in Table 2.1, *Groundwater Nitrate Analytical Data (1991 – 2003).*

2.2 SITE GEOLOGY/HYDROGEOLOGY

The geologic framework of the site has been summarized by Bechtel Environmental (Bechtel, 1989) and K.W. Brown and Associates (K.W. Brown, 1990). Based on these assessments, the plant area is located on Quaternary alluvium consisting of sand, silt, clay and gravel. At the plant site, the thickness of the alluvium varies from less than three feet to more than 75 feet (Bechtel, 1989). Underlying the alluvium is the Tertiary Nacimiento Formation consisting of interbedded coarse- to medium-grained arkosic sandstone, siltstone and shale which were deposited as both channel fill and floodplain deposits (Bechtel, 1989). Orientation of the channel-fill sandstone deposits may locally control groundwater flow due to higher hydraulic conductivities through these features.

An assessment of site hydrogeology and groundwater resources of the Blanco Plant area was conducted by Bechtel Environmental in 1989 (Bechtel, 1989). Based on the information collected during this study, it was concluded that the direction of groundwater flow through the plant area is to the south-southwest and then trends southward through the southern portion of the site. The average hydraulic conductivity was estimated to be 2.1×10^{-4} centimeters per second. Depth to groundwater ranged from 50 feet (at MW-2) to nine feet (at MW-10) below ground surface (5564 to 5552 feet above sea level) (EPNG, 1989). These results were generally consistent with the findings of K.W. Brown (1990).

A potentiometric surface map for the site has been prepared based on water level measurements collected in June 2003, and is presented in Figure 2.1, *Groundwater Potentiometric Surface Map - June 2003.* Based on these data, groundwater is flowing to the southeast with a hydraulic gradient of 0.027 ft/ft in the Blanco Plant site area and 0.067 ft/ft in the North Flare Pit area. At the southern boundary of the site the

groundwater gradient trends towards the east, likely as a result of groundwater mounding in that area due to recharge from Citizens Ditch. This is consistent with the groundwater flow pattern of previous years.

3.0 2003 ANNUAL GROUNDWATER SAMPLING

3.1 GROUNDWATER NITRATE DATA

Groundwater samples were collected on June 3, 2003 from wells MW-6, MW-8, MW-12, MW-13, MW-14, MW-15, MW-19, MW-23, MW-27, MW-28, MW-29 and MW-30 using standard purging and sampling techniques and analyzed for nitrite+nitrate concentrations. Groundwater sampling was attempted at wells MW-2, MW-5, MW-7, MW-24 and MW-26 at this time; however, these wells were either dry (MW-2 and MW-7), purged dry (MW-5 and MW-24) or contained free-product (MW-26 in North Flare Pit area) and could not be sampled. Field data and sampling information are presented on field sampling forms, included in Appendix A.

Analytical data are listed in Table 2.1, and laboratory analytical reports are included in Appendix B. Nitrate concentrations were consistent with historic data for these wells. These data indicate that nitrate concentrations have consistently exceeded NMWQCC standards in monitoring wells MW-6, MW-14, MW-15, MW-28, MW-29 and MW-30. Monitoring well MW-2 has not been sampled since 1994 because the well has been dry (although data collected from 1991 through 1994 indicated elevated nitrate concentrations at that location). Monitoring well MW-20 was damaged in 2000 and abandoned in 2002.

Groundwater nitrate concentrations from the June 2003 sampling event are presented on Figure 3.1, *Groundwater Nitrate Data - June 2003.* The 10 mg/L isoconcentration contour is also presented on this figure to indicate areas in exceedance of the NMWQCC standard. As shown in this figure, there is no obvious source or apparent trend in the nitrate data. Instead, there appear to be two confined areas or "hot spots" of high nitrate concentrations that are adjacent to wells with nitrate concentrations consistently below NMWQCC standards. In addition, there is no indication that high nitrate groundwater is migrating off site.

3.2 GROUNDWATER CHLORINATED HYDROCARBON DATA

Four wells in the D Plant area were also sampled and analyzed for a suite of selected chlorinated hydrocarbons (CHCs), in accordance with the site monitoring requirements The CHCs include tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethane (DCA), 1,2-dichlorobenzene (DCB), 1,1-dichloroethene (DCE), trans 1,2-DCE and cis 1,2-DCE. These compounds were targeted because they had been detected previously at the site. Analytical data from May 2002 and June 2003 are presented in Table 3.1, *Groundwater Chlorinated Hydrocarbon Analytical Data (2002 and 2003).* As shown in this table, analytical data are generally consistent between the two years, with the exception that concentrations of several CHCs in MW-12 decreased in 2003. PCE, the most highly-chlorinated solvent of the analyte group, occurs in wells MW-12 and MW-13, and TCE is present in wells MW-12, MW-13 and MW-14. Daughter products of these two compounds (DCE and DCA) are detected in all of the wells, indicating that degradation of these compounds is naturally occurring in the groundwater. The only CHC detected in well MW-15 is a relatively low concentration of 1,1-DCA (6.0 µg/L in June 2003), indicating that the groundwater at this location is likely approaching non-detectable levels of CHCs.

4.0 CONCLUSIONS

In order to continue to monitor groundwater nitrate and CHC concentrations at the site, the following actions will continue to be conducted by EPNG:

- All groundwater monitoring wells on the Blanco Plant and in the North Flare Pit area will be sampled annually and analyzed for nitrate+nitrite concentrations, as shown in Table 4.1, *Groundwater Sampling Schedule.*

- Groundwater samples from monitoring wells in the D Plant Area (MW-12, MW-13, MW-14 and MW-15) will continue to be analyzed for chlorinated hydrocarbon compounds, as listed in Table 4.1.

- The results of the nitrate and chlorinated hydrocarbon groundwater sampling will be reported to NMOCD in annual groundwater monitoring reports (typically submitted in August of each year).

- In accordance with the approval letter from NMOCD, dated May 3, 2002, EPC will plug and abandon monitoring wells MW-10, MW-16, MW-17 and MW-18.

EPNG will notify NMOCD at least 48 hours in advance of all scheduled sampling activities, such that NMOCD has the opportunity to witness the events and split samples, if desired.

5.0 REFERENCES

Bechtel Environmental, 1989. *Groundwater Investigation Report, El Paso Natural Gas Company's Blanco Plant, San Juan County, New Mexico.* January 1989.

K.W. Brown and Associates, Inc, 1990. *Site Investigation of the Blanco Plant, San Juan County, New Mexico.* Prepared for El Paso Natural Gas Company. February 1990.

MWH, 2002. *Groundwater Nitrate Work Plan for Blanco South Flare Pit and D Plant Areas.* July 2002.

MWH, 2003. *Groundwater Nitrate Report for the Blanco Plant South Flare Pit and D Plant Areas.* April 2003.

Tables

TABLES

TABLE 2.1
GROUNDWATER NITRATE ANALYTICAL DATA (1991 - 2003)
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO

Monitoring Well	Sample Date	Nitrate (mg/l)
	NMOCD Standard: 10 mg/L	
MW-2	6/18/91	180
	2/23/93	256
	6/8/93	228
	9/29/93	233
	2/10/94	249
	5/29/02	dry
	6/3/03	dry
MW-5	6/18/91	0.08
	2/19/93	<1.0
	6/7/93	<1.0
	1/27/94	<1.0
	8/8/00	4.6
	8/8/00	4.6
	11/10/00	4
	9/24/02	dry
	6/3/03	dry
MW-6	6/19/91	110
	2/19/93	63.5
	6/7/93	76.4
	9/28/93	85.9
	10/7/93	94.5
	1/26/94	95.8
	8/20/94	1.7
	12/20/94	94
	2/16/95	90.6
	11/10/00	59
	9/24/02	95.1
	6/3/03	74
MW-7	6/18/91	0.28
	6/7/93	3
	9/27/93	<2.8
	5/29/02	dry
	9/24/02	dry
	6/3/03	dry
MW-8	6/18/91	<0.06
	2/19/93	2.0
	6/7/93	<1.0
	9/27/93	<1.0
	1/27/94	<1.0
	11/10/00	<0.1
	11/10/00	<0.1
	3/23/01	0.21
	3/23/01	0.21
	8/28/01	0.33
	5/28/02	0.26
	6/3/03	0.13
MW-10	6/18/91	0.74
	2/19/93	1.2
	6/7/93	2.2
	9/27/93	2.1
	1/27/94	2.0
	5/28/02	dry
	9/24/02	dry
	6/3/03	NS
MW-12	6/19/91	7.8
	2/25/93	7.8
	6/7/93	8.5
	9/28/93	9.1
	1/27/94	7.3
	8/8/00	<10
	11/9/00	5.7
	3/22/01	8.4
	8/28/01	8.0
	5/28/02	2.0
	6/3/03	6.7
MW-13	6/19/91	6.3
	2/24/93	10.9
	6/8/93	8.1
	9/28/93	4.1
	1/27/94	5.4
	8/8/00	<12.5
	11/9/00	9.8
	3/22/01	13
	8/28/01	7.9
	5/28/02	6.0
	6/3/03	5.8

Monitoring Well	Sample Date	Nitrate (mg/l)
	NMOCD Standard: 10 mg/L	
MW-14	2/25/93	19.2
	6/8/93	17.5
	9/28/93	11.8
	1/27/94	15.4
	8/8/00	19
	11/13/00	0.24
	3/22/01	13
	8/28/01	20
	5/28/02	15
	6/3/03	15
MW-15	6/19/91	50
	2/24/93	5
	6/8/93	48.1
	9/28/93	43
	1/27/94	43.7
	8/8/00	35
	11/9/00	38
	3/22/01	25
	8/28/01	30
	5/28/02	24
	6/3/03	21
MW-16	6/19/91	0.07
	2/25/93	3.7
	6/8/93	<1.0
	6/3/03	NS
MW-17	2/25/93	15.3
	9/24/02	dry
	6/3/03	NS
MW-18	2/25/93	8.19
	6/8/93	<1.0
	9/28/93	<1.0
	9/24/02	3.1
	6/3/03	NS
MW-19	6/19/91	70
	2/25/93	10.6
	6/10/93	NA
	11/13/00	<0.1
	3/26/01	0.19
	5/30/02	0.13
	6/3/03	<0.10
MW-20	9/26/92	NA
	2/24/93	<1.0
	6/10/93	<1.0
	9/29/93	<1.0
	1/27/94	<1.0
	5/13/94	NA
	8/22/94	NA
	11/13/00	damaged
	6/3/03	abandoned
MW-23	9/26/92	0.62
	2/1/93	NA
	2/25/93	0.56
	6/8/93	<1.0
	9/29/93	<1.0
	2/10/94	<1.0
	5/13/94	NA
	8/22/94	NA
	11/13/00	0.12
	3/26/01	0.18
	5/30/02	0.23
	6/3/03	<0.10

Monitoring Well	Sample Date	Nitrate (mg/l)
	NMOCD Standard: 10 mg/L	
MW-24	9/26/92	1.42
	2/23/93	<1.0
	6/10/93	<1.0
	9/29/93	<1.0
	2/10/94	<1.0
	5/13/94	NA
	8/22/94	NA
	11/13/00	0.1
	3/26/01	0.18
	5/30/02	0.15
	6/3/03	dry
MW-26	2/25/93	23
	6/10/93	8.2
	3/26/01	0.24
	5/30/02	0.26
	6/3/03	NS
MW-27	2/26/93	<1.0
	6/10/93	<1.0
	9/30/93	<1.0
	2/2/94	<1.0
	5/14/94	NA
	11/13/00	0.28
	3/26/01	0.61
	5/30/02	0.21
	6/3/03	<0.10
MW-28	10/7/93	2.1
	2/2/94	2.8
	8/20/94	2.7
	12/20/94	0.33
	2/16/95	1.6
	8/10/00	25
	11/10/00	53
	3/23/01	34
	8/28/01	63
	5/28/02	83
	6/3/03	87
MW-29	10/7/93	8.3
	2/2/94	19.6
	8/20/94	28.8
	12/20/94	41
	2/16/95	28.1
	8/10/00	50
	11/10/00	66
	3/26/01	70
	8/28/01	58
	5/28/02	70
	6/3/03	79
MW-30	10/7/93	28.1
	2/2/94	57.1
	8/20/94	67.6
	2/16/95	91.3
	8/10/00	84
	11/10/00	70
	3/26/01	72
	8/28/01	76
	5/28/02	66
	6/3/03	58

< Indicates analyte not detected at the method detection limit (MDL). Value shown is the MDL.
Shaded values indicate exceedances of the NMWQCC Nitrate+Nitrite (as N) standard of 10 mg/L.

TABLE 3.1
GROUNDWATER CHLORINATED HYDROCARBON ANALYTICAL DATA (2002 and 2003)
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO

Monitoring Well	Sample Date	Static Water Level (ft btoc)	Chlorinated Hydrocarbons by EPA M 8260 (ug/L)						
			1,1-DCA	1,2-DCB	1,1-DCE	trans 1,2-DCE	cis 1,2-DCE	TCE	PCE
NMWQCC Water Quality Standard:			**25**	**NS**	**5.0**	**NS**	**NS**	**100**	**20**
US EPA MCL:			**NS**	**NS**	**7.0**	**100**	**70**	**5.0**	**5.0**
May 2002 Sampling Event									
MW-12	5/28/02	20.95	21	5.2	<1.0	1.7	20	8.0	3.0
MW-13	5/28/02	16.76	61	79	1.3	8.2	45	39	1.6
MW-14	5/29/02	21.57	8.7	<1.0	<1.0	<1.0	2.9	1.9	<1.0
MW-15	5/28/02	20.33	5.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
June 2003 Sampling Event									
MW-12	6/3/03	16.99	8.2	3.4	<2.0	<2.0	8.2	4.5	3.2
MW-13	6/3/03	14.44	53.8	50.5	1.4	8.2	33	35.1	1.4
MW-14	6/3/03	19.85	9.5	<2.0	<2.0	<2.0	3.3	2.4	<2.0
MW-15	6/3/03	18.85	6.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

Chlorinated Hydrocarbons by EPA Method 8260
PCE: Tetrachloroethene
TCE: Trichloroethene
DCE: Dichloroethene
DCB: Dichlorobenzene
DCA: Dichloroethane

< Indicates analyte not detected at the method detection limit (MDL). Value shown is the MDL.

NMWQCC: New Mexico Water Quality Control Commission
US EPA MCL: United States Environmental Protection Agency Maximum Contaminant Level

NS: No Standard

TABLE 4.1
GROUNDWATER SAMPLING SCHEDULE
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO

Monitoring Well	Analyses	Sampling Frequency
North Flare Pit Area		
MW-2	Nitrate+Nitrite	Annual
MW-19	Nitrate+Nitrite	Annual
MW-23	Nitrate+Nitrite	Annual
MW-24	Nitrate+Nitrite	Annual
MW-26	Nitrate+Nitrite	Annual
MW-27	Nitrate+Nitrite	Annual
South Flare Pit Area		
MW-5	Nitrate+Nitrite	Annual
MW-6	Nitrate+Nitrite	Annual
MW-7	Nitrate+Nitrite	Annual
MW-8	Nitrate+Nitrite	Annual
MW-28	Nitrate+Nitrite	Annual
MW-29	Nitrate+Nitrite	Annual
MW-30	Nitrate+Nitrite	Annual
D Plant Area		
MW-12	Nitrate+Nitrite, CHCs	Annual
MW-13	Nitrate+Nitrite, CHCs	Annual
MW-14	Nitrate+Nitrite, CHCs	Annual
MW-15	Nitrate+Nitrite, CHCs	Annual

CHCs: Chlorinated Hydrocarbons by EPA M 8260: 1,1-DCA, 1,1-DCE, 1,2-DCB, cis 1,2-DCE, trans 1,2-DCE, TCE and PCE.

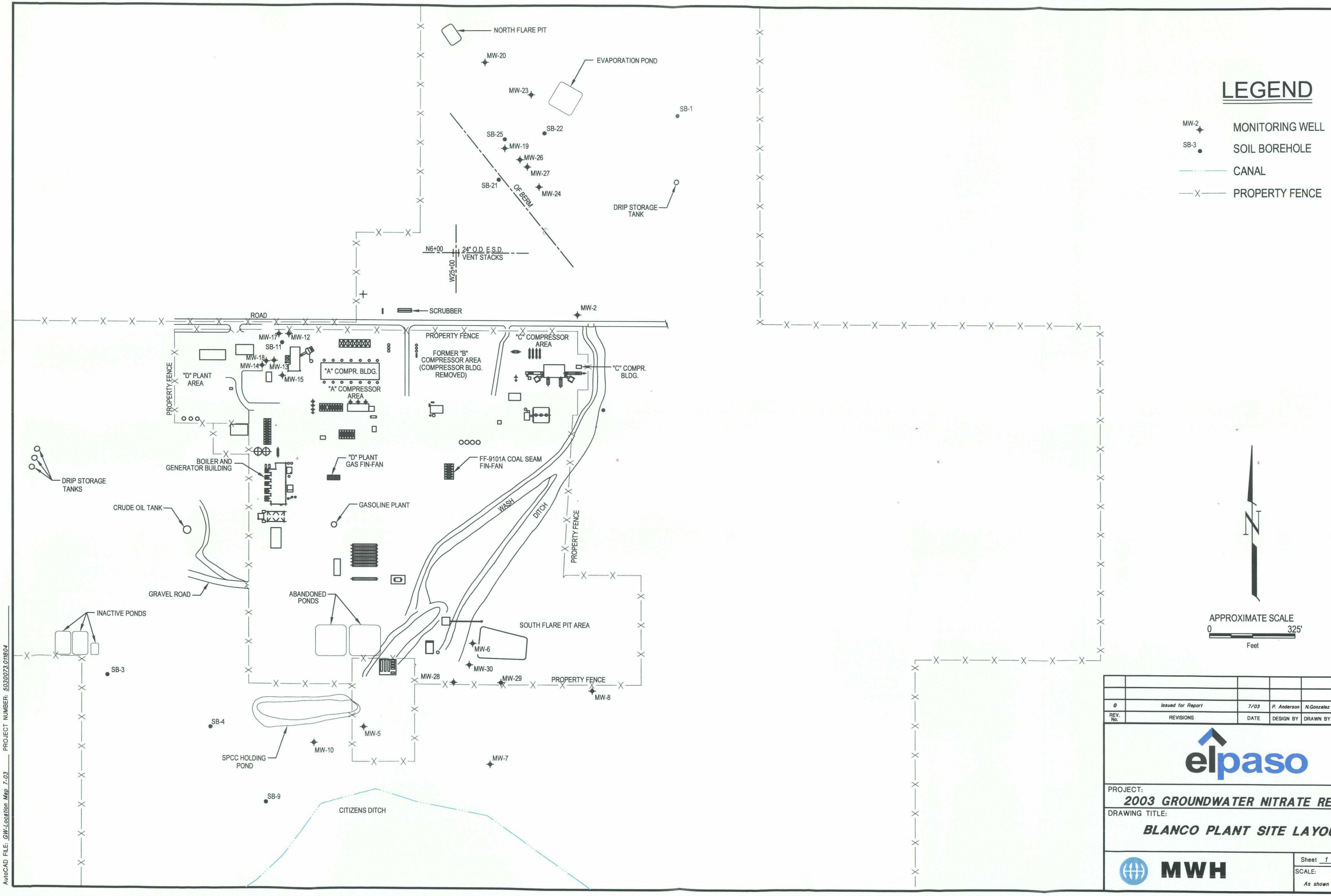
Nitrate+Nitrite as N by EPA M 353.2, 354.1, or 4500.

PCE: Tetrachloroethene
TCE: Trichloroethene
DCE: Dichloroethene
DCB: Dichlorobenzene
DCA: Dichloroethane

Figures

MWH

FIGURES



LEGEND

- MW-2 — MONITORING WELL
- SB-3 — SOIL BOREHOLE
- CANAL
- PROPERTY FENCE

N

APPROXIMATE SCALE
0 325'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	7/03	P. Anderson	N.Gonzalez	D. Ellerbroek

elpaso

PROJECT:
2003 GROUNDWATER NITRATE REPORT

DRAWING TITLE:
BLANCO PLANT SITE LAYOUT

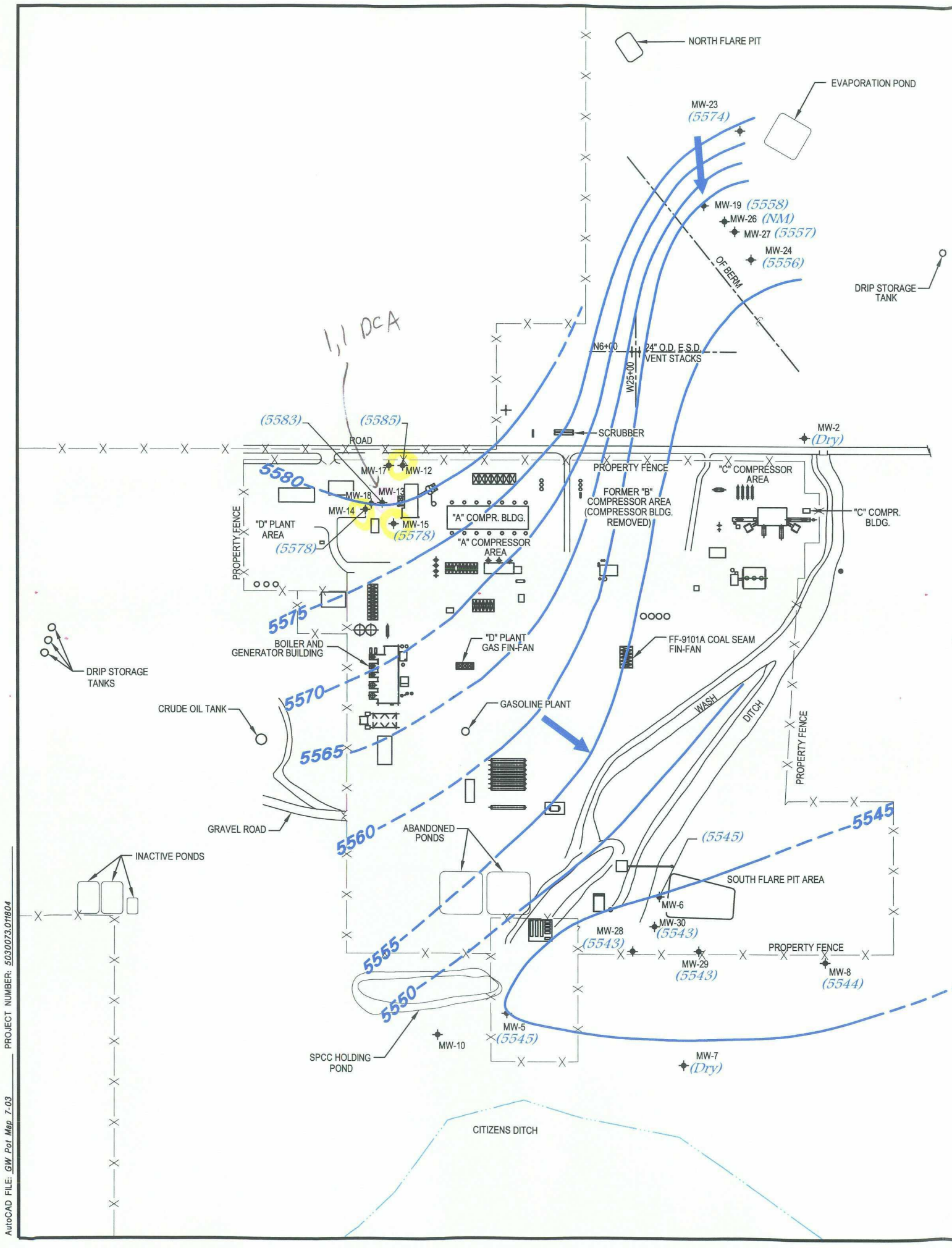
MWH

Sheet 1 Of 1 Sheets

SCALE: As shown

FIGURE No. 1.1

AutoCAD FILE: GW-Location Map 7-03 PROJECT NUMBER: 5030073.01B04



LEGEND

- MW-2 — MONITORING WELL
- (5585) — GROUNDWATER ELEVATION *(feet MSL)*
- NM — NOT MEASURED
- 5545 — APPROXIMATE GROUNDWATER ELEVATION CONTOUR *(feet MSL)*
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- CANAL
- PROPERTY FENCE

N

APPROXIMATE SCALE
0 325'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	7/03	P. Anderson	N.Gonzalez	D. Ellerbrook

elpaso

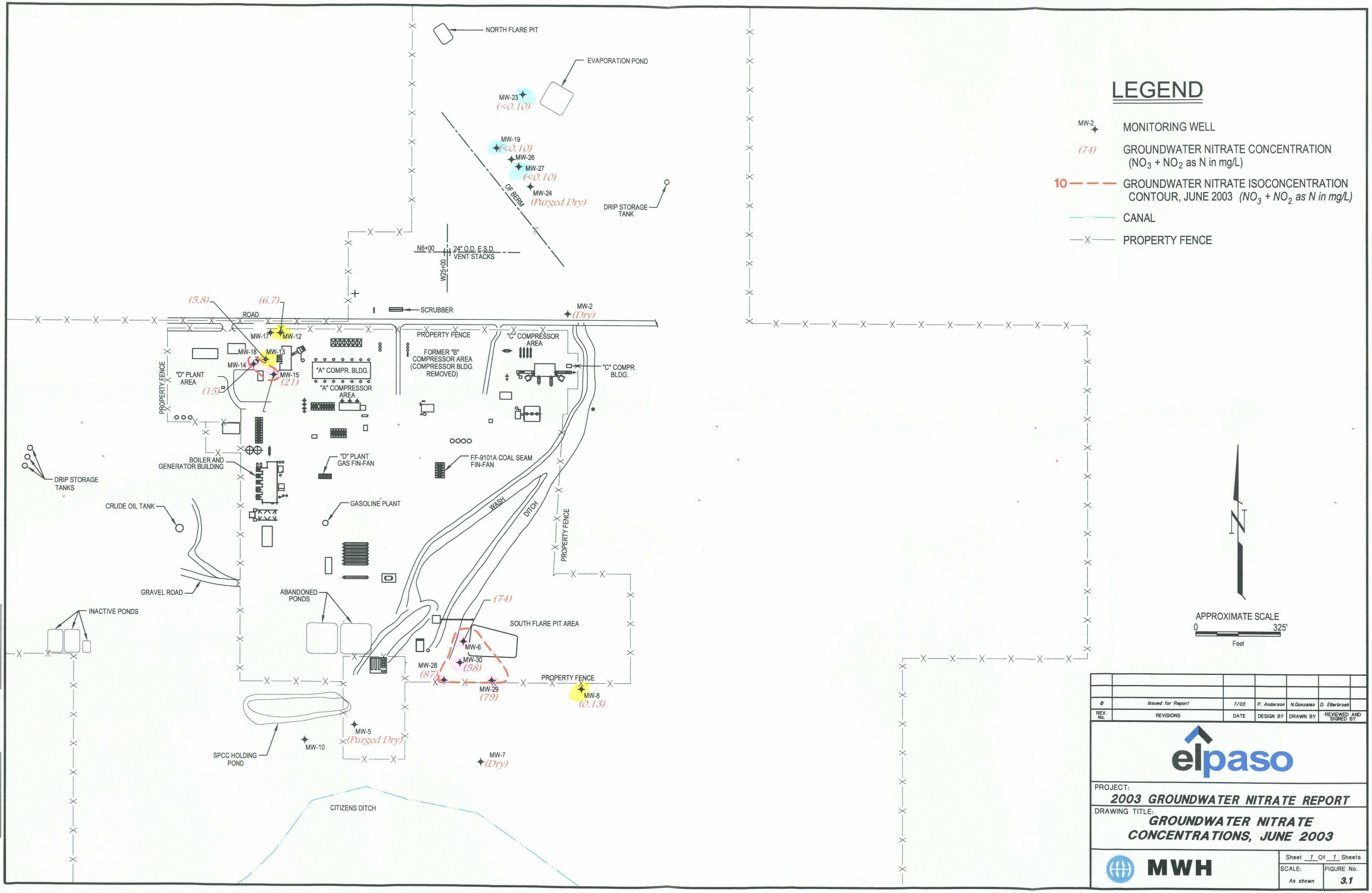
PROJECT:
2003 GROUNDWATER NITRATE REPORT

DRAWING TITLE:
GROUNDWATER POTENTIOMETRIC SURFACE MAP, JUNE 2003

MWH

Sheet 1 Of 1 Sheets
SCALE: As shown
FIGURE No. 2.1

AutoCAD FILE: GW Pot Map 7-03 PROJECT NUMBER: 5030073.011804



LEGEND

- MW-2 — MONITORING WELL
- (74) — GROUNDWATER NITRATE CONCENTRATION (NO_3 + NO_2 as N in mg/L)
- 10 — GROUNDWATER NITRATE ISOCONCENTRATION CONTOUR, JUNE 2003 (NO_3 + NO_2 as N in mg/L)
- CANAL
- PROPERTY FENCE

N

APPROXIMATE SCALE
0 325'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	7/03	P. Anderson	N.Gonzalez	D. Ellerbroek

elpaso

PROJECT: 2003 GROUNDWATER NITRATE REPORT

DRAWING TITLE: GROUNDWATER NITRATE CONCENTRATIONS, JUNE 2003

MWH

Sheet 1 Of 1 Sheets

SCALE: As shown

FIGURE No. 3.1

AutoCAD FILE: GW_NO3 conc 7-03 PROJECT NUMBER: 5030073.01804

Appendix A

MWH

APPENDIX A

FIELD SAMPLING FORMS

WATER LEVEL DATA

Martin J. Nee
PO Box 3861
Farmington, NM 87499-3861
(505)334-2791 (505)320-9675cell

Project Name_ San Juan Basin Ground Water **Project No.** 30001.0
Project Manager MJN
Client Company MWH **Date** 5-27-03
Site Name Blanco

Well	Time	Depth to Product (ft)	Depth to Water (ft)	Comments
MW-2	1130	-	-	Well is dry
MW-19		-	63.90	
MW-23		-	57.12	
MW-24		-	66.38	
MW-26		-		Product pump in well
MW-27		-	64.41	Very Strong HC odor
MW-5		-	20.36	
MW-6		-	29.62	
MW-7		-	-	Well is dry
MW-8		-	34.05	
MW-28		-	29.68	
MW-29		-	31.96	
MW-30		-	31.87	
MW-12		-	16.99	
MW-13		-	14.44	
MW-14		-	19.85	
MW-15		-	18.85	

Comments

Signature: *Martin J. Nee* Date: May 27, 2003

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 302201-0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-5 Development ☐ Sampling ☒

Project Manager: MJN Date: 6-2-03 Start Time: 1210 Weather: 80s Sunny Windy

Depth to Water: 20.36 Depth to Product: — Product Thickness: — Measuring Point: TOC

Water Column Height: 0.88 Well Dia.: 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other: or bail dry

Gal/ft x ft of water	Water Volume in Well: Gallons	Water Volume in Well: Ounces	Gal/oz to be removed
.88 x .65	.57	72.9	1.71 / 220

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (oz)	Comments/ Flow rate
1215	6.99	2340	25.5				20	water is light gray
	6.98	2220	22.6				38	
	7.10	2210	19.6				46	clean
1228	7.05	2150	20.2				78	well is dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1228	7.05	2150	20.2					78 oz	

COMMENTS: Returned @ 1331 to sample. Well had not recovered at all. No sample

INSTRUMENTATION: pH Meter ☒ DO Monitor ☐ Conductivity Meter ☒ Temperature Meter ☒ Other ☐

Water Disposal: Kutz

No Sample

Sample ID: Blanco MW-5 Sample Time: ____ BTEX ☐ VOCs ☐ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB ____

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001-0 Project Name: San Juan Basin Client: [illegible]
Location: Blanco Well No: MW-6 Development ☐ Sampling ☒
Project Manager: MJN Date: 6-3-03 Start Time: 1231 Weather: Sunny 90s
Depth to Water: 29.605 Depth to Product: — Product Thickness: — Measuring Point: TOC
Water Column Height: 1.61 Well Dia.: 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐
Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐
Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other: or bail dry

Gal/ft x ft of water	Water Volume In Well: Gallons	Water Volume In Well: Ounces	Gal/oz to be removed
1.61 x .65	1.04 x 3		3.13

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
1237	6.98	5030	22.2				.5	clear
	6.84	4900	20.4				.75	bailing down
1252	6.96	4890	20.5				1	dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
1252	6.96	4890	20.5					1 gal	

COMMENTS: Not enough water to fill bottle @ 1255 returned @ 1410 to fill

INSTRUMENTATION: pH Meter ☒ DO Monitor ☐ Conductivity Meter ☒ Temperature Meter ☒ Other ☐

Water Disposal: KUTZ
Sample ID: Blanco MW-6 Sample Time: 1255 BTEX ☐ VOCs ☐ Alkalinity ☐
TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐
Total Phosphorus ☐ ☐ ☐ ☐ ☐
MS/MSD ____ BD ____ BD Name/Time ____ TB [illegible]

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-8 Development ☐ Sampling ☒

Project Manager MTN Date 6-2-03 Start Time 1255 Weather 80s Sunny Windy

Depth to Water 34.35 Depth to Product ___ Product Thickness ___ Measuring Point ___

Water Column Height 2.6 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other bailed dry

Gal/ft x ft of water	Water Volume In Well: Gallons	Ounces	Gal/oz to be removed
2.6 x .65	1.68 x 3		5.01 Gal

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O (mg/L)	Turbidity (NTU)	Vol Evac (gal)	Comments/ Flow rate
1259	7.72	5750	21.9				5	clear
	7.65	5550	21.1				1.0	
1323	7.61	5600	22.1				1.5	well is dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
1323	7.61	5600	22.1					1.5	

COMMENTS: ___

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒ DO Monitor ☐ Other ☐ Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-8 Sample Time 1450 BTEX ☐ VOCs ☐ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ___ ☐ ___ ☐ ___ ☐ ___ ☐

MS/MSD ___ BD ___ BD Name/Time ___ TB ___

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30201.0 Project Name: San Juan Basin Client: [illegible]

Location: Blanco Well No: MW-12 Development ☐ Sampling ☒

Project Manager: MJN Date: 6-3-03 Start Time: 0854 Weather: Cloudy 80s

Depth to Water: 16.97 Depth to Product: — Product Thickness: — Measuring Point: TOC

Water Column Height: 9.7 Well Dia.: 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☐ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other: or bail dry

Gal/ft x ft of water	Water Volume in Well: Gallons	Water Volume in Well: Ounces	Gal/oz to be removed
.17 x .16	1.47 x 3		4.40

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/Flow rate
905	8.21	6100	16.7				0.5	clear
908	8.02	6650	16.6				1	
	7.87	6860	16.8				1.5	
914	7.81	6980	16.6				2.5	
	7.74	7150	16.6				3.5	
924	7.74	7330	16.7				4.5	

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
924	7.74	7330	16.7					4.5	clear

COMMENTS:

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒

DO Monitor ☐ Other ☐

Conductivity Meter ☒

Water Disposal: Kutz

Sample ID: Blanco MW-12 Sample Time: 0930 BTEX ☐ VOCs ☒ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD ___ BD ___ BD Name/Time ___ TB 20603BB1

WELL DEVELOPMENT AND SAMPLING LOG

Project No. 30001-0 Project Name: San Juan Basin Client MW4

Location: Blanco Well No: MW-13 Development ☐ Sampling ☒

Project Manager MTV Date 3-6-03 Start Time 0944 Weather Cloudy 80s

Depth to Water 14.37 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 8.70 Well Dia 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☐ Other on bad day

Gal/ft x ft of water	Water Volume in Well: Gallons	Ounces	Gal/oz to be removed
13.70 x .16	1.39 x 3		4.18

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (ga.)	Comments/ Flow rate
0957	7.35	4270	18.4				.5	clear
	7.27	8420	18.2				1	
	7.21	9170	17.7				1.5	
1007	7.20	9740	17.7				2.5	
	7.21	10210	17.7				3.5	
1015	7.21	10620	17.7				4.5	clear

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1015	7.21	10620	17.7					4.5	clear

COMMENTS:

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒ DO Monitor ☐ Other ☐ Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-13 Sample Time 1025 BTEX ☐ VOCs ☒ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ MS/MSD — BD — BD Name/Time — TB 030603TBQ1

WELL DEVELOPMENT AND SAMPLING LOG

Project No. 3000-0 Project Name: San Juan Basin Client: mwh

Location: Blanco Well No. MW-14 Development ☐ Sampling ☒

Project Manager MJN Date 6-3-03 Start Time 0820 Weather Cloudy 80s

Depth to Water 19.65 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 7.78 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☐ Other as bailed dry

Gal/ft x ft of water	Water Volume in Well: Gallons	Water Volume in Well: Ounces	Gal/oz to be removed
7.78 x .16	1.24 x 3		3.73

Time (military)	pH	SC (umhos/cm)	Temp (°C)	En-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac (gal.)	Comments/Flow rate
0828	7.22	8310	16.3				.25	Clear
	7.20	7370	17.0				.5	
	7.07	7670	17.0				1	
	6.48	8740	17.1				1.5	
0845	6.98	8250	17.3				1.8!	well bailed dry will return later to sample

Final:

Time	pH	SC	Temp	En-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0845	6.48	8250	17.3					1.81	

COMMENTS:

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒

DO Monitor ☐ Other ☐

Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-14 Sample Time 1420 BTEX ☐ VOCs ☒ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD BD BD Name/Time TB 230603TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30001.0 Project Name: San Juan Basin Client: MW-1

Location: Blanco Well No MW-15 Development ☐ Sampling ☒

Project Manager MJN Date 6-30-03 Start Time 1057 Weather cloudy, 80s

Depth to Water 18.58' Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 8.19 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other bail dry

Gal/ft x ft of water	Water Volume in Well: Gallons	Ounces	Gal/oz to be removed
5.8 x .16	1.3 x 3		3.93

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O (mg/L)	Turbidity (NTU)	Vol Evac (gal.)	Comments/ Flow rate
1051	5.03	9560	20.8				.5	Yellow
	4.49	11890	21.7				1	
	4.20	12650	21.4				1.5	
	3.89	13610	20.5				2.5	
	3.85	13470	20.0				3.5	
1109	3.79	13230	19.8				4.0	Yellow

Final:

Time	pH	SC	Temp	Eh-ORP	D.O	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
1109	3.79	13230	19.8					4.0	Yellow

COMMENTS

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒ DO Monitor ☐ Other ☐ Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco mw-15 Sample Time 1120 BTEX ☐ VOCs ☒ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD — BD — BD Name/Time — TB 030630BO1

WELL DEVELOPMENT AND SAMPLING LOG

Project No. 20001.0 Project Name San Juan Basin Client MWH

Location Blanco Well No: MW-19 Development ☐ Sampling ☒

Project Manager MJH Date 6-2-03 Start Time 1003 Weather 80s, Sunny

Depth to Water 63.77 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 35.3 Well Dia. 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other ~~or bailed dry~~

Cal/ft x ft of water	Water Volume in Well: Gallons	Ounces	Gal/oz to be removed
3.53 x .16	.56 x 3		1.68 gal / 216 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
	6.83	>20K	21.0				24	clear
	6.81	18.40	19.8				48	HC odor
1021	6.78	18.30	18.2				78	
	6.89	>20K	18.8				102	water is spurg
	6.83	>20K	18.9				118	
	6.85	18.20	18.9				128	almost dry
1058	6.89	>20K	19.2				134	well is dry will return later to sample

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1058	6.89	>20K	19.2					134	

COMMENTS:

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒

DO Monitor ☐ Other ☐

Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-19 Sample Time 1419 BTEX ☒ VOCs ☐ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD BD BD Name/Time TB

WELL DEVELOPMENT AND SAMPLING LOG

Project No 30001.0 Project Name: San Juan Basin Client: MWH

Location: Blanco Well No: MW-23 Development ☐ Sampling ☒

Project Manager MJN Date 6-2-03 Start Time 1048 Weather 80s Sunny Windy

Depth to Water 57.01 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 9.84 Well Dia. 4"

Sampling Method Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other 4 bail dry

Gal/ft x ft of water	Water Volume In Well: Gallons	Ounces	Gal/oz to be removed
9.84 x 0.65	6.4 x 3		19.9

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac (gal.)	Comments/ Flow rate
1058	7.03	>20K	21.4				1	water is gray & silty
	6.94	>20K	20.8				2	
	6.90	19,350	19.1				3	turned to dark gray
	7.13	>20K	19.5				8	well is almost dry
1130	7.24	>20K	19.9				85	Light gray well is dry will return later to sample.

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1140	7.24	>20K	19.9					85	

COMMENTS

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒

DO Monitor ☐ Other ☐

Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-23 Sample Time 1431 BTEX ☒ VOCs ☐ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD BD BD Name/Time TB 030603TB01

No Sample

WELL DEVELOPMENT AND SAMPLING LOG

Project No. 30016 Project Name. San Juan Basin Client: MWH
Location: Blanco Well No. MW-24 Development ☐ Sampling ☒
Project Manager MTN Date 6-2-03 Start Time 0800 Weather 80s
Depth to Water 66.40 Depth to Product — Product Thickness — Measuring Point TOC
Water Column Height 0.81 Well Dia 4"

Sampling Method Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐
Bottom Valve Bailer ☑ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐
Criteria: 3 to 5 Casing Volumes of Water Removal ☑ Sanitization of Indicator Parameters ☑ Other as bailing

Gal/ft x ft of water	Water Volume in Well: Gallons	Ounces	Gal/oz to be removed
0.81 x .65	.53 x 3		1.58 Gal (202 oz)

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac (gal.) oz	Comments/ Flow rate
	6.86	3330	16.5				16	Very Very dark gray
	6.93	3960	19.2				23	Strong HC Sheen
	6.98	4056	19.3				40	odor
0846	7.02	4120	20.5				70	well is dry
								well is dry no sample will return late in day

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
0846	7.02	4120	20.5					70oz	See below

COMMENTS: Returned @ 1342 hrs to collect sample. The wellbore still dry No sample.

INSTRUMENTATION pH Meter ☒ Temperature Meter ☒
DO Monitor ☐ Other ☐
Conductivity Meter ☒
Water Disposal Lutz
Sample ID NC Sample Time NC BTEX ☒ VOCs ☐ Alkilinity ☐
TDS ☐ Cations ☐ Anions ☐ Nitrate ☐ Nitrite ☐ Ammonia ☐ TKN ☐ NM WQCC Metals ☐
Total Phosphorus ☐
MS/MSD BD BD Name/Time TB

WELL DEVELOPMENT AND SAMPLING LOG

Project No 30001-0 Project Name San Juan Basin Client MW-H

Location Blanco Well No MW-27 Development ☐ Sampling ☒

Project Manager MTA Date 6-26-03 Start Time 0900 Weather 80s Sunny

Depth to Water 64.41 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 4.78 Well Dia 2"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other ~~or bail dry~~

Cas/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
4.78 x .16	28 x 3	99 x 3	249 oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	En-ORP (millivolts)	D.O (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
0904	7.09	4500	17.5				32	milky
	7.12	6050	19.0				84	strong HC odor
	7.11	6270	18.6				118	milky
0918	7.05	6350	18.4				152	
	7.13	7250	18.3				180	well is bailing down
	7.17	6460	18.4				204	
	7.20	6410	18.5				219	
	7.26	6270	18.4				231	
0935	7.27	6290	18.0				239	well has bailed dry will return 1hr to sample

Final:

Time	pH	SC	Temp	En-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
0935	7.27	6290	18.6				~~25~~	239	

COMMENTS: Appeared to be oil on water level probe. There was none on bailer.

INSTRUMENTATION: pH Meter ☐ ____ Temperature Meter ☒ ____

DO Monitor ☐ ____ Other ☐ ____

Conductivity Meter ☒ ____

Water Disposal Kirtland

Sample ID Blanco MW-27 Sample Time 1353 BTEX ☒ VOCs ☐ Alkalinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB 0626-031654

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 30221.0 Project Name San Juan Basin Client MWH
Location: Blanco Well No MW-28 Development: ☐ Sampling ☒
Project Manager MJN Date 6-3-03 Start Time 1340 Weather Sunny 70s Windy
Depth to Water 29.47 Depth to Product — Product Thickness — Measuring Point TOC
Water Column Height 3.6 Well Dia 4"

Sampling Method Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐
Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐
Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other or bail dry

Gal/ft x ft of water	Water Volume in Well: Gallons	Water Volume in Well: Ounces	Gal/oz to be removed
3.6 x .65	2.34		7.02

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal)	Comments/ Flow rate
1343	6.92	5270	21.7				.5	clear
	6.94	5150	20.3				1.25	
	6.97	4960	19.7				2.0	
	6.93	5090	20.4				5.0	
1357	6.91	5080	19.8				7.25	

Final:

Time	pH	SC	Temp	Eh-ORP	D.O	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
1357	6.91	5080	19.8					7.25	

COMMENTS: Well makes good water

INSTRUMENTATION: pH Meter ☒ Temperature Meter ☒
DO Monitor ☐ Other ☐
Conductivity Meter ☒

Water Disposal Kutz
Sample ID Blanco MW-28 Sample Time 1400 BTEX ☐ VOCs ☐ Alkalinity ☐
TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐
Total Phosphorus ☐ ☐ ☐ ☐ ☐
MS/MSD BD BD Name/Time TB 030603TB01

WELL DEVELOPMENT AND SAMPLING LOG

Project No 30001.0 Project Name San Juan Basin Client: PNM

Location Blanco Well No. MW-29 Development ☐ Sampling ☒

Project Manager MJH Date 6-3-03 Start Time 1148 Weather Sunny 80s

Depth to Water 3.65 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 5.25 Well Dia. 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other 10 build days

Cal/ft x ft of water	Water Volume in Well: Gallons	Ounces	Cal/oz to be removed
5.25 x .65	3.41 x 3		10.42

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac (gal.)	Comments/ Flow rate
1200	6.99	5500	23.1				1	clear
	7.00	53.0	20.3				2	
	7.05	51.10	20.3				3	
	7.12	51.30	20.0				4	well bailing foam
1223	7.20	53.10	19.9				5.25	well is dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
1223	7.20	53.10	19.9					5.25	

COMMENTS:

INSTRUMENTATION pH Meter ☒ Temperature Meter ☒

DO Monitor ☐ Other ☐

Conductivity Meter ☒

Water Disposal Kutz

Sample ID Blanco MW-29 Sample Time 1230 BTEX ☐ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ☐ ☐ ☐

MS/MSD BD BD Name/Time TB 030603CBQ1

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 32904-O Project Name: San Juan Basin Client: MWH
Location: Blanco Well No: MW-30 Development ☐ Sampling ☒
Project Manager: MTN Date: 6-3-03 Start Time: 1305 Weather: Sunny 90s
Depth to Water: 31.60 Depth to Product: — Product Thickness: — Measuring Point: TOC
Water Column Height: 4.83 Well Dia: 4"

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐
Bottom Valve Bailer ☒ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐
Criteria: 3 to 5 Casing Volumes of Water Removal ☒ Stabilization of Indicator Parameters ☒ Other: or bail dry

Gal/ft x ft of water	Water Volume in Well — Gallons	Ounces	Gal/oz to be removed
4.83 x .65	3.14x3		9.42

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal)	Comments/ Flow rate
1317	6.92	5350	22.7				1	clear
	6.87	5010	20.1				2	
	6.87	4740	19.2				3	
1328	7.04	4870	19.6				5.25	well has bailed dry

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac	Comments/Flow rate
1328	7.04	4870	19.6					5.25	

COMMENTS:

INSTRUMENTATION: pH Meter ☒ DO Monitor ☐ Conductivity Meter ☒ Temperature Meter ☒ Other ☐

Water Disposal: Kutz
Sample ID: Blanco MW-30 Sample Time: 1335 BTEX ☐ VOCs ☐ Alkalinity ☐
TDS ☐ Cations ☐ Anions ☐ Nitrate ☒ Nitrite ☒ Ammonia ☐ TKN ☐ NM WQCC Metals ☐
Total Phosphorus ☐ ☐ ☐ ☐ ☐
MS/MSD ____ BD ____ BD Name/Time ____ TB 430603TB01

☐ Development
☑ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW 12

Page 1 of 1

Project Name EPFS G.W. PROJECT Project Manager LISA WINN Project No. 157000121

Client Company El Paso Field Services

Site Name Blanco plant Site Address Bloomfield NM.

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☐ Stabilization of Indicator Parameters
☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 26.21
Initial Depth to Water (feet) 20.95
Height of Water Column in Well (feet) 5.26
Diameter (inches): Well 2" Gravel Pack _____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing	5.26	0.85 x 3	2.55
Gravel Pack			
Drilling Fluids			
Total			2.55

Instruments

	Serial No. (If applicable)
☑ pH Meter	YSI 63
☑ DO Monitor	YSI 95
☑ Conductivity Meter	YSI 63
☑ Temperature Meter	YSI 63
☐ Other _____	

Methods of Development

Pump: ☐ Centrifugal ☐ Submersible ☐ Peristaltic
Bailer: ☑ Bottom Valve ☐ Double Check Valve ☐ Stainless-steel Kemmerer
☐ Other _____

Water Disposal

Lutz Seperator Bloomfield NM.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
5-28-02	1404		X				.75	.75			19.8	7.45	10.91		clear, NO Odor
	1406		X				.75	1.5			17.2	7.46	10.34		" "
	1409		X				.75	2.25			16.7	7.46	10.35		" "
	1410		X				.75	3			16.6	7.45	10.49		" "
	1413		X			22.39	.75	3.75			16.3	7.46	10.35	0.66	no Change

Comments SAMPLED for VOC NITRATES 1420

Developer's Signature(s) [signature] Date 5-28-02 Reviewer [signature] Date 6/3/02

☐ Development
☑ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW 13

Page 1 of 1

Project Name EPFS G.W. project

Project Manager LISA winn

Project No. 152000121

Client Company El paso Field Services

Site Name Blanco plant

Site Address Bloomfield NM.

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☑ Stabilization of Indicator Parameters
☐ Other

Methods of Development

Pump	Bailer
☐ Centrifugal	☑ Bottom Valve
☐ Submersible	☐ Double Check Valve
☐ Peristaltic	☐ Stainless-steel Kemmerer

☐ Other

Water Volume Calculation

Initial Depth of Well (feet) 23.13
Initial Depth to Water (feet) 16.76
Height of Water Column in Well (feet) 6.37
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	6.37	1.03 X 3	3.09
Gravel Pack			
Drilling Fluids			
Total			3.09

Instruments

	Serial No. (If applicable)
☑ pH Meter	YSI 63
☑ DO Monitor	YSI 95
☑ Conductivity Meter	YSI 63
☑ Temperature Meter	YSI 63
☐ Other	

Water Disposal

Kutz Seperator Bloomfield NM.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
5-28-02	1316		X				.75	.75			21.9	6.85	13.65		clear NO odor
	1319		X				.75	1.5			17.9	6.97	13.39		" "
	1321		X				.75	2.28			17.5	7.02	13.36		" "
	1324		X				.75	3			16.9	7.00	13.18		" "
	1327		X			17.82	.75	3.75			16.9	7.03	13.15	0.74	NO Change

Comments SAMPled for VOC Nitrates 1335

Developer's Signature(s) [signature] Date 5-28-02

Reviewer [signature] Date 6/3/02

☐ Development
☑ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW 14 Page 1 of 1

Project Name EPFS G.W. Project Project Manager LISA Winn Project No. 151200012

Client Company El Paso Field Services

Site Name Blanco Plant Site Address Bloomfield N.M.

Development Criteria

☑ 3 to 5 Casing Volumes of Water Removal
☑ Stabilization of Indicator Parameters
☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 27.42
Initial Depth to Water (feet) 21.57
Height of Water Column in Well (feet) 5.85
Diameter (inches): Well ____ Gravel Pack ____

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing	5.85	0.95 X 3	2.85
Gravel Pack			
Drilling Fluids			
Total			2.85

Instruments

	Serial No. (If applicable)
☑ pH Meter	YSI 63
☑ DO Monitor	YSI 95
☑ Conductivity Meter	YSI 63
☑ Temperature Meter	YSI 63
☐ Other	

Methods of Development

Pump: ☐ Centrifugal ☐ Submersible ☐ Peristaltic
Bailer: ☑ Bottom Valve ☐ Double Check Valve ☐ Stainless-steel Kemmerer
☐ Other _____

Water Disposal

Kutz Separator Bloomfield N.M.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
5-29-02	1450		X				.75	.75			19.7	6.99	12.80		Clear NO Odor
	1453		X				.75	1.5			18.4	6.89	12.44		" "
	1457		X			22.07	.25	1.75			—	—	—	0.37	no Change
5-29-02	1430					21.82									

Comments After Bailing Approximately 1.75 gal Bailed well Dry Let Recover 24 HRS Sampled for VOCs NITRATES 1435

Developer's Signature(s) Rio A. Mar Date 5-29-02 Reviewer [illegible] Date 6/3/02

L:\forms\MW Dvlpmnt 2.dot 11/28/01

amec

WELL DEVELOPMENT AND PURGING DATA FORM

☐ Development
☑ Purging

Well Number MW 15

Page 1 of 1

Project Name EpFS GW project

Project Manager LISA Winn

Project No. 517000121

Client Company El paso Field Services

Site Name Blanco plant

Site Address Bloomfield NM.

Development Criteria

☑ (3) to 5 Casing Volumes of Water Removal
☑ Stabilization of Indicator Parameters
☐ Other

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☑ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Other

Water Volume Calculation

Initial Depth of Well (feet) 26.82
Initial Depth to Water (feet) 20.33
Height of Water Column in Well (feet) 6.49
Diameter (inches): Well 2" Gravel Pack

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	6.49	1.05 x3	3.15
Gravel Pack			
Drilling Fluids			
Total			3.15

Instruments — Serial No. (If applicable)

☑ pH Meter — YSI 63
☑ DO Monitor — YSI 95
☑ Conductivity Meter — YSI 63
☑ Temperature Meter — YSI 63
☐ Other

Water Disposal
Kutz Seperator Bloomfield NM.

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
5-28-02	1224						.75	.75			22.8	4.82	19.98		Cloudy yellow tint no odor
	1226						.75	1.5			19.4	4.38	20.04		" "
	1229						.75	2.25			18.7	4.15	20.06		Cloudy Light yellow tint, no odor
	1231						.75	3			18.5	4.06	20.03		" "
	1234					24.65	.75	3.75			18.7	4.03	20.41	1.35	no Change

Comments SAMpled for VOC NITraTES 1240

Developer's Signature(s) [signature] Date 5-28-02

Reviewer [signature] Date 6/3/02

Appendix B

MWH

APPENDIX B

LABORATORY ANALYTICAL REPORTS

ANALYTICAL DATA REPORT
CHLORINATED HYDROCARBONS
MAY 2002

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205224
PROJECT # : 1517000121 — DATE RECEIVED : 05/29/02
PROJECT NAME : BLANCO PLANT (SOUTH)

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-01	BLA-0205-MW12	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
Dichlorodifluoromethane (75-71-8)	1.0	< 1.0	ug/L
Chloromethane (74-87-9)	1.0	< 1.0	ug/L
Vinyl Chloride (75-01-4)	1.0	< 1.0	ug/L
Bromomethane (74-83-9)	2.0	< 2.0	ug/L
Chloroethane (75-00-3)	2.0	< 2.0	ug/L
Trichlorofluoromethane (75-69-4)	1.0	< 1.0	ug/L
Acetone (67-64-1)	10	< 10	ug/L
Acrolein (107-02-8)	5.0	< 5.0	ug/L
1,1-Dichloroethene (75-35-4)	1.0	< 1.0	ug/L
Iodomethane (74-88-4)	5.0	< 5.0	ug/L
Methylene Chloride (75-09-2)	1.0	< 1.0	ug/L
Acrylonitrile (107-13-1)	5.0	< 5.0	ug/L
cis-1,2-Dichloroethene (107-06-2)	**1.0**	**20**	**ug/L**
Methyl-t-butyl Ether (628-28-4)	1.0	< 1.0	ug/L
1,1,2-Trichlorotrifluoroethane (76-13-1)	5.0	< 5.0	ug/L
1,1-Dichloroethane (75-34-3)	**1.0**	**21**	**ug/L**
trans-1,2-Dichloroethene (156-60-5)	**1.0**	**1.7**	**ug/L**
2-Butanone (78-93-3)	10	< 10	ug/L
Carbon Disulfide (75-15-0)	1.0	< 1.0	ug/L
Bromochloromethane (74-97-5)	1.0	< 1.0	ug/L
Chloroform (67-66-3)	1.0	< 1.0	ug/L
2,2-Dichloropropane (594-20-7)	1.0	< 1.0	ug/L
1,2-Dichloroethane (107-06-2)	1.0	< 1.0	ug/L
Vinyl Acetate (108-05-4)	1.0	< 1.0	ug/L
1,1,1-Trichloroethane (71-55-6)	1.0	< 1.0	ug/L
1,1-Dichloropropene (563-58-6)	1.0	< 1.0	ug/L
Carbon Tetrachloride (56-23-5)	1.0	< 1.0	ug/L
Benzene (71-43-2)	1.0	< 1.0	ug/L
1,2-Dichloropropane (78-87-5)	1.0	< 1.0	ug/L
Trichloroethene (79-01-6)	**1.0**	**8.0**	**ug/L**
Bromodichloromethane (75-27-4)	1.0	< 1.0	ug/L
2-Chloroethyl Vinyl Ether (110-75-8)	10	< 10	ug/L
cis-1,3-Dichloropropene (10061-01-5)	1.0	< 1.0	ug/L
trans-1,3-Dichloropropene (10061-02-6)	1.0	< 1.0	ug/L
1,1,2-Trichloroethane (79-00-5)	1.0	< 1.0	ug/L
1,3-Dichloropropane (142-28-9)	1.0	< 1.0	ug/L
Dibromomethane (74-95-3)	1.0	< 1.0	ug/L
Toluene (108-88-3)	1.0	< 1.0	ug/L
1,2-Dibromoethane (106-93-4)	1.0	< 1.0	ug/L
4-Methyl-2-Pentanone (108-10-1)	10	< 10	ug/L
2-Hexanone (591-78-6)	10	< 10	ug/L
Dibromochloromethane (124-48-1)	1.0	< 1.0	ug/L
Tetrachloroethene (127-18-4)	**1.0**	**3.0**	**ug/L**
Chlorobenzene (108-90-7)	1.0	< 1.0	ug/L
Ethylbenzene (100-41-4)	1.0	< 1.0	ug/L

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205224
PROJECT # : 1517000121 — DATE RECEIVED : 05/29/02
PROJECT NAME : BLANCO PLANT (SOUTH)

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-01	BLA-0205-MW12	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
1,1,1,2-Tetrachloroethane (630-20-6)	1.0	< 1.0	ug/L
m&p Xylenes (108-38-3, 106-42-3)	1.0	< 1.0	ug/L
o-Xylene (95-47-6)	1.0	< 1.0	ug/L
Styrene (100-42-5)	1.0	< 1.0	ug/L
Bromoform (75-25-2)	1.0	< 1.0	ug/L
1,1,2,2-Tetrachloroethane (79-34-5)	1.0	< 1.0	ug/L
1,2,3-Trichloropropane (96-18-4)	1.0	< 1.0	ug/L
Isopropyl Benzene (98-82-8)	1.0	< 1.0	ug/L
Bromobenzene (108-86-1)	1.0	< 1.0	ug/L
trans-1,4-Dichloro-2-Butene (110-57-6)	1.0	< 1.0	ug/L
n-Propylbenzene (103-65-1)	1.0	< 1.0	ug/L
2-Chlorotoluene (95-49-8)	1.0	< 1.0	ug/L
4-Chlorotoluene (106-43-4)	1.0	< 1.0	ug/L
1,3,5-Trimethylbenzene (108-67-8)	1.0	< 1.0	ug/L
tert-Butylbenzene (98-06-6)	1.0	< 1.0	ug/L
1,2,4-Trimethylbenzene (95-63-6)	1.0	< 1.0	ug/L
sec-Butylbenzene (135-98-8)	1.0	< 1.0	ug/L
1,3-Dichlorobenzene (541-73-1)	1.0	< 1.0	ug/L
1,4-Dichlorobenzene (106-46-7)	1.0	< 1.0	ug/L
p-Isopropyltoluene (99-87-6)	1.0	< 1.0	ug/L
1,2-Dichlorobenzene (95-50-1)	**1.0**	**5.2**	**ug/L**
n-Butylbenzene (104-51-8)	1.0	< 1.0	ug/L
1,2-Dibromomo-3-chloropropane (96-12-8)	1.0	< 1.0	ug/L
1,2,4-Trichlorobenzene (120-82-1)	1.0	< 1.0	ug/L
Naphthalene (91-20-3)	3.0	< 3.0	ug/L
Hexachlorobutadiene (87-68-3)	1.0	< 1.0	ug/L
1,2,3-Trichlorobenzene (87-61-6)	1.0	< 1.0	ug/L

SURROGATE % RECOVERY		
1,2-Dichloroethane-d4	98	(80 - 120)
Toluene-d8	101	(88 - 110)
Bromofluorobenzene	100	(86 - 115)

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205224
PROJECT # : 1517000121 — DATE RECEIVED : 05/29/02
PROJECT NAME : BLANCO PLANT (SOUTH)

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-02	BLA-0205-MW13	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
Dichlorodifluoromethane (75-71-8)	1.0	< 1.0	ug/L
Chloromethane (74-87-9)	1.0	< 1.0	ug/L
Vinyl Chloride (75-01-4)	1.0	< 1.0	ug/L
Bromomethane (74-83-9)	2.0	< 2.0	ug/L
Chloroethane (75-00-3)	2.0	< 2.0	ug/L
Trichlorofluoromethane (75-69-4)	1.0	< 1.0	ug/L
Acetone (67-64-1)	10	< 10	ug/L
Acrolein (107-02-8)	5.0	< 5.0	ug/L
1,1-Dichloroethene (75-35-4)	**1.0**	**1.3**	**ug/L**
Iodomethane (74-88-4)	5.0	< 5.0	ug/L
Methylene Chloride (75-09-2)	1.0	< 1.0	ug/L
Acrylonitrile (107-13-1)	5.0	< 5.0	ug/L
cis-1,2-Dichloroethene (107-06-2)	**1.0**	**45**	**ug/L**
Methyl-t-butyl Ether (628-28-4)	1.0	< 1.0	ug/L
1,1,2-Trichlorotrifluoroethane (76-13-1)	5.0	< 5.0	ug/L
1,1-Dichloroethane (75-34-3)	**1.0**	**61**	**ug/L**
trans-1,2-Dichloroethene (156-60-5)	**1.0**	**8.2**	**ug/L**
2-Butanone (78-93-3)	10	< 10	ug/L
Carbon Disulfide (75-15-0)	1.0	< 1.0	ug/L
Bromochloromethane (74-97-5)	1.0	< 1.0	ug/L
Chloroform (67-66-3)	1.0	< 1.0	ug/L
2,2-Dichloropropane (594-20-7)	1.0	< 1.0	ug/L
1,2-Dichloroethane (107-06-2)	1.0	< 1.0	ug/L
Vinyl Acetate (108-05-4)	1.0	< 1.0	ug/L
1,1,1-Trichloroethane (71-55-6)	1.0	< 1.0	ug/L
1,1-Dichloropropene (563-58-6)	1.0	< 1.0	ug/L
Carbon Tetrachloride (56-23-5)	1.0	< 1.0	ug/L
Benzene (71-43-2)	**1.0**	**1.8**	**ug/L**
1,2-Dichloropropane (78-87-5)	1.0	< 1.0	ug/L
Trichloroethene (79-01-6)	**1.0**	**39**	**ug/L**
Bromodichloromethane (75-27-4)	1.0	< 1.0	ug/L
2-Chloroethyl Vinyl Ether (110-75-8)	10	< 10	ug/L
cis-1,3-Dichloropropene (10061-01-5)	1.0	< 1.0	ug/L
trans-1,3-Dichloropropene (10061-02-6)	1.0	< 1.0	ug/L
1,1,2-Trichloroethane (79-00-5)	1.0	< 1.0	ug/L
1,3-Dichloropropane (142-28-9)	1.0	< 1.0	ug/L
Dibromomethane (74-95-3)	1.0	< 1.0	ug/L
Toluene (108-88-3)	1.0	< 1.0	ug/L
1,2-Dibromoethane (106-93-4)	1.0	< 1.0	ug/L
4-Methyl-2-Pentanone (108-10-1)	10	< 10	ug/L
2-Hexanone (591-78-6)	10	< 10	ug/L
Dibromochloromethane (124-48-1)	1.0	< 1.0	ug/L
Tetrachloroethene (127-18-4)	**1.0**	**1.6**	**ug/L**
Chlorobenzene (108-90-7)	1.0	< 1.0	ug/L
Ethylbenzene (100-41-4)	1.0	< 1.0	ug/L

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL
PROJECT # : 1517000121
PROJECT NAME : BLANCO PLANT (SOUTH)
PINNACLE I.D. : 205224
DATE RECEIVED : 05/29/02

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-02	BLA-0205-MW13	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
1,1,1,2-Tetrachloroethane (630-20-6)	1.0	< 1.0	ug/L
m&p Xylenes (108-38-3, 106-42-3)	1.0	< 1.0	ug/L
o-Xylene (95-47-6)	1.0	< 1.0	ug/L
Styrene (100-42-5)	1.0	< 1.0	ug/L
Bromoform (75-25-2)	1.0	< 1.0	ug/L
1,1,2,2-Tetrachloroethane (79-34-5)	1.0	< 1.0	ug/L
1,2,3-Trichloropropane (96-18-4)	1.0	< 1.0	ug/L
Isopropyl Benzene (98-82-8)	1.0	< 1.0	ug/L
Bromobenzene (108-86-1)	1.0	< 1.0	ug/L
trans-1,4-Dichloro-2-Butene (110-57-6)	1.0	< 1.0	ug/L
n-Propylbenzene (103-65-1)	1.0	< 1.0	ug/L
2-Chlorotoluene (95-49-8)	1.0	< 1.0	ug/L
4-Chlorotoluene (106-43-4)	1.0	< 1.0	ug/L
1,3,5-Trimethylbenzene (108-67-8)	1.0	< 1.0	ug/L
tert-Butylbenzene (98-06-6)	1.0	< 1.0	ug/L
1,2,4-Trimethylbenzene (95-63-6)	1.0	< 1.0	ug/L
sec-Butylbenzene (135-98-8)	1.0	< 1.0	ug/L
1,3-Dichlorobenzene (541-73-1)	1.0	< 1.0	ug/L
1,4-Dichlorobenzene (106-46-7)	1.0	< 1.0	ug/L
p-Isopropyltoluene (99-87-6)	1.0	< 1.0	ug/L
1,2-Dichlorobenzene (95-50-1)	**1.0**	**79**	**ug/L**
n-Butylbenzene (104-51-8)	1.0	< 1.0	ug/L
1,2-Dibromomo-3-chloropropane (96-12-8)	1.0	< 1.0	ug/L
1,2,4-Trichlorobenzene (120-82-1)	1.0	< 1.0	ug/L
Naphthalene (91-20-3)	3.0	< 3.0	ug/L
Hexachlorobutadiene (87-68-3)	1.0	< 1.0	ug/L
1,2,3-Trichlorobenzene (87-61-6)	1.0	< 1.0	ug/L

SURROGATE % RECOVERY		
1,2-Dichloroethane-d4	98	(80 - 120)
Toluene-d8	102	(88 - 110)
Bromofluorobenzene	99	(86 - 115)

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205241
PROJECT # : 1517000121 — DATE RECEIVED : 05/31/02
PROJECT NAME : BLANCO PLANT SOUTH

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205241-01	BLA-0205-MW14	AQUEOUS	05/29/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
Dichlorodifluoromethane (75-71-8)	1.0	< 1.0	ug/L
Chloromethane (74-87-9)	1.0	< 1.0	ug/L
Vinyl Chloride (75-01-4)	1.0	< 1.0	ug/L
Bromomethane (74-83-9)	2.0	< 2.0	ug/L
Chloroethane (75-00-3)	2.0	< 2.0	ug/L
Trichlorofluoromethane (75-69-4)	1.0	< 1.0	ug/L
Acetone (67-64-1)	10	< 10	ug/L
Acrolein (107-02-8)	5.0	< 5.0	ug/L
1,1-Dichloroethene (75-35-4)	1.0	< 1.0	ug/L
Iodomethane (74-88-4)	5.0	< 5.0	ug/L
Methylene Chloride (75-09-2)	1.0	< 1.0	ug/L
Acrylonitrile (107-13-1)	5.0	< 5.0	ug/L
cis-1,2-Dichloroethene (107-06-2)	**1.0**	**2.9**	**ug/L**
Methyl-t-butyl Ether (628-28-4)	1.0	< 1.0	ug/L
1,1,2-Trichlorotrifluoroethane (76-13-1)	5.0	< 5.0	ug/L
1,1-Dichloroethane (75-34-3)	**1.0**	**8.7**	**ug/L**
trans-1,2-Dichloroethene (156-60-5)	1.0	< 1.0	ug/L
2-Butanone (78-93-3)	10	< 10	ug/L
Carbon Disulfide (75-15-0)	1.0	< 1.0	ug/L
Bromochloromethane (74-97-5)	1.0	< 1.0	ug/L
Chloroform (67-66-3)	1.0	< 1.0	ug/L
2,2-Dichloropropane (594-20-7)	1.0	< 1.0	ug/L
1,2-Dichloroethane (107-06-2)	1.0	< 1.0	ug/L
Vinyl Acetate (108-05-4)	1.0	< 1.0	ug/L
1,1,1-Trichloroethane (71-55-6)	1.0	< 1.0	ug/L
1,1-Dichloropropene (563-58-6)	1.0	< 1.0	ug/L
Carbon Tetrachloride (56-23-5)	1.0	< 1.0	ug/L
Benzene (71-43-2)	1.0	< 1.0	ug/L
1,2-Dichloropropane (78-87-5)	1.0	< 1.0	ug/L
Trichloroethene (79-01-6)	**1.0**	**1.9**	**ug/L**
Bromodichloromethane (75-27-4)	1.0	< 1.0	ug/L
2-Chloroethyl Vinyl Ether (110-75-8)	10	< 10	ug/L
cis-1,3-Dichloropropene (10061-01-5)	1.0	< 1.0	ug/L
trans-1,3-Dichloropropene (10061-02-6)	1.0	< 1.0	ug/L
1,1,2-Trichloroethane (79-00-5)	1.0	< 1.0	ug/L
1,3-Dichloropropane (142-28-9)	1.0	< 1.0	ug/L
Dibromomethane (74-95-3)	1.0	< 1.0	ug/L
Toluene (108-88-3)	1.0	< 1.0	ug/L
1,2-Dibromoethane (106-93-4)	1.0	< 1.0	ug/L
4-Methyl-2-Pentanone (108-10-1)	10	< 10	ug/L
2-Hexanone (591-78-6)	10	< 10	ug/L
Dibromochloromethane (124-48-1)	1.0	< 1.0	ug/L
Tetrachloroethene (127-18-4)	1.0	< 1.0	ug/L
Chlorobenzene (108-90-7)	1.0	< 1.0	ug/L
Ethylbenzene (100-41-4)	1.0	< 1.0	ug/L

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205241
PROJECT # : 1517000121 — DATE RECEIVED : 05/31/02
PROJECT NAME : BLANCO PLANT SOUTH

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205241-01	BLA-0205-MW14	AQUEOUS	05/29/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
1,1,1,2-Tetrachloroethane (630-20-6)	1.0	< 1.0	ug/L
m&p Xylenes (108-38-3, 106-42-3)	1.0	< 1.0	ug/L
o-Xylene (95-47-6)	1.0	< 1.0	ug/L
Styrene (100-42-5)	1.0	< 1.0	ug/L
Bromoform (75-25-2)	1.0	< 1.0	ug/L
1,1,2,2-Tetrachloroethane (79-34-5)	1.0	< 1.0	ug/L
1,2,3-Trichloropropane (96-18-4)	1.0	< 1.0	ug/L
Isopropyl Benzene (98-82-8)	1.0	< 1.0	ug/L
Bromobenzene (108-86-1)	1.0	< 1.0	ug/L
trans-1,4-Dichloro-2-Butene (110-57-6)	1.0	< 1.0	ug/L
n-Propylbenzene (103-65-1)	1.0	< 1.0	ug/L
2-Chlorotoluene (95-49-8)	1.0	< 1.0	ug/L
4-Chlorotoluene (106-43-4)	1.0	< 1.0	ug/L
1,3,5-Trimethylbenzene (108-67-8)	1.0	< 1.0	ug/L
tert-Butylbenzene (98-06-6)	1.0	< 1.0	ug/L
1,2,4-Trimethylbenzene (95-63-6)	1.0	< 1.0	ug/L
sec-Butylbenzene (135-98-8)	1.0	< 1.0	ug/L
1,3-Dichlorobenzene (541-73-1)	1.0	< 1.0	ug/L
1,4-Dichlorobenzene (106-46-7)	1.0	< 1.0	ug/L
p-Isopropyltoluene (99-87-6)	1.0	< 1.0	ug/L
1,2-Dichlorobenzene (95-50-1)	1.0	< 1.0	ug/L
n-Butylbenzene (104-51-8)	1.0	< 1.0	ug/L
1,2-Dibromomo-3-chloropropane (96-12-8)	1.0	< 1.0	ug/L
1,2,4-Trichlorobenzene (120-82-1)	1.0	< 1.0	ug/L
Naphthalene (91-20-3)	3.0	< 3.0	ug/L
Hexachlorobutadiene (87-68-3)	1.0	< 1.0	ug/L
1,2,3-Trichlorobenzene (87-61-6)	1.0	< 1.0	ug/L

SURROGATE % RECOVERY		
1,2-Dichloroethane-d4	99	(80 - 120)
Toluene-d8	103	(88 - 110)
Bromofluorobenzene	101	(86 - 115)

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST : VOLATILE ORGANICS EPA METHOD 8260
CLIENT : AMEC EARTH & ENVIRONMENTAL — PINNACLE I.D. : 205224
PROJECT # : 1517000121 — DATE RECEIVED : 05/29/02
PROJECT NAME : BLANCO PLANT (SOUTH)

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-03	BLA-0205-MW15	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
Dichlorodifluoromethane (75-71-8)	1.0	< 1.0	ug/L
Chloromethane (74-87-9)	1.0	< 1.0	ug/L
Vinyl Chloride (75-01-4)	1.0	< 1.0	ug/L
Bromomethane (74-83-9)	2.0	< 2.0	ug/L
Chloroethane (75-00-3)	2.0	< 2.0	ug/L
Trichlorofluoromethane (75-69-4)	1.0	< 1.0	ug/L
Acetone (67-64-1)	10	< 10	ug/L
Acrolein (107-02-8)	5.0	< 5.0	ug/L
1,1-Dichloroethene (75-35-4)	1.0	< 1.0	ug/L
Iodomethane (74-88-4)	5.0	< 5.0	ug/L
Methylene Chloride (75-09-2)	1.0	< 1.0	ug/L
Acrylonitrile (107-13-1)	5.0	< 5.0	ug/L
cis-1,2-Dichloroethene (107-06-2)	1.0	< 1.0	ug/L
Methyl-t-butyl Ether (628-28-4)	1.0	< 1.0	ug/L
1,1,2-Trichlorotrifluoroethane (76-13-1)	5.0	< 5.0	ug/L
1,1-Dichloroethane (75-34-3)	**1.0**	**5.3**	**ug/L**
trans-1,2-Dichloroethene (156-60-5)	1.0	< 1.0	ug/L
2-Butanone (78-93-3)	10	< 10	ug/L
Carbon Disulfide (75-15-0)	1.0	< 1.0	ug/L
Bromochloromethane (74-97-5)	1.0	< 1.0	ug/L
Chloroform (67-66-3)	**1.0**	**1.1**	**ug/L**
2,2-Dichloropropane (594-20-7)	1.0	< 1.0	ug/L
1,2-Dichloroethane (107-06-2)	1.0	< 1.0	ug/L
Vinyl Acetate (108-05-4)	1.0	< 1.0	ug/L
1,1,1-Trichloroethane (71-55-6)	1.0	< 1.0	ug/L
1,1-Dichloropropene (563-58-6)	1.0	< 1.0	ug/L
Carbon Tetrachloride (56-23-5)	1.0	< 1.0	ug/L
Benzene (71-43-2)	**1.0**	**1.1**	**ug/L**
1,2-Dichloropropane (78-87-5)	1.0	< 1.0	ug/L
Trichloroethene (79-01-6)	1.0	< 1.0	ug/L
Bromodichloromethane (75-27-4)	1.0	< 1.0	ug/L
2-Chloroethyl Vinyl Ether (110-75-8)	10	< 10	ug/L
cis-1,3-Dichloropropene (10061-01-5)	1.0	< 1.0	ug/L
trans-1,3-Dichloropropene (10061-02-6)	1.0	< 1.0	ug/L
1,1,2-Trichloroethane (79-00-5)	1.0	< 1.0	ug/L
1,3-Dichloropropane (142-28-9)	1.0	< 1.0	ug/L
Dibromomethane (74-95-3)	1.0	< 1.0	ug/L
Toluene (108-88-3)	1.0	< 1.0	ug/L
1,2-Dibromoethane (106-93-4)	1.0	< 1.0	ug/L
4-Methyl-2-Pentanone (108-10-1)	10	< 10	ug/L
2-Hexanone (591-78-6)	10	< 10	ug/L
Dibromochloromethane (124-48-1)	1.0	< 1.0	ug/L
Tetrachloroethene (127-18-4)	1.0	< 1.0	ug/L
Chlorobenzene (108-90-7)	1.0	< 1.0	ug/L
Ethylbenzene (100-41-4)	1.0	< 1.0	ug/L

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GC/MS RESULTS

TEST	: VOLATILE ORGANICS EPA METHOD 8260		
CLIENT	: AMEC EARTH & ENVIRONMENTAL	PINNACLE I.D. :	205224
PROJECT #	: 1517000121	DATE RECEIVED :	05/29/02
PROJECT NAME	: BLANCO PLANT (SOUTH)		

SAMPLE ID #	CLIENT ID	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
205224-03	BLA-0205-MW15	AQUEOUS	05/28/02	N/A	06/03/02	1

PARAMETER (CAS#)	DET. LIMIT	RESULT	UNITS
1,1,1,2-Tetrachloroethane (630-20-6)	1.0	< 1.0	ug/L
m&p Xylenes (108-38-3, 106-42-3)	1.0	< 1.0	ug/L
o-Xylene (95-47-6)	1.0	< 1.0	ug/L
Styrene (100-42-5)	1.0	< 1.0	ug/L
Bromoform (75-25-2)	1.0	< 1.0	ug/L
1,1,2,2-Tetrachloroethane (79-34-5)	1.0	< 1.0	ug/L
1,2,3-Trichloropropane (96-18-4)	1.0	< 1.0	ug/L
Isopropyl Benzene (98-82-8)	1.0	< 1.0	ug/L
Bromobenzene (108-86-1)	1.0	< 1.0	ug/L
trans-1,4-Dichloro-2-Butene (110-57-6)	1.0	< 1.0	ug/L
n-Propylbenzene (103-65-1)	1.0	< 1.0	ug/L
2-Chlorotoluene (95-49-8)	1.0	< 1.0	ug/L
4-Chlorotoluene (106-43-4)	1.0	< 1.0	ug/L
1,3,5-Trimethylbenzene (108-67-8)	1.0	< 1.0	ug/L
tert-Butylbenzene (98-06-6)	1.0	< 1.0	ug/L
1,2,4-Trimethylbenzene (95-63-6)	1.0	< 1.0	ug/L
sec-Butylbenzene (135-98-8)	1.0	< 1.0	ug/L
1,3-Dichlorobenzene (541-73-1)	1.0	< 1.0	ug/L
1,4-Dichlorobenzene (106-46-7)	1.0	< 1.0	ug/L
p-Isopropyltoluene (99-87-6)	1.0	< 1.0	ug/L
1,2-Dichlorobenzene (95-50-1)	1.0	< 1.0	ug/L
n-Butylbenzene (104-51-8)	1.0	< 1.0	ug/L
1,2-Dibromomo-3-chloropropane (96-12-8)	1.0	< 1.0	ug/L
1,2,4-Trichlorobenzene (120-82-1)	1.0	< 1.0	ug/L
Naphthalene (91-20-3)	3.0	< 3.0	ug/L
Hexachlorobutadiene (87-68-3)	1.0	< 1.0	ug/L
1,2,3-Trichlorobenzene (87-61-6)	1.0	< 1.0	ug/L

SURROGATE % RECOVERY		
1,2-Dichloroethane-d4	101	(80 - 120)
Toluene-d8	100	(88 - 110)
Bromofluorobenzene	100	(86 - 115)

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 5-28-02 PAGE: 1 OF 1

PLL Accession #:

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER:	Lisa Winn
COMPANY:	AMEC
ADDRESS:	2060 AFTON Place Farmington N.M. 87401
PHONE:	(505) 327-7928
FAX:	(505) 326-5721
BILL TO:	Scott Pope
COMPANY:	El Paso Field Service
ADDRESS:	C/4 Reilly Ave Farmington N.M. 87401

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) MTBE	8021 (BTEX) ☐MTBE ☐TMB ☐PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB ☐ / DBCP ☐	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides/PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry:	Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311)	Metals:	NUMBER OF CONTAINERS
							Associated Metals							VOCs										See Attached					See Attached	
BLA-0205-MW 12	5-28-02	1420	H_2O				X							X															6
BLA-0205-MW 13	5-28-02	1335	H_2O				X							X															6
BLA-0205-MW 15	5-28-02	1240	H_2O				X							X															6
BLA-0205-MW 29	5-28-02	1140	H_2O				X																X				X		5
Trip Blank	5-20-02	1550	H_2O											X															1

PROJECT INFORMATION	
PROJ. NO.:	15170000121
PROJ. NAME	EPFS GW proj.
P.O. NO.:	
SHIPPED VIA	Greyhound

SAMPLE RECEIPT	
NO. CONTAINERS	
CUSTODY SEALS	Y / N / NA
RECEIVED INTACT	
BLUE ICE/ICE	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐24hr ☐48hr ☐72hr ☐1 WEEK (NORMAL) ☑

CERTIFICATION REQUIRED ☐NM ☐SDWA ☐OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

BLANCO plant (SOUTH)

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
Signature: Time: 1600	Signature: Time:
Printed Name: Chris MAEZ Date: 5-28-02	Printed Name: Date:
Company:	Company:
See reverse side (Force Majeure)	
RECEIVED BY: 1.	**RECEIVED BY: (LAB) 2.**
Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:
Company:	Pinnacle Laboratories Inc.

ANALYTICAL DATA REPORTS
NITRATE + NITRITE (as N)
JUNE 2003

Gulf Coast
ACCUTEST
Laboratories

07/01/03

Technical Report for

Montgomery Watson

EPFS San Juan Basin GS

San Juan Basin Blanco

Accutest Job Number: T4438

Report to:

Pamela.J.Anderson@us.mwhglobal.com

Total number of pages in report: 10

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Sample Summary

Montgomery Watson

Job No: T4438

EPFS San Juan Basin GS
Project No: San Juan Basin Blanco

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
T4438-1	06/02/03	13:53	MN	06/03/03	AQ	Water	BLANCO MW-27
T4438-2	06/02/03	14:19	MN	06/03/03	AQ	Water	BLANCO MW-19
T4438-3	06/02/03	14:31	MN	06/03/03	AQ	Water	BLANCO MW-23
T4438-4	06/02/03	14:50	MN	06/03/03	AQ	Water	BLANCO MW-8

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-27		
Lab Sample ID:	T4438-1	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	< 0.10	0.10	mg/l	1	06/03/03 14:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	< 0.050	0.050	mg/l	1	06/03/03 14:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/03/03 13:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-19		
Lab Sample ID:	T4438-2	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	< 0.10	0.10	mg/l	1	06/03/03 14:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	< 0.050	0.050	mg/l	1	06/03/03 14:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/03/03 13:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-23		
Lab Sample ID:	T4438-3	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	< 0.10	0.10	mg/l	1	06/03/03 14:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	< 0.050	0.050	mg/l	1	06/03/03 14:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/03/03 13:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-8		
Lab Sample ID:	T4438-4	Date Sampled:	06/02/03
Matrix:	AQ - Water	Date Received:	06/03/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.13	0.10	mg/l	1	06/03/03 14:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	0.13	0.050	mg/l	1	06/03/03 14:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/03/03 13:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4438
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	RL	MB Result	Units	BSP %Recov	QC Limits
Nitrogen, Nitrate + Nitrite	GN4410	0.050	<0.050	mg/l	97.0	80-114%
Nitrogen, Nitrite	GN4409	0.050	<0.050	mg/l	100.0	80-120%

Associated Samples:
Batch GN4409: T4438-1, T4438-2, T4438-3, T4438-4
Batch GN4410: T4438-1, T4438-2, T4438-3, T4438-4

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4438
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Nitrogen, Nitrate + Nitrite	GN4410	T4438-4	mg/l	0.13	0.13	0.0	0-5%
Nitrogen, Nitrite	GN4409	T4438-4	mg/l	<0.050	<0.050	0.0	0-20%

Associated Samples:
Batch GN4409: T4438-1, T4438-2, T4438-3, T4438-4
Batch GN4410: T4438-1, T4438-2, T4438-3, T4438-4

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4438
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Nitrogen, Nitrate + Nitrite	GN4410	T4438-4	mg/l	0.13	0.100	0.23	100.0	90-115%
Nitrogen, Nitrite	GN4409	T4438-1	mg/l	<0.050	0.100	0.11	107.0	75-125%

Associated Samples:
Batch GN4409: T4438-1, T4438-2, T4438-3, T4438-4
Batch GN4410: T4438-1, T4438-2, T4438-3, T4438-4

ACCUTEST Laboratories

CHAIN OF CUSTODY # 020603MN01

10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking #	Bottle Order Control #
836557901566	
Accutest Quote #	Accutest Job #

Client / Reporting Information

Company Name: MWH / El Paso
Address: 614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 505 599 2178
Sampler's Name: Martin Nee

Project Information

Project Name: San Juan Basin Blanco
Street:
City: State:
Project #:
Fax #: 505 599 2119
Client Purchase Order #:

Requested Analysis: Nitrate Nitrite

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Date	Time	Sampled By	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	Nitrate Nitrite	LAB USE ONLY
1	Blanco MW-27		6-2-3	1353	MN	WG	1					X				X	2BB
2	Blanco MW-19		6-2-3	1419	MN	WG	1					X				X	
3	Blanco MW-23		6-2-3	1431	MN	WG	1					X				X	
4	Blanco MW-8		6-2-3	1450	MN	WG	1					X				X	
	Temp Blank																

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe

Turnaround Time (Business Days) — Approved By: / Date:

- [x] 10 Day STANDARD
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format ____

Commercial "A" = Results Only

Comments / Remarks

T4438

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler: 1 [signature]	Date Time: 6-2-03 1630	Received by: 1	Relinquished by: 2	Date Time: 6-3-03 0845	Received by: 2 [signature]
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☐	On Ice X Cooler Temp. 5.0°C

Gulf Coast
ACCUTEST
Laboratories

06/09/03

Technical Report for

Montgomery Watson

EPFS San Juan Basin GS

San Juan Basin Blanco

Accutest Job Number: T4449

Report to:

El Paso

scott.pope@elpaso.com

Total number of pages in report: 14

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Sample Summary

Montgomery Watson

Job No: T4449

EPFS San Juan Basin GS
Project No: San Juan Basin Blanco

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
T4449-1	06/03/03	09:30	MJN	06/04/03	AQ	Water	BLANCO MW-12
T4449-2	06/03/03	10:25	MJN	06/04/03	AQ	Water	BLANCO MW-13
T4449-3	06/03/03	11:20	MJN	06/04/03	AQ	Water	BLANCO MW-15
T4449-4	06/03/03	12:30	MJN	06/04/03	AQ	Water	BLANCO MW-29
T4449-5	06/03/03	12:55	MJN	06/04/03	AQ	Water	BLANCO MW-6
T4449-6	06/03/03	13:35	MJN	06/04/03	AQ	Water	BLANCO MW-30
T4449-7	06/03/03	14:00	MJN	06/04/03	AQ	Water	BLANCO MW-28
T4449-8	06/03/03	14:20	MJN	06/04/03	AQ	Water	BLANCO MW-14

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-12		
Lab Sample ID:	T4449-1	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	6.7	1.3	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	6.7	1.3	mg/l	25	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-13		
Lab Sample ID:	T4449-2	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	5.8	1.3	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	5.9	1.3	mg/l	25	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	0.090	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-15		
Lab Sample ID:	T4449-3	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	21.0	1.3	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	21.0	1.3	mg/l	25	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-29		
Lab Sample ID:	T4449-4	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	78.7	5.1	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	79.0	5.0	mg/l	100	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	0.30	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-6		
Lab Sample ID:	T4449-5	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	74.0	5.1	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	74.0	5.0	mg/l	100	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-30		
Lab Sample ID:	T4449-6	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	58.0	5.1	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	58.0	5.0	mg/l	100	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	< 0.050	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-28		
Lab Sample ID:	T4449-7	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	86.9	5.1	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	87.0	5.0	mg/l	100	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	0.10	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-14		
Lab Sample ID:	T4449-8	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
		Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	14.8	1.3	mg/l	1	06/06/03 11:00	LN	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	15.0	1.3	mg/l	25	06/06/03 11:00	LN	EPA 353.2
Nitrogen, Nitrite	0.20	0.050	mg/l	1	06/04/03 14:00	LN	EPA 353.2

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RL = Reporting Limit

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4449
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	RL	MB Result	Units	BSP %Recov	QC Limits
Nitrogen, Nitrate + Nitrite	GN4423	0.050	<0.050	mg/l	99.0	80-114%
Nitrogen, Nitrite	GN4411	0.050	<0.050	mg/l	112.0	80-120%

Associated Samples:
Batch GN4411: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8
Batch GN4423: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4449
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Nitrogen, Nitrate + Nitrite	GN4423	T4449-4	mg/l	79.0	80.0	1.3	0-5%
Nitrogen, Nitrite	GN4411	T4449-4	mg/l	0.30	0.30	0.0	0-20%

Associated Samples:
Batch GN4411: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8
Batch GN4423: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: T4449
Account: MWHSLCUT - Montgomery Watson
Project: EPFS San Juan Basin GS

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Nitrogen, Nitrate + Nitrite	GN4423	T4449-4	mg/l	79.0	10.0	88.0	90.0	90-115%
Nitrogen, Nitrite	GN4411	T4449-4	mg/l	0.30	0.100	<0.050	100.0	75-125%

Associated Samples:
Batch GN4411: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8
Batch GN4423: T4449-1, T4449-2, T4449-3, T4449-4, T4449-5, T4449-6, T4449-7, T4449-8

CHAIN OF CUSTODY

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 836557900651 | Bottle Order Control # | Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: MWH/GL P250
Address: 1614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 5055992178
Sampler's Name: MJ Nee

Project Information

Project Name: San Juan Basin Blanco
Street:
City: State:
Project #:
Fax #:
Client Purchase Order #:

Requested Analysis

NITRATE - NITRITE as N by EPA M 353.2, 354.1 or 4500

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

LAB USE ONLY: 25B

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	Na2SO4	MEOH	ENCORE	NITRATE - NITRITE as N
1	Blanco MW-12		6-3-03	0930	MN	WG	1					1				X
2	Blanco MW-13		6-3-03	1025	MN	WG	1					1				X
3	Blanco MW-15		6-3-03	1120	MN	WG	1					1				X
4	Blanco MW-29		6-3-03	1230	MN	WG	1					1				X
5	Blanco MW-6		6-3-03	1255	MN	WG	1					1				X
6	Blanco MW-30		6-3-03	1335	MN	WG	1					1				X
7	Blanco MW-28		6-3-03	1400	MN	WG	1					1				X
8	Blanco MW-14		6-3-03	1420	MN	WG	1					1				X

Turnaround Time (Business Days)

- [x] 10 Day STANDARD — Approved By: / Date:
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] Other

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

T4449

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time: 6-3-03 1630	Received by: 1	Relinquished by 2	Date Time: 6-4-03 0845	Received by: 2
Relinquished by: 3	Date Time:	Received by: 3	Relinquished by: 4	Date Time:	Received by: 4
Relinquished by: 5	Date Time:	Received by: 5	Custody Seal #	Preserved where applicable ☐	On Ice X Cooler Temp. 5.3°C

ANALYTICAL DATA REPORT
CHLORINATED HYDROCARBONS
JUNE 2003

Gulf Coast
ACCUTEST.
Laboratories

06/13/03

Technical Report for

Montgomery Watson

EPFS San Juan Basin GS

San Juan Basin Blanco

Accutest Job Number: T4448

Report to:

El Paso

scott.pope@elpaso.com

ATTN: Scott Pope

Total number of pages in report: 14

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Ron Martino
Laboratory Manager

Accutest Laboratories

Sample Summary

Montgomery Watson

Job No: T4448

EPFS San Juan Basin GS
Project No: San Juan Basin Blanco

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
T4448-1	06/03/03	09:30	MJN	06/04/03	AQ	Water	BLANCO MW-12
T4448-2	06/03/03	10:25	MJN	06/04/03	AQ	Water	BLANCO MW-13
T4448-3	06/03/03	11:20	MJN	06/04/03	AQ	Water	BLANCO MW-15
T4448-4	06/03/03	14:20	MJN	06/04/03	AQ	Water	BLANCO MW-14
T4448-5	06/03/03	07:00	MJN	06/04/03	AQ	Trip Blank Water	030603TB01

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-12		
Lab Sample ID:	T4448-1	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F0055519.D	1	06/08/03	JH	n/a	n/a	VF852
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	8.2	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	8.2	2.0	ug/l	
95-50-1	o-Dichlorobenzene	3.4	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	3.2	2.0	ug/l	
79-01-6	Trichloroethylene	4.5	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		88-114%
17060-07-0	1,2-Dichloroethane-D4	97%		81-122%
2037-26-5	Toluene-D8	101%		88-110%
460-00-4	4-Bromofluorobenzene	104%		88-115%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	BLANCO MW-13		
Lab Sample ID:	T4448-2	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	Z1988.D	1	06/12/03	JH	n/a	n/a	VZ104
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	53.8	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	1.4	2.0	ug/l	J
156-59-2	cis-1,2-Dichloroethylene	33.0	2.0	ug/l	
95-50-1	o-Dichlorobenzene	50.5	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	8.2	2.0	ug/l	
127-18-4	Tetrachloroethylene	1.4	2.0	ug/l	J
79-01-6	Trichloroethylene	35.1	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		88-114%
17060-07-0	1,2-Dichloroethane-D4	102%		81-122%
2037-26-5	Toluene-D8	97%		88-110%
460-00-4	4-Bromofluorobenzene	97%		88-115%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-15		
Lab Sample ID:	T4448-3	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z1991.D	1	06/12/03	JH	n/a	n/a	VZ104
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	6.0	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	2.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	2.0	ug/l	
79-01-6	Trichloroethylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		88-114%
17060-07-0	1,2-Dichloroethane-D4	100%		81-122%
2037-26-5	Toluene-D8	99%		88-110%
460-00-4	4-Bromofluorobenzene	99%		88-115%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANCO MW-14		
Lab Sample ID:	T4448-4	Date Sampled:	06/03/03
Matrix:	AQ - Water	Date Received:	06/04/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Z1987.D	1	06/11/03	JH	n/a	n/a	VZ104
Run #2	F0055522.D	1	06/08/03	JH	n/a	n/a	VF852

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA TCL List

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	9.5	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	3.3	2.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	2.0	ug/l	
79-01-6	Trichloroethylene	2.4	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%	73% [a]	88-114%
17060-07-0	1,2-Dichloroethane-D4	102%	47% [a]	81-122%
2037-26-5	Toluene-D8	98%	137% [a]	88-110%
460-00-4	4-Bromofluorobenzene	97%	143% [a]	88-115%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	030603TB01		
Lab Sample ID:	T4448-5	Date Sampled:	06/03/03
Matrix:	AQ - Trip Blank Water	Date Received:	06/04/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	EPFS San Juan Basin GS		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F0055518.D	1	06/08/03	JH	n/a	n/a	VF852
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA TCL List

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	2.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	2.0	ug/l	
79-01-6	Trichloroethylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		88-114%
17060-07-0	1,2-Dichloroethane-D4	98%		81-122%
2037-26-5	Toluene-D8	100%		88-110%
460-00-4	4-Bromofluorobenzene	102%		88-115%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Blank Spike Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VF852-BS	F0055515.D	1	06/08/03	JH	n/a	n/a	VF852

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-1, T4448-4, T4448-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
75-34-3	1,1-Dichloroethane	25	26.2	105	74-127
75-35-4	1,1-Dichloroethylene	25	27.8	111	70-134
156-59-2	cis-1,2-Dichloroethylene	25	23.7	95	76-125
95-50-1	o-Dichlorobenzene	25	24.5	98	77-116
156-60-5	trans-1,2-Dichloroethylene	25	26.8	107	72-131
127-18-4	Tetrachloroethylene	25	27.3	109	69-134
79-01-6	Trichloroethylene	25	25.4	102	75-128

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	100%	88-114%
17060-07-0	1,2-Dichloroethane-D4	99%	81-122%
2037-26-5	Toluene-D8	103%	88-110%
460-00-4	4-Bromofluorobenzene	98%	88-115%

Blank Spike Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VZ104-BS	Z1971.D	1	06/11/03	JH	n/a	n/a	VZ104

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-2, T4448-3, T4448-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
75-34-3	1,1-Dichloroethane	25	25.2	101	74-127
75-35-4	1,1-Dichloroethylene	25	26.8	107	70-134
156-59-2	cis-1,2-Dichloroethylene	25	23.6	94	76-125
95-50-1	o-Dichlorobenzene	25	23.4	94	77-116
156-60-5	trans-1,2-Dichloroethylene	25	26.1	104	72-131
127-18-4	Tetrachloroethylene	25	25.2	101	69-134
79-01-6	Trichloroethylene	25	24.5	98	75-128

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	100%	88-114%
17060-07-0	1,2-Dichloroethane-D4	99%	81-122%
2037-26-5	Toluene-D8	99%	88-110%
460-00-4	4-Bromofluorobenzene	99%	88-115%

Method Blank Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VF852-MB	F0055516.D	1	06/08/03	JH	n/a	n/a	VF852

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-1, T4448-4, T4448-5

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	2.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	2.0	ug/l	
79-01-6	Trichloroethylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	100%	88-114%
17060-07-0	1,2-Dichloroethane-D4	95%	81-122%
2037-26-5	Toluene-D8	99%	88-110%
460-00-4	4-Bromofluorobenzene	103%	88-115%

Method Blank Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VZ104-MB	Z1972.D	1	06/11/03	JH	n/a	n/a	VZ104

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-2, T4448-3, T4448-4

CAS No.	Compound	Result	RL	Units	Q
75-34-3	1,1-Dichloroethane	ND	2.0	ug/l	
75-35-4	1,1-Dichloroethylene	ND	2.0	ug/l	
156-59-2	cis-1,2-Dichloroethylene	ND	2.0	ug/l	
95-50-1	o-Dichlorobenzene	ND	2.0	ug/l	
156-60-5	trans-1,2-Dichloroethylene	ND	2.0	ug/l	
127-18-4	Tetrachloroethylene	ND	2.0	ug/l	
79-01-6	Trichloroethylene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	88-114%
17060-07-0	1,2-Dichloroethane-D4	99%	81-122%
2037-26-5	Toluene-D8	98%	88-110%
460-00-4	4-Bromofluorobenzene	99%	88-115%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T4448-2MS	Z1989.D	1	06/12/03	JH	n/a	n/a	VZ104
T4448-2MSD	Z1990.D	1	06/12/03	JH	n/a	n/a	VZ104
T4448-2 [a]	Z1988.D	1	06/12/03	JH	n/a	n/a	VZ104

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-2, T4448-3, T4448-4

CAS No.	Compound	T4448-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-34-3	1,1-Dichloroethane	53.8		25	82.1	113	77.5	95	6	78-125/11
75-35-4	1,1-Dichloroethylene	1.4	J	25	28.2	107	28.1	107	0	72-136/12
156-59-2	cis-1,2-Dichloroethylene	33.0		25	59.2	105	58.9	104	1	77-123/10
95-50-1	o-Dichlorobenzene	50.5		25	75.2	99	74.2	95	1	77-113/10
156-60-5	trans-1,2-Dichloroethylene	8.2		25	35.5	109	35.0	107	1	72-133/10
127-18-4	Tetrachloroethylene	1.4	J	25	25.4	96	25.3	96	0	80-127/11
79-01-6	Trichloroethylene	35.1		25	62.4	109	61.7	106	1	81-124/10

CAS No.	Surrogate Recoveries	MS	MSD	T4448-2	Limits
1868-53-7	Dibromofluoromethane	102%	102%	106%	88-114%
17060-07-0	1,2-Dichloroethane-D4	102%	99%	102%	81-122%
2037-26-5	Toluene-D8	96%	99%	97%	88-110%
460-00-4	4-Bromofluorobenzene	98%	97%	97%	88-115%

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: T4448
Account: MWHSLCUT Montgomery Watson
Project: EPFS San Juan Basin GS

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
T4448-4MS	F0055523.D	1	06/08/03	JH	n/a	n/a	VF852
T4448-4MSD	F0055524.D	1	06/08/03	JH	n/a	n/a	VF852
T4448-4	F0055522.D	1	06/08/03	JH	n/a	n/a	VF852

The QC reported here applies to the following samples: Method: SW846 8260B

T4448-1, T4448-4, T4448-5

CAS No.	Compound	T4448-4 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
75-34-3	1,1-Dichloroethane	9.8		25	34.7	100	34.5	99	1	78-125/11
75-35-4	1,1-Dichloroethylene	ND		25	32.7	131	31.2	125	5	72-136/12
156-59-2	cis-1,2-Dichloroethylene	3.7		25	23.2	78	23.7	80	2	77-123/10
95-50-1	o-Dichlorobenzene	ND		25	17.8	71*	18.8	75*	5	77-113/10
156-60-5	trans-1,2-Dichloroethylene	ND		25	29.9	120	28.8	115	4	72-133/10
127-18-4	Tetrachloroethylene	ND		25	40.5	162*	38.2	153*	6	80-127/11
79-01-6	Trichloroethylene	3.0		25	29.5	106	28.8	103	2	81-124/10

CAS No.	Surrogate Recoveries	MS	MSD	T4448-4	Limits
1868-53-7	Dibromofluoromethane	70%*	73%*	73%* [a]	88-114%
17060-07-0	1,2-Dichloroethane-D4	48%*	51%*	47%* [a]	81-122%
2037-26-5	Toluene-D8	136%*	132%*	137%* [a]	88-110%
460-00-4	4-Bromofluorobenzene	134%*	128%*	143%* [a]	88-115%

(a) Outside control limits due to matrix interference. Confirmed by reanalysis.

CHAIN OF CUSTODY

030603MN #1

ACCUTEST Laboratories
10165 Harwin Drive, Ste. 150, Houston, TX 77036
TEL. 713-271-4700 FAX: 713-271-4770
www.accutest.com

FED-EX Tracking # 836557900651 | Bottle Order Control #
Accutest Quote # | Accutest Job #

Client / Reporting Information

Company Name: MWH / EL Paso
Address: 614 Reilly Ave
City: Farmington State: NM Zip: 87401
Project Contact: Lynn Benally E-mail:
Phone #: 505 599 2178
Sampler's Name: M J Nee

Project Information

Project Name: San Juan Basin
Street: Blanco
City: State:
Project #:
Fax #:
Client Purchase Order #:

Requested Analysis

8260 1,1-DCA, 1,1-DCE, 1,2-DCE, CIS, 1,2-DCE, TCE, PCE, trans 1,2-DCE, 1,2-DCB should be per client + Pamela Lynn 6/4/03 SM

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OT - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	SUMMA # / MEOH Vial #	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	NaHSO4	MEOH	ENCORE	8260 1,1-DCA, 1,1-DCE, 1,2-DCE, CIS, 1,2-DCE, TCE, PCE	trans 1,2-DCE, 1,2-DCB should be per client + Pamela Lynn 6/4/03 SM	LAB USE ONLY
1	Blanco MW-12		6-3-03	0930	MN	WG	3	3								X	X	VOA
2	Blanco MW-13		6-3-03	1025	MN	WG	3	3								X	X	
3	Blanco MW-15		6-3-03	1120	MN	WG	3	3								X	X	
4	Blanco MW-14		6-3-03	1420	MN	WG	3	3								X	X	
5	030603TB#1		6-3-03	0700	MN	WQ	1	1										

Turnaround Time (Business Days)

- [X] 10 Day *STANDARD*
- [ ] 5 Day *RUSH*
- [ ] 3 Day *EMERGENCY*
- [ ] 2 Day *EMERGENCY*
- [ ] 1 Day *EMERGENCY*
- [ ] Other

Approved By: / Date:

Emergency & Rush T/A data available VIA LabLink

Data Deliverable Information

- [ ] Commercial "A"
- [ ] Commercial "B"
- [ ] Reduced Tier 1
- [ ] Full Tier 1
- [ ] TRRP13
- [ ] EDD Format _____

Commercial "A" = Results Only

Comments / Remarks

T4448

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time: 6-3-03 1630	Received by:	Relinquished by	Date Time: 6-4-03 0845	Received by:
1		1	2		2
Relinquished by:	Date Time:	Received by:	Relinquished by:	Date Time:	Received by:
3		3	4		4
Relinquished by:	Date Time:	Received by:	Custody Seal #	Preserved where applicable ☐	On Ice X Cooler Temp. 5-3°C
5		5			

Prepared for:

El Paso Field Services
614 Reilly Avenue
Farmington, New Mexico 87401

BLANCO NORTH FLARE PIT WORK PLAN UPDATE
TECHNICAL MEMORANDUM
SAN JUAN COUNTY, NEW MEXICO

June 2003

Prepared by:

MWH
1475 Pine Grove Road, Suite 109
P.O. Box 774018
Steamboat Springs, Colorado 80477
(970) 879-6260

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

LIST OF ACRONYMS

AS	Air Sparging
AFCEE	Air Force Center for Environmental Excellence
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and total xylenes
cfm	cubic feet per minute
EPFS	El Paso Field Services
NMOCD	New Mexico Oil Conservation Division
NMWQCC	New Mexico Water Quality Control Commission
psi	pounds per square inch

1.0 INTRODUCTION

This *Blanco North Flare Pit Work Plan Update* has been prepared for El Paso Field Services (EPFS) as a technical memorandum to update the *Work Plan for the Blanco North Flare Pit, July 2002* (MWH, 2002) (Work Plan). This update has been developed due to the recent unexpected detection of free-product in one of the wells in the North Flare Pit area. As a result, this update details modifications to the scope and schedule of the Work Plan to address this development in site conditions, including operation and monitoring of the recently installed free-product removal and air sparging (AS) systems in the North Flare Pit area.

The purpose of these systems is groundwater remediation downgradient of the North Flare Pit. Constituents of potential concern at the site include free-phase hydrocarbons (i.e., free-product), benzene, ethylbenzene, toluene and total xylenes (BTEX). Regulatory drivers for groundwater remediation at this site include New Mexico Oil Conservation Division's (NMOCD) guidelines and the New Mexico Water Quality Control Commission's (NMWQCC) regulations. This update describes a phased approach to groundwater remediation at the site. Phase I will consist of AS enhanced free-product removal. Following adequate removal of free-product, Phase II will be initiated which will consist of AS for groundwater remediation of dissolved-phase hydrocarbon contamination.

The Work Plan summarizes the available information related to the North Flare Pit, including a summary of previous site activities and investigations, a description of the geology/hydrogeology of the area and historic groundwater quality data. Therefore these discussions will not be reiterated in this update.

2.0 REMEDIAL ACTIVITIES

2.1 RECENT REMEDIAL ACTIVITIES

As described in the Work Plan (MWH, 2002), EPFS proposed AS in the vicinity of the impacted groundwater to remediate dissolved-phase hydrocarbon contamination and reduce BTEX concentrations to below NMWQCC standards. On December 16, 2002 a new AS well, SW-1, was installed approximately 25 feet upgradient (north) of monitoring well MW-26 as shown on Figure 2.1, *New Air Sparging Well Location.* The AS well was drilled through unconsolidated sediments to a depth of approximately 66 feet below ground surface (bgs) and into sandstone bedrock to a total boring depth of 75.5 feet bgs. The well was constructed of two-inch diameter PVC casing with a five-foot long, 0.01-inch slotted well screen. The well screen was installed at the base of the well from 70.2 to 75.2 feet bgs. The water level in MW-26 is typically between 62 and 64 feet below top of casing, which is indicative of the final water level in the new AS well.

During drilling and installation of the AS well, free-product was discovered in well MW-26. The nearby monitoring wells were checked for the presence of free-product; however, none was encountered in any of the existing wells or the new AS well. On December 17th, approximately 1.4 feet of free-product was measured and removed from MW-26 (approximately 2 gallons of water/product). On February 3, 2003, approximately 1.53 feet of free-product was measured in the well, and on April 22, 2003, approximately 2 feet of free-product was measured. In mid-April 2003 a skimmer pump was installed in MW-26 and free-product removal was initiated on April 23, 2003. On May 2, 2003, it was reported that a total of 1.63 gallons of free-product had been removed from the well. Operation and maintenance of the skimmer pump is ongoing.

On February 3, 2002, a one-day pressure test was conducted on the AS system to investigate communication between the AS well and the surrounding monitoring wells MW-26, MW-27 and MW-19. The field reports are included in Attachment A, *AESE Field Reports, February 2003.* It was concluded that there is good communication between the AS well, SW-1, and wells MW-26 and MW-19.

Currently, the AS system is instrumented and prepared for operation. The AS system operation has not yet been initiated, pending baseline groundwater sampling scheduled for May 2003, as described in the Work Plan and summarized in Section 2.3.2. Start-up of the AS system is tentatively scheduled for June 5, 2003.

2.2 PHASE I: AIR SPARGING-ENHANCED FREE-PRODUCT REMOVAL

Phase I of groundwater remediation at the site will consist of AS enhanced free-product removal. The skimmer will continue to be operated in MW-26 to remove free-product. Air sparging will be initiated to potentially enhance free-product removal. Enhancement of free-product removal by air sparging has been demonstrated at other sites (Payne et al., 1997; Payne et al., 1998). AS system start-up is tentatively scheduled for June 5, 2003.

Air will be introduced into the AS well, SW-1, to volatilize free-product and to enhance biodegradation of the dissolved phase hydrocarbons. The injection will be conducted on a

12-hour off/on cycle to help reduce the potential for channeling. Volatilized hydrocarbons will be biodegraded in the vadose zone. Extensive testing conducted by the United States Air Force Center for Environmental Excellence (AFCEE) and EPFS's experience in the local area, has shown that AS systems are more effective when the air injected into a formation is pulsed. The pulsing helps to prevent and close preferential pathways that may be generated by over-pressuring the formation. These pathways essentially short circuit the treatment process and reduce the effectiveness of the AS system. EPFS anticipates injecting 5 to 10 cubic feet per minute (cfm) of air into the well at 50 to 100 pounds per square inch (psi). The air flow and injection pressures of the system will be monitored and adjusted to optimize air flow through the affected area.

During the initial phase of operation, weekly maintenance checks on the skimmer and AS systems will be conducted. Air pressure measurements will be measured at each well head using magnehelic gages, and field parameters, including pH, temperature, specific conductance and dissolved oxygen, will be monitored (preferably downhole measurements). Once the systems are generally stabilized, maintenance visits may be reduced to bi-weekly or monthly. Visits may be more or less frequent depending on operational conditions and constraints. Following each visit, a field report will be prepared that will include the following information:

General
- date/time of the visit
- overall status of the systems
- any maintenance that was performed
- any relevant information related to the system operations

Free-product Removal/Skimmer System
- volume of product recovered
- volume of product disposed (if any)
- pressures on the skimmer pump and tank
- skimmer pump timer settings

AS System Monitoring
- injection pressure
- flow measurements
- imposed air pressure at monitoring wells
- water levels in monitoring wells
- groundwater field parameters in monitoring wells

2.3 PHASE II: GROUNDWATER REMEDIATION BY AIR SPARGING

Following adequate removal of free-product from MW-26 (and any additional wells where free-product may have developed), Phase II of groundwater remediation will be initiated. This phase of remediation will consist of removal of dissolved-phase hydrocarbon contamination using the AS system. An eight-week pilot test will be conducted to evaluate the effectiveness of the system in remediating groundwater. Based

on the results of the pilot test, recommendations will be made for continued operation of the AS system. This pilot test is described in the Work Plan and is summarized below.

2.3.1 AS System Operation

The AS system will continue to be operated under the conditions and on the schedule determined to be optimal during Phase I of operations.

2.3.2 AS System and Groundwater Monitoring

Prior to system start-up, groundwater monitoring will be conducted at each of the six monitoring wells in the North Flare Pit area (wells containing free-product will not be sampled). These wells and monitoring parameters are listed in Table 2.1, *Groundwater Monitoring*. Groundwater levels and field parameters (pH, temperature, specific conductance and dissolved oxygen) will be measured at each monitoring well (preferably downhole measurements), and samples will be analyzed for BTEX. Groundwater samples will be collected again from all of the monitoring wells after four weeks, and again after eight weeks of Phase II system operations. (Forty-eight hours prior to sample collection the AS system will be shut–down to ensure natural groundwater conditions are being evaluated.)

During this period, maintenance visits for the AS system will be conducted bi-weekly. Air pressures at well heads, water levels and field parameters will also be monitored during these visits. Following each visit, a field report will be prepared that will include the following:

General
- date/time of the visit
- overall status of the AS system
- any maintenance that was performed
- any relevant information related to the system operations

AS System/Groundwater Monitoring (bi-weekly)
- air injection pressure
- air flow measurement
- imposed air pressure at monitoring wells
- water levels in monitoring wells
- groundwater field parameters in monitoring wells

Groundwater Monitoring (Baseline, 4 weeks and 8 weeks)
- water levels
- groundwater field parameters
- date/time of sample collection
- types of samples collected (numbers, amounts, preservatives)
- condition of samples (color, odor)
- Chain of Custody form

At the end of the pilot test, EPFS will continue to operate the AS system and groundwater sampling will continue on a quarterly basis until four, consecutive rounds of groundwater samples indicate BTEX concentrations below NMWQCC standards or until levels reach steady-state values.

3.0 SCHEDULE AND REPORTING

The free-product removal and AS system operation and monitoring schedule for 2003 is presented in Table 3.1, *2003 AS System and Free-Product Removal Operation and Monitoring Schedule.*

At the end of the eight-week evaluation period, the results of the AS pilot-study will be evaluated and reported to NMOCD with recommendations. A report documenting performance of the pilot AS system and status of the free-product removal activities will be prepared. This report will include a summary of free-product removal, location and construction details of the AS well, as-built details of the AS system and groundwater analytical results collected over this period. An evaluation of the AS system and recommendations for modifications and future activities will also be included in this report. This report will be submitted to NMOCD within 30 days of receipt of the final groundwater sampling data report.

In addition, results of the quarterly groundwater sampling events will be submitted to NMOCD in annual reports.

4.0 REFERENCES

Burlington Environmental, Inc, 1992. *Monitoring Well Installation and Testing at the North Flare Pit Area of Blanco Plant.* Prepared for El Paso Natural Gas Company. December 1992.

EPNG, 1989. *Groundwater Investigation Report, El Paso Natural Gas Company's Blanco Plant, San Juan County, New Mexico.* January 1989.

EPNG, 1995. Letter from El Paso Natural Gas Company (David Bays) to New Mexico Oil Conservation Division (William C. Olson); Re: Blanco Plant Sampling Plan. September 7, 1995.

K.W. Brown and Associates, Inc, 1990. *Site Investigation of the Blanco Plant, San Juan County, New Mexico.* Prepared for El Paso Natural Gas Company. February 1990.

Payne, R.E., M.N. Gallagher, S.J. Pinizzotto and E.M. Nobles-Harris. 1997. *Air Sparging Below Hydrocarbon Free Product Without Vapor Control.* Battelle Conference.

Payne. R.E., M.N. Gallagher, et al. 1998. *Using Air Sparging To Enhance Free Product Recovery Without Vapor Control*, API/NGWA Hydrocarbon Conference.

MWH, 2002. *Work Plan for the Blanco North Flare Pit.* Prepared for El Paso Natural Gas Company. July 2002.

TABLES

TABLE 2.1
GROUNDWATER MONITORING
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO
EL PASO FIELD SERVICES

Monitoring Well	Analyses
North Flare Pit Area	
MW-2	Field Parameters, BTEX
MW-19	Field Parameters, BTEX
MW-23	Field Parameters, BTEX
MW-24	Field Parameters, BTEX
MW-26	Field Parameters, BTEX
MW-27	Field Parameters, BTEX

Notes:

1. Field Parameters include temperature, pH, dissolved oxygen, specific conductance and air pressure measurement and will be conducted bi-weekly during the 8-week pilot test.

2. Monitoring well MW-20 was damaged and will be abandoned in 2003.

3. Monitoring wells containing free product will not be sampled.

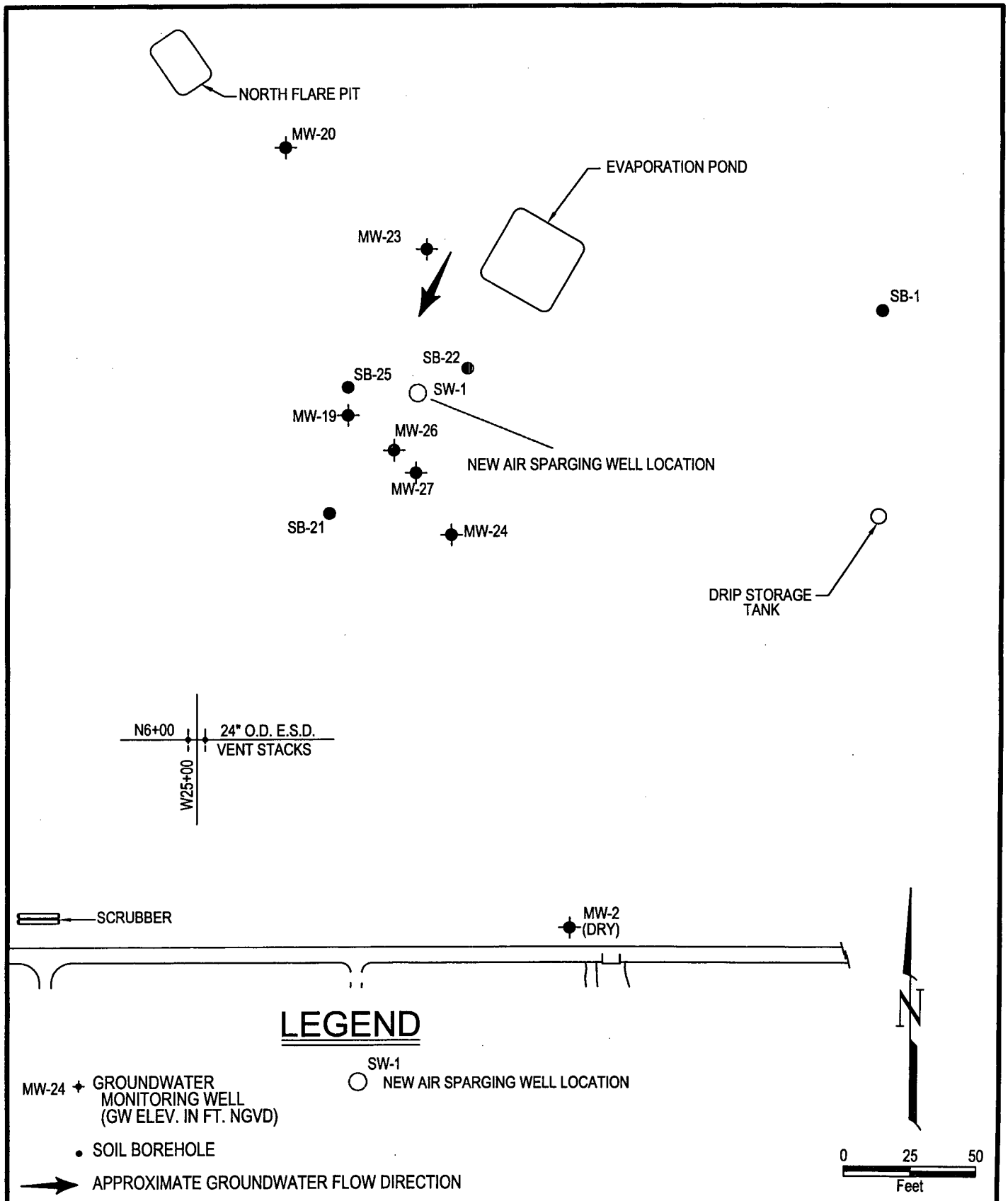
BTEX: Benzene, Toluene, Ethylbenzene and Total Xylenes.

TABLE 3.1
2003 AS SYSTEM AND FREE PRODUCT REMOVAL OPERATION AND MONITORING SCHEDULE
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO
EL PASO FIELD SERVICES

ACTIVITY/ DELIVERABLE	May 2003	Phase I Start (June 5, 2003)	Week 1	Week 2	Week 3	Week 4	Phase II Start	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
PHASE I: AIR SPARGING ENHANCED FREE PRODUCT REMOVAL															
Free Product Removal	X	→	→	→	→	→									
AS System Operation		X	→	→	→	→	→	→	→	→	→	→	→	→	→
Maintenance Visits [1]	X	X	X	X	X	X									
PHASE II: GROUNDWATER REMEDIATION BY AIR SPARGING															
Groundwater Sampling	X										X				X
Maintenance Visits [2]	X						X		X		X		X		X
Field Parameter Monitoring	X						X		X		X		X		X

1. A maintenance visit consists of monitoring of the free-product removal system, the AS system and groundwater field parameter measurements.
2. A maintenance visit consists of monitoring of the AS system and groundwater field parameter measurements.

FIGURE



REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Review	5/03	P.Anderson	K.Conrath	P.Anderson

MWH

PROJECT No.: 2450162.
AutoCAD FILE: NFlare Sparge Loc
SCALE: As Shown
FIGURE No: 2.1

elpaso NORTH FLARE PIT

NEW AIR SPARGING WELL LOCATION

ATTACHMENT A

AESE Field Reports, February 2003

AESE
906 San Juan Blvd., Suite D,
Farmington, NM 87401
(505) 566-9116

Memo

To: Marc Greeley, Lynn Benally

From: Martin Nee

CC: File

Date: 2/3/03

Re: Blanco North

1/22/03, AESE visited Blanco North to prepare a one-day pilot test to investigate communication between the newly installed sparge well and surrounding monitoring wells MW-26, 27, and 19. Well casing sizes were verified and the distance from the compressor house to the wells was measured. We looked at the existing compressor as a source of sparge air. The existing compressor is not an oil-less model and it has been drained of oil and tagged out-of-service.

A 30A 240V receptacle will need to be installed to run the oil-less compressor.
Static water in the sparge well was 68.465 feet beneath top of casing and total depth 80.18. No product was present.

1/24/03 AESE contacted David Nichols and delivered a key to the compressor shed to him at Blanco so he could wire the compressor for a pilot test at the new sparge well. AESE also placed the sparge compressor in the shed.

1/31/03 Traveled to Jaquez to pick up magnehelic gauges for pilot test at Blanco. Dropped off magnehelic gauges and checked to make sure compressor was operational. Also purchased hardware for pilot test.

2/3/03 1130 hrs, arrived at site to conduct limited pilot test. Objective is to determine if communication can be established between SW-1(sparge well 1) and nearby monitoring wells MW- 19, 27, and 26. Compressor was plumbed to SW-1 and preparations made for pilot test.

1257 hrs, water levels were measured as follows

MW-19	63.64 feet beneath top of well casing (fbtoc)
MW-26	64.55 water, 63.02 product fbtoc
MW-27	64.05 fbtoc
SW-1	68.396 fbtoc.

Water was bailed from SW-1 so the compressor would not have to push the water in the well into the formation. Approximately 3.0 gallons of water were removed. Final water level measurement indicated a depth of water at 76.80 fbtoc, td is 80.18 fbtoc.
The compressor was started at 1345 hrs and a flow rate of 12 scfm was measured while vented to the atmosphere. Flow was directed to SW-1 and the flow rate dropped to 5 scfm and remained constant throughout the test.

Pressure readings from monitoring wells were recorded as follows:

1350 hrs	MW-19	0.75 inches H_2O
1354 hrs	MW-26	1.25 inches H_2O
1358 hrs	MW-27	0.01 inches H_2O
1442 hrs	MW-27	0.02 inches H_2O
1444 hrs	MW-26	5.5 inches H_2O strong hydrocarbon vapors from well
1446 hrs	MW-19	3.8 inches H_2O
1500 hrs	Ended test	

Conclusion
Good communication between SW-1, MW-26 and MW-19.

AESE
906 San Juan Blvd., Suite D,
Farmington, NM 87401
(505) 566-9116

Memo

To: Marc Greeley, Lynn Benally

From: Martin Nee

CC: File

Date: 2/7/03

Re: Blanco North 2/6/03 pilot

1145 hrs, water levels were measured as follows

MW-19	63.61 feet beneath top of well casing (fbtoc)
MW-26	64.31 water, 62.98 product fbtoc
MW-27	64.06 fbtoc
SW-1	75.725 fbtoc.

1208 hrs
The compressor was started and a flow rate of 11 scfm was measured while vented to the atmosphere. Flow was directed to SW-1 and the flow rate dropped to 5 scfm and remained constant throughout the test.

1238 hrs

MW-19	62.56 fbtoc	
MW-26	64.23 fbtoc water	62.65 fbtoc product
MW-27	64.055 fbtoc	

1248 hrs turned off sparge and checked water levels

MW-19	62.55 fbtoc	
MW-26	64.17 fbtoc water	62.56 fbtoc product
MW-27	64.09 fbtoc	
SW-1	76.87 fbtoc	

Prepared for:

EL PASO NATURAL GAS COMPANY

elpaso

614 Reilly Avenue
Farmington, New Mexico 87401

GROUNDWATER NITRATE REPORT FOR THE BLANCO PLANT SOUTH FLARE PIT AND D PLANT AREAS

San Juan County, New Mexico

April 2003

Prepared by:

MWH
P.O. Box 774018
Steamboat Springs, Colorado 80477
(970) 879-6260

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

This *Draft Groundwater Nitrate Report for the Blanco Plant South Flare Pit and D Plant Areas* (report) has been prepared on behalf of El Paso Natural Gas Company (EPNG) to summarize results of work conducted to investigate the source and extent of elevated nitrate concentrations in groundwater in these areas. This work was initiated, pursuant to New Mexico Oil Conservation Division's (NMOCD) letter dated May 3, 2002 regarding remediation activities at EPNG's Blanco Plant, and was described in the *Groundwater Nitrate Work Plan for Blanco South Flare Pit and D Plant Areas* (the Work Plan) (MWH, 2002). The Work Plan was submitted to NMOCD in July 2002 and was approved by NMOCD in a letter dated February 21, 2003, with the following conditions:

- EPNG will sample all groundwater wells annually for nitrate
- Results of the nitrate sampling will be presented in annual reports
- EPNG will notify NMOCD in advance of scheduled sampling events

These conditions are discussed in more detail in this report.

The Blanco Plant is located in San Juan County, New Mexico, approximately 1.5 miles northeast of the town of Bloomfield, New Mexico on San Juan County Road 4900. Figure 1.1, *Blanco Plant Site Layout*, presents the Blanco Plant site layout and location of the D Plant and South Flare Pit. The map also shows the location of the North Flare Pit area.

This report describes historic and current information regarding nitrate concentrations in groundwater at the site and summarizes results of work conducted under the Work Plan. These tasks include:

1. A literature review of background groundwater nitrate data in the region
2. A review of EPNG site information to investigate potential on-site nitrate source(s)
3. Groundwater sampling of selected wells

Regulatory drivers for groundwater remediation at this site include the New Mexico Water Quality Control Commission's (NMWQCC) nitrate standard of 10 mg/L.

Section 2.0 of this report summarizes available information relating to groundwater nitrate in the South Flare Pit and D Plant area including a description of previous investigations and a description of the geology/hydrogeology of the area. Section 3.0 describes the Work Plan tasks and results of the investigations. Section 4.0 proposes continued actions at the site.

2.0 SITE BACKGROUND

2.1 PREVIOUS INVESTIGATIONS – GROUNDWATER NITRATE

An initial assessment of site hydrogeology and groundwater resources of the Blanco Plant area was conducted by Bechtel Environmental in 1989 (Bechtel, 1989). Six monitoring wells were installed and sampled during this investigation. High nitrate concentrations were identified in wells MW-2 (290 ppm) and MW-6 (51 ppm) at that time. It was concluded in this study that "the high concentration of nitrate in the upgradient well (MW-2) could not have been due to plant operations".

As part of a groundwater study by K.W. Brown & Associates, Inc (K.W. Brown, 1990) to investigate the extent of contamination resulting from a leaking underground storage tank in the D Plant Area, the source of elevated nitrate in groundwater was further investigated. Monitoring well, MW-19, was installed upgradient of MW-2. Sampling results from this investigation indicated high nitrate concentrations in MW-2 (200 ppm), MW-19 (90 ppm), MW-14 (210 ppm) and MW-15 (89 ppm). Inspection of the plant area at that time did not find a source for potential nitrate contamination. Suggested potential sources included the presence of naturally occurring sodium nitrate salts (nitratine, $NaNO_3$), amines from sour gas treatment or by-products from pigging piplines (K.W. Brown, 1990).

2.2 SITE GEOLOGY/HYDROGEOLOGY

The geologic framework of the site has been summarized by Bechtel Environmental (Bechtel, 1989) and K.W. Brown and Associates (K.W. Brown, 1990). Based on these assessments, the plant area is located on Quaternary alluvium consisting of sand, silt, clay and gravel. At the plant site, the thickness of the alluvium varies from less than three feet to more than 75 feet (Bechtel, 1989). Underlying the alluvium is the Tertiary Nacimiento Formation consisting of interbedded coarse- to medium-grained arkosic sandstone, siltstone and shale which were deposited as both channel fill and floodplain deposits (Bechtel, 1989). Orientation of the channel-fill sandstone deposits may locally control groundwater flow due to higher hydraulic conductivities through these features.

An assessment of site hydrogeology and groundwater resources of the Blanco Plant area was conducted by Bechtel Environmental in 1989 (Bechtel, 1989). Based on the information collected during this study, it was concluded that the direction of groundwater flow through the plant area is to the south-southwest and then trends southward through the southern portion of the site. The average hydraulic conductivity was estimated to be 2.1×10^{-4} centimeters per second. Depth to groundwater ranged from 50 feet (at MW-2) to nine feet (at MW-10) below ground surface (5564 to 5552 feet above sea level) (EPNG, 1989). These results were generally consistent with the findings of K.W. Brown (1990).

A potentiometric surface map for the site has been prepared based on water level measurements collected on May 30, 2002, and is presented in Figure 3.1, *Groundwater Nitrate Concentrations and Potentiometric Surface.* Based on these data, groundwater is flowing to the southeast with a hydraulic gradient of 0.032 ft/ft in the Blanco Plant site area and 0.067 ft/ft in the North Flare Pit area. At the southern boundary of the site the groundwater gradient trends towards the east, likely as a result of groundwater mounding in that area due to recharge from Citizens Ditch.

3.0 GROUNDWATER NITRATE INVESTIGATION

3.1 GROUNDWATER NITRATE INVESTIGATION TASKS

Tasks associated with the groundwater nitrate investigation were outlined in the Work Plan (MWH, 2002). The objective of the work was to investigate potential sources and extent of nitrate concentrations in groundwater at the site. The tasks included:

- Review available data for nitrate data in the region
- Review EPNG site information to investigate potential, on-site nitrate source(s)
- Sample existing selected monitoring wells

The results and findings of these tasks are described in the following sections.

3.2 REGIONAL NITRATE DATA

A review of available literature and databases was conducted in an attempt to determine potential background nitrate concentrations in alluvial aquifers in the area. Databases maintained by USGS and other sources/documents were reviewed. Following is a brief summary of the findings.

- USGS Hydrogeologic Maps (Levings et al, 1990): Maps of the area present groundwater nitrate data from 29 wells in the Naciemento Formation collected between 1938 – 1984. Nitrate concentrations ranged between 0.02 and 5.6 mg/L. These concentrations are all below the nitrate standard of 10 mg/L.
- USGS Surface Water Data from Animas River, San Juan River and La Plata River near Farmington, USGS Stations: 09364500, 09365000, 09387500, 09367500 (Data from 1970 – August 2001): Total nitrogen concentrations ranged between 0.05 and 22 mg/L. Total nitrate/nitrite concentrations ranged between 0 and 3.2 mg/L.
- New Mexico Bureau of Mines and Mineral Resources, Hydrogeology and Water Resources of San Juan Basin, New Mexico, (Stone et al 1983): According to this report, "...stormflow specific conductance values as high as 7000 umhos" have been reported to occur when "....the rising water dissolves salts left by evaporation at the channel floor..... Analysis of salt or "alkalai deposits" indicates $NaNO_3$ evaporite mineral (page 23)."

In order to investigate the presence of nitrate-rich evaporative salts at the site, a soil sample was collected and leachate from the soil was analyzed for nitrate (as well as other major cations and anions). The nitrate concentration in the leachate was 8.5 mg/L. Other major ion analyses included sulfate (199 mg/L), chloride (23.6 mg/L), sodium (126 mg/L), calcium (46 mg/L), magnesium (3.2 mg/L) and potassium (5.8 mg/L). The laboratory report for this analysis is attached in Appendix B. These data indicate that

evaporite salt deposits may be present at the site and based on the results of the leachate test may produce concentrations high enough to generate elevated nitrate concentrations in groundwater.

3.3 BLANCO PLANT SOURCE INVESTIGATION

Blanco Plant files were reviewed and appropriate site personnel were interviewed to investigate the presence of nitrogen-containing compounds on-site that may constitute a potential source(s). A site interview was conducted on December 16, 2002 and is attached as Appendix A to this Report. Potential sources were identified during the interview, as described below.

The following potential sources in the D plant area were identified:

- A possible leach field for the old office and lab building.
- An old chemical storage building that was once in that area. However, this building apparently had a concrete floor and no significant spills of nitrate-based chemicals were reported.

The following potential sources in the area around MW-2 were identified:

- North Flare Pit: The only known discharge into the flare pit would have been pipeline condensates. These condensates typically do not contain high concentrations of nitrates.
- Kutz separator evaporation ponds: The Kutz separator ponds receive pipeline condensates from the field. The hydrocarbons and water are separated, water evaporated and hydrocarbons recovered for sale to the local refinery.

The following potential sources near the South flare pit area were identified:

- Former Fertilizer Storage Shed: The Shed was located near the south fence in the area of the South Flare pit and was used to store fertilizer for the golf course to the south and east of the plant fence. No large spills of fertilizer were reported.
- Sewer Pit: A sewer pit that may have stored sewage from the plant or camp was also in the area of the south flare pit. Water from the camp housing sewage lagoons (mostly located south and east of the plant fence) was used throughout the plant and camp area for dust control and irrigation.

In approximately 1983, the corrosion-inhibiting chemical used in the cooling system for compressors in the B plant was switched to a nitrite-based chemical. The chemical was used in a closed system in small quantities and no known spills of significant volume occurred. The chemical is called Unichem 2310 and its main ingredient is sodium nitrite. This sodium nitrite-based chemical is currently used in the A plant compressors. Specific concentrations are not reported in the MSDS sheet. The B plant was decommissioned in

1988 and demolished in 1989. The former B plant area was due east and cross-gradient from the D plant area.

In addition, a nitrite-based chemical is used is the boiler water to prevent scaling. Again, no significant spills of this chemical have been reported at the plant. The chemical is called Unichem 3030. The main ingredient is listed as sodium nitrate at 15%. Other ingredients include Ethylenediaminetetraacetic acid, tetrasodium salt, potassium hydroxide and trisodium nitrilotriacetate. The boiler area is due south and cross-gradient of the D plant area.

Based on site knowledge there does not appear to be a known source of nitrate or nitrite to groundwater resulting from plant operations or an on-site source.

3.4 GROUNDWATER NITRATE DATA

Groundwater samples were recently collected (September 2002) from wells MW-6 and MW-18 using standard purging and sampling techniques and analyzed for nitrite and nitrate concentrations. Groundwater sampling was attempted at wells MW-5, MW-7, MW-10 and MW-17 at this time, however these wells were dry and could not be sampled. The wells listed above were selected because they had not been recently sampled and would provide additional information on the extent of nitrate in the groundwater. Nitrate concentrations in wells MW-6 and MW-18 were 95.1 mg/L and 3.1 mg/L, respectively, consistent with historic data for these wells. Nitrite was not detected in either sample. Laboratory analytical reports are included in Appendix B.

Historic and recent groundwater nitrate data from several rounds of groundwater sampling (1991 – 2002) at the site (including North Flare Pit wells) are presented in Table 3.1, *Groundwater Nitrate Analytical Data.* These data indicate that nitrate concentrations have consistently exceeded NMWQCC standards in monitoring wells, MW-2, MW-6, MW-14, MW-15, MW-28, MW-29 and MW-30. Monitoring well MW-2 has not been sampled since 1994 because the well has been dry.

The most recent nitrate concentration from each of the wells is presented on Figure 3.1. The 10 mg/L iso-concentration contour, based on May/September 2002 nitrate data, is also presented on this figure to indicate areas in exceedance of the NMWQCC standard. As shown in this figure, there is no obvious source or apparent trend in the nitrate data. Instead, there appears to be confined areas or "hot spots" of high nitrate concentrations adjacent to wells with nitrate concentrations consistently below NMWQCC standards. In addition, there is no indication that high nitrate groundwater is migrating off site.

4.0 PROPOSED ACTIONS

In order to continue to monitor groundwater nitrate concentrations at the site, the following actions will be conducted by EPNG:

- All groundwater monitoring wells on the Blanco Plant and in the North Flare Pit area will be sampled annually and analyzed for nitrate+nitrite concentrations, as shown in Table 4.1, *Groundwater Sampling Schedule.*

- Groundwater samples from monitoring wells in the D Plant Area (MW-12, MW-13, MW-14 and MW-15) will also continue to be analyzed for chlorinated hydrocarbon compounds, as listed in Table 4.1.

- The results of the nitrate and chlorinated hydrocarbon groundwater sampling will be reported to NMOCD in annual groundwater monitoring reports (typically submitted in August of each year).

- In accordance with the approval letter from NMOCD, dated May 3, 2002, EPC will plug and abandon monitoring wells MW-10, MW-16, MW-17 and MW-18.

- EPNG will notify NMOCD at least 48 hours in advance of all scheduled sampling activities, such that NMOCD has the opportunity to witness the events and split samples, if desired.

5.0 REFERENCES

Bechtel Environmental, 1989. *Groundwater Investigation Report, El Paso Natural Gas Company's Blanco Plant, San Juan County, New Mexico.* January 1989.

Dana, J.D., 1977. *Manual of Mineralogy, 20th Edition.* John Wiley and Sons, New York.

K.W. Brown and Associates, Inc, 1990. *Site Investigation of the Blanco Plant, San Juan County, New Mexico.* Prepared for El Paso Natural Gas Company. February 1990.

Levings et al. 1990. USGS Hydrogeologic Maps (Map HA-720-A)

MWH, 2002. *Groundwater Nitrate Work Plan for Blanco South Flare Pit and D Plant Areas.* July 2002.

Stone, et al. 1983. *Hydrogeology and Water Resources of San Juan Basin, New Mexico.* NM Bureau Mines and Mineral Resources

Tables

MWH

TABLES

TABLE 3.1
GROUNDWATER NITRATE ANALYTICAL DATA (1991 - 2002)
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO

		Nitrate (mg/l)
	NMOCD Standard	10
Monitoring Well	Sample Date	
MW-2	18-Jun-1991	180
	23-Feb-1993	256
	08-Jun-1993	228
	29-Sep-1993	233
	10-Feb-1994	249
	29-May-2002	dry
MW-5	18-Jun-1991	0.08
	19-Feb-1993	<1.0
	07-Jun-1993	<1.0
	27-Jan-1994	<1.0
	08-Aug-2000	4.6
	08-Aug-2000	4.6
	10-Nov-2000	4
	24-Sep-2002	dry
MW-6	19-Jun-1991	110
	19-Feb-1993	63.5
	07-Jun-1993	76.4
	28-Sep-1993	85.9
	07-Oct-1993	94.5
	26-Jan-1994	95.8
	20-Aug-1994	1.68
	20-Dec-1994	94
	16-Feb-1995	90.6
	10-Nov-2000	59
	24-Sep-2002	95.1
MW-7	18-Jun-1991	0.28
	07-Jun-1993	3
	27-Sep-1993	<2.8
	29-May-2002	dry
	24-Sep-2002	dry
MW-8	18-Jun-1991	<0.06
	19-Feb-1993	1.95
	07-Jun-1993	<1.0
	27-Sep-1993	<1.0
	27-Jan-1994	<1.0
	10-Nov-2000	<0.1
	10-Nov-2000	<0.1
	23-Mar-2001	0.21
	23-Mar-2001	0.21
	28-Aug-2001	0.33
	28-May-2002	0.26
MW-10	18-Jun-1991	0.74
	19-Feb-1993	1.19
	07-Jun-1993	2.16
	27-Sep-1993	2.1
	27-Jan-1994	1.95
	28-May-2002	dry
	24-Sep-2002	dry
MW-12	19-Jun-1991	7.8
	25-Feb-1993	7.82
	07-Jun-1993	8.45
	28-Sep-1993	9.1
	27-Jan-1994	7.32
	08-Aug-2000	<10
	09-Nov-2000	5.7
	22-Mar-2001	8.4
	28-Aug-2001	8.0
	28-May-2002	2.0
MW-13	19-Jun-1991	6.3
	24-Feb-1993	10.9
	08-Jun-1993	8.09
	28-Sep-1993	4.1
	27-Jan-1994	5.37
	08-Aug-2000	<12.5
	09-Nov-2000	9.8
	22-Mar-2001	13
	28-Aug-2001	7.9
	28-May-2002	6.0
MW-14	25-Feb-1993	19.2
	08-Jun-1993	17.5
	28-Sep-1993	11.8
	27-Jan-1994	15.4
	08-Aug-2000	19
	13-Nov-2000	0.24
	22-Mar-2001	13
	28-Aug-2001	20
	28-May-2002	15

		Nitrate (mg/l)
	NMOCD Standard	10
Monitoring Well	Sample Date	
MW-15	19-Jun-1991	50
	24-Feb-1993	5
	8-Jun-1993	48.1
	28-Sep-1993	43
	27-Jan-1994	43.7
	8-Aug-2000	35
	9-Nov-2000	38
	22-Mar-2001	25
	28-Aug-2001	30
	28-May-2002	24
MW-16	19-Jun-1991	0.07
	25-Feb-1993	3.68
	8-Jun-1993	<1.0
MW-17	25-Feb-1993	15.3
	24-Sep-2002	dry
MW-18	25-Feb-1993	8.19
	8-Jun-1993	<1.0
	28-Sep-1993	<1.0
	24-Sep-2002	3.1
MW-19	19-Jun-1991	70
	25-Feb-1993	10.6
	10-Jun-1993	NA
	13-Nov-2000	<0.1
	26-Mar-2001	0.19
	30-May-2002	0.13
MW-20	26-Sep-1992	NA
	24-Feb-1993	<1.0
	10-Jun-1993	<1.0
	29-Sep-1993	<1.0
	27-Jan-1994	<1.0
	13-May-1994	NA
	22-Aug-1994	NA
	13-Nov-2000	damaged
MW-23	26-Sep-1992	0.62
	1-Feb-1993	NA
	25-Feb-1993	0.56
	8-Jun-1993	<1.0
	29-Sep-1993	<1.0
	10-Feb-1994	<1.0
	13-May-1994	NA
	22-Aug-1994	NA
	13-Nov-2000	0.12
	26-Mar-2001	0.18
	30-May-2002	0.23
MW-24	26-Sep-1992	1.42
	23-Feb-1993	<1.0
	10-Jun-1993	<1.0
	29-Sep-1993	<1.0
	10-Feb-1994	<1.0
	13-May-1994	NA
	22-Aug-1994	NA
	13-Nov-2000	0.1
	26-Mar-2001	0.18
	30-May-2002	0.15
MW-26	25-Feb-1993	23
	10-Jun-1993	8.23
	26-Mar-2001	0.24
	30-May-2002	0.26
MW-27	26-Feb-1993	<1.0
	10-Jun-1993	<1.0
	30-Sep-1993	<1.0
	2-Feb-1994	<1.0
	14-May-1994	NA
	13-Nov-2000	0.28
	26-Mar-2001	0.61
	30-May-2002	0.21

		Nitrate (mg/l)
	NMOCD Standard	10
Monitoring Well	Sample Date	
MW-28	07-Oct-1993	2.1
	02-Feb-1994	2.83
	20-Aug-1994	2.72
	20-Dec-1994	0.33
	16-Feb-1995	1.56
	10-Aug-2000	25
	10-Nov-2000	53
	23-Mar-2001	34
	28-Aug-2001	63
	28-May-2002	83
MW-29	07-Oct-1993	8.3
	02-Feb-1994	19.6
	20-Aug-1994	28.84
	20-Dec-1994	41
	16-Feb-1995	28.1
	10-Aug-2000	50
	10-Nov-2000	66
	26-Mar-2001	70
	28-Aug-2001	58
	28-May-2002	70
MW-30	07-Oct-1993	28.1
	02-Feb-1994	57.1
	20-Aug-1994	67.63
	16-Feb-1995	91.3
	10-Aug-2000	84
	10-Nov-2000	70
	26-Mar-2001	72
	28-Aug-2001	76
	28-May-2002	66

TABLE 4.1
GROUNDWATER SAMPLING SCHEDULE
BLANCO PLANT - SAN JUAN COUNTY, NEW MEXICO

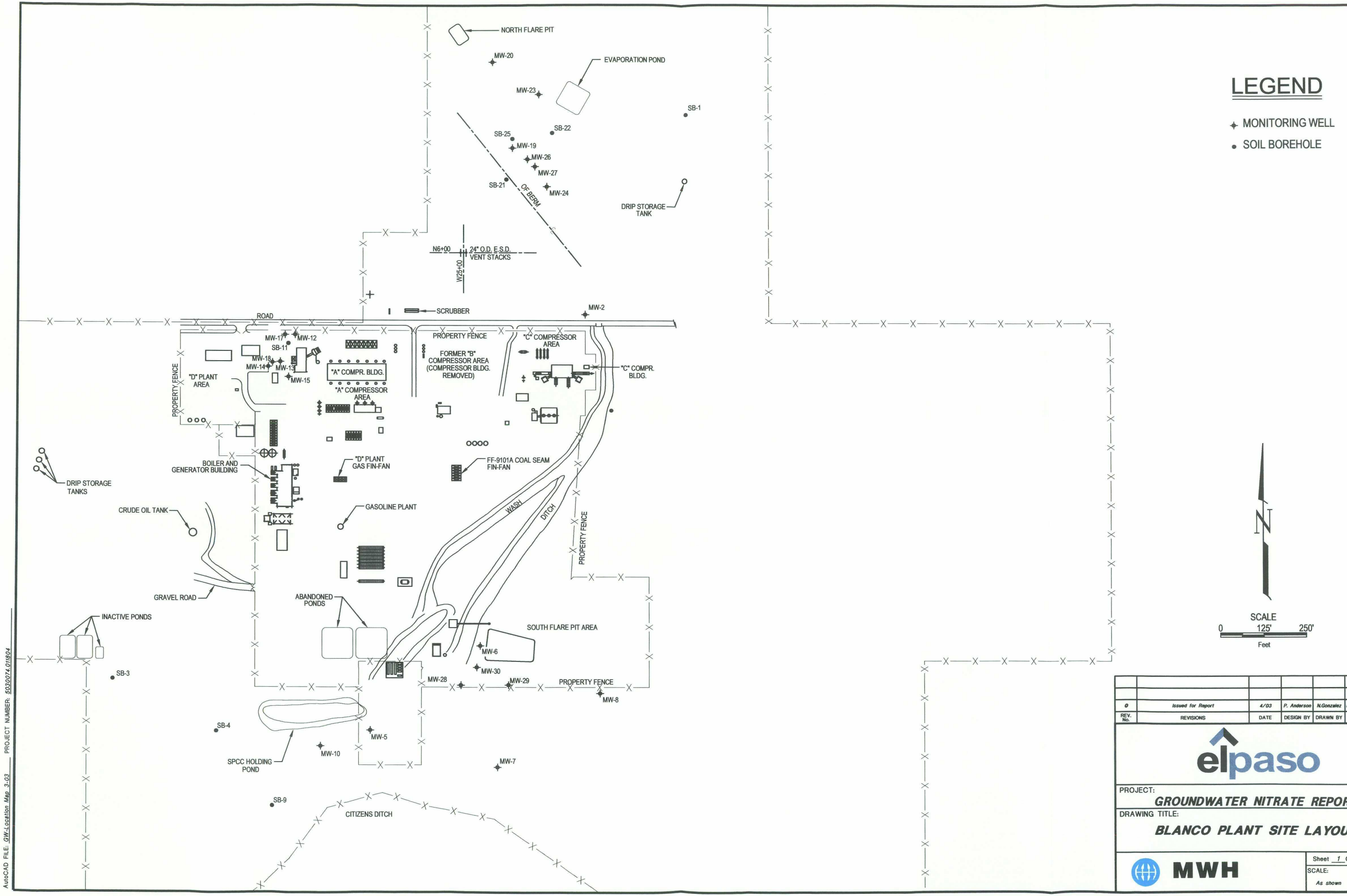
Monitoring Well	Analyses	Sampling Frequency
North Flare Pit Area		
MW-2	Nitrate+Nitrite	Annual
MW-19	Nitrate+Nitrite	Annual
MW-23	Nitrate+Nitrite	Annual
MW-24	Nitrate+Nitrite	Annual
MW-26	Nitrate+Nitrite	Annual
MW-27	Nitrate+Nitrite	Annual
South Flare Pit Area		
MW-5	Nitrate+Nitrite	Annual
MW-6	Nitrate+Nitrite	Annual
MW-7	Nitrate+Nitrite	Annual
MW-8	Nitrate+Nitrite	Annual
MW-28	Nitrate+Nitrite	Annual
MW-29	Nitrate+Nitrite	Annual
MW-30	Nitrate+Nitrite	Annual
D Plant Area		
MW-12	Nitrate+Nitrite, CHCs	Annual
MW-13	Nitrate+Nitrite, CHCs	Annual
MW-14	Nitrate+Nitrite, CHCs	Annual
MW-15	Nitrate+Nitrite, CHCs	Annual

CHCs: Chlorinated Hydrocarbons by EPA M 8260: 1,1-DCA, 1,1-DCE, 1,2-DCE, cis 1,2-DCE, trans 1,2-DCE, TCE and PCE.

Nitrate+Nitrite as N by EPA M 353.2, 354.1, or 4500.

Figures

FIGURES



LEGEND

- MONITORING WELL
- SOIL BOREHOLE

N

SCALE
0 125' 250'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	4/03	P. Anderson	N.Gonzalez	D. Ellerbroek

elpaso

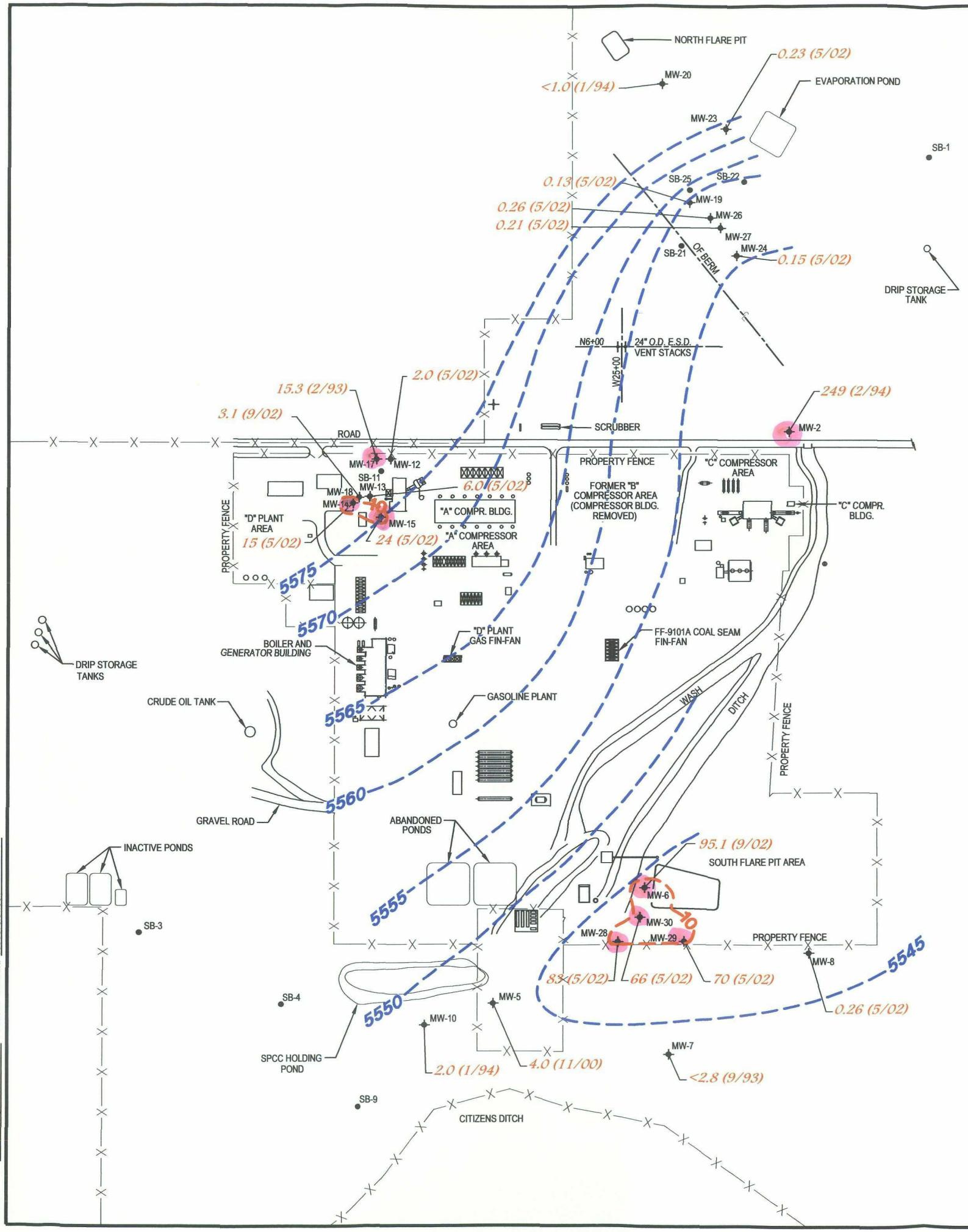
PROJECT:
GROUNDWATER NITRATE REPORT

DRAWING TITLE:
BLANCO PLANT SITE LAYOUT

MWH

Sheet 1 Of 1 Sheets
SCALE: As shown
FIGURE No. 1.1

AutoCAD FILE: GW-Location Map 3-03 PROJECT NUMBER: 5030074.01804



LEGEND

5545 — — — APPROXIMATE POTENTIOMETRIC SURFACE CONTOUR *(Groundwater Elevation in feet)*

10 — — — GROUNDWATER NITRATE ISOCONCENTRATION CONTOUR, MAY/SEPTEMBER 2002 DATA *(10 mg/L)*

SOIL BOREHOLE

MW-2 MONITORING WELL

KEY

MW-2 — *Most Recent Groundwater NO_3 Concentration (mg/L) (Date Sampled)*

59 (11/00)

N

SCALE
0 125' 250'
Feet

REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued for Report	4/03	P. Anderson	N.Gonzalez	D. Ellerbroek

elpaso

PROJECT:
GROUNDWATER NITRATE REPORT

DRAWING TITLE:
GROUNDWATER NITRATE CONCENTRATIONS AND POTENTIOMETRIC SURFACE

MWH

Sheet 1 Of 1 Sheets

SCALE: As shown

FIGURE No. 3.1

AutoCAD FILE: GW-Nitrate-pot surf 4-03 PROJECT NUMBER: 5030073.011804

Appendix A

MWH

APPENDIX A

BLANCO PLANT SITE INTERVIEWS
(February 28, 2003)

elpaso

MEMORANDUM

To: Blanco South Flare Pit File

Date: February 28, 2003

From: Scott Pope

Place: Environmental Remediation

Subject: Interview with Don Sanders Regarding Potential Sources of Nitrates in Groundwater at Blanco Plant

On December 16, 2002 I met with Don Sanders at the Blanco Plant to discuss potential sources of nitrates that would have been released in significant quantities to cause impact to groundwater. Don has worked at the plant since 1980 and has some historical knowledge of operations of the plant prior to 1980.

I showed Don the current plume map showing concentrations above standards in the D plant area, north of the plant near MW-2 and the area south of the plant near the former south flare pit. He identified the following as potential sources in the D plant area:

- Possible leach field for the old office and lab building.
- Old chemical storage building that was once in that area. However, this building apparently had a concrete floor and no significant spills of nitrate-based chemicals were reported.

Potential sources in the area around MW-2:

- North Flare Pit. However the only know discharge into the flare pit would have been pipeline condensates. These condensates typically do not contain high concentrations of nitrates.
- Kutz Separator Evaporation Ponds. Again, the Kutz separator ponds receive pipeline condensates from the field. The hydrocarbons and water are separated, water evaporated and hydrocarbons recovered for sale to the local refinery.

Potential sources near the South Flare Pit area:

- Former Fertilizer Storage Shed. The Shed was located near the south fence in the area of the South Flare Pit. The shed was used to store fertilizer for the golf course south and east of the plant fence. No large spills of fertilizer were reported.
- A Sewer Pit. A sewer pit that may have stored sewage from the plant or camp was also in the area of the South Flare Pit. Water from the camp housing sewage lagoons (mostly located south and east of the plant fence) were used throughout the plant and camp area for dust control and irrigation.

When asked about other potential sources of nitrates, Mr. Sanders indicated that in approximately 1983 the corrosion inhibiting chemical used in the cooling system for compressors in the B plant was switched to a nitrite-based chemical. He added that the chemical was in a closed system and was used in small quantities and no known spills of significant volume had occurred. The chemical is called Unichem 2310 and its main ingredient is sodium nitrite. This sodium nitrite based chemical is

currently used in the A plant compressors. Specific concentrations are not reported in the MSDS sheet. The B plant was decommissioned in 1988 and demolished in 1989. The former B plant area was located due east and cross gradient of the D plant area.

Another area where a nitrite-based chemical is used is in the boiler water to prevent scaling. Again no significant spills have been reported of this chemical at the plant. The chemical is called Unichem 3030. The main ingredient is listed as sodium nitrate at 15%. Other ingredients include Ethylenediaminetetraacetic acid, tetrasodium salt, potassium hydroxide, and trisodium nitrilotriacetate. The boiler area is located due south and cross gradient of the D plant area.

In conclusion, based on site knowledge there does not appear to be a known source coming from the plant operations. Even if the potential sources identified had impacted groundwater they are generally located cross gradient or down gradient of areas identified as having elevated nitrates.

Appendix B

MWH

APPENDIX B

LABORATORY ANALYTICAL REPORTS

GROUNDWATER NITRATE/NITRITE ANALYSES
MW-6 AND MW-18

ANALYTICAL DATA REPORT
SEPTEMBER 2002

EL PASO BLANCO PLANT

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL Analytical Report

Submitted to:
Montgomery Watson Harza
Attention: Brian Buttars
10619 South Jordan Gateway
Salt Lake City UT 84095
Tel: (801)617-3200 Fax: (801)617-4200

Service ID #: 801-025076
Collected by: Ashley Lowe
Collected on: 09/24/02

Received: 09/25/02
Extracted: N/A
Tested: 09/25/02
Reported: 10/02/02

Sample Description: Water
Project Description: 220013 San Juan River Basin

Analysis of Water Samples

Component Analyzed	Method	Unit	PQL	Analysis Result MW-6 Blanco 02-05076-1	Analysis Result MW-18 Blanco 02-05076-2
Dilution Factor				50	5
NITRATE AS N	EPA300.0	mg/L	0.04	95.1	3.1
NITRITE AS N	EPA300.0	mg/L	0.04	< 2	< 0.2

PQL: Practical Quantitation Limit. MDL: Method Detection Limit. CRDL: Contract Required Detection Limit
N.D.: Not Detected or less than the practical quantitation limit. "-": Analysis is not required.
J: Reported between PQL and MDL.
Listed Dilution Factors (DF) are relative to the method default DF. All unlisted DFs are 1.0

Respectfully submitted,

Dominic Lau
Laboratory Director
Applied P & Ch Laboratory

CADHS ELAP No.: 1431

CI-0984 D004 N 02-5076 h

Applied P & Ch Laboratory
13760 Magnolia Ave. Chino CA 91710
Tel: (909) 590-1828 Fax: (909) 590-1498

APCL QA/QC Report

Submitted to:
Montgomery Watson Harza
Attention: Brian Buttars
10619 South Jordan Gateway
Salt Lake City, UT 84095
Tel: (801)617-3200 Fax: (801)617-4200

Service ID #: 801-025076
Collected by: Ashley Lowe
Collected on: 09/24/02
Sample description:
Water
Project: San Juan River Basin /220013

Received: 09/25/02
Tested: 09/25/02
Reported: 10/03/02

Analysis of Water

801-025076QC

Component Name	Analysis Batch #	CCV (mg/L)	CCV %Rec	M-Blank	Conc. Unit	SP Level	LCS %Rec	MS %Rec	MSD %Rec	MS/MSD %RPD	Control Limit %Rec	Control Limit %Diff
WET Analysis in Water												
Nitrite as N-NO_2^-, by IC	02W4532	1.50	95	N.D.	mg/L	7.50	100	104	104	1	75-125	20
Nitrate as N-NO_3^-, by IC	02W4532	1.50	94	N.D.	mg/L	7.50	101	99	99	0	75-125	20

*: LCS/LCSD is used.

Notation:
ICV – Initial Calibration Verification
CCV – Continuation Calibration Verification
LCS – Lab Control Spike
MS – Matrix Spike
MSD – Matrix Spike Duplicate
ICS – Interference Check Standard
MD – Matrix Duplicate
N.D. – Not detected or less than PQL
CCB – Continuation Calibration Blank
M-blank – Method Blank
SP Level – Spike Level
%Rec – Recovery Percent
%RPD – Relative Percent Differences
%Diff – Control Limit for %RPD
ICP-SD – ICP Serial Dilution
N.A. – Not Applicable

Respectfully submitted,

Regina Kirakozova,
Associate QA/QC Director
Applied P & Ch Laboratory

DATA VALIDATION WORKSHEET

Analytical Method/Analytes: Wet Chemistry **Sample Collection Date(s):** 09/24/02

Laboratory: APCL **MWH Job Number:** SJRB (So. Flare Pit)

Batch Identification: 02-05076 **Matrix:** Water

QC Identification[a]: **Page:** 1 of 2

Validation Complete: Brian Buttars 10-9-02
(Date/Signature)

Project	Sample ID	Lab. ID	Hits (Y/N)	Quals.	Comments
SF	Blanco MW-6	02-05076-01	Y		
SF	Blanco MW-18	02-05076-02	Y		

DATA VALIDATION WORKSHEET

Analytical Method: Wet Chemistry **MWH Job Number:** SJRB (South Flare Pit)

Laboratory: APCL **Batch Identification:** 02-05076

Validation Criteria								
Analytes	**Nitrate & Nitrite**							
Analytical Method	**U.S. EPA 300.0**							
Sample ID	**Blanco MW-6**	**Blanco MW-18**						
Lab ID	**02-05076-01**	**02-05076-02**						
Hardcopy vs. Chain-of-Custody	A	A						
Holding Time	A	A						
Analyte List	A	A						
Reporting Limits	A	A						
Method Blank (all methods)	A	A						
Equipment Rinseate Blanks	N/A	N/A						
Field Duplicate/Replicate	N/A	N/A						
Initial Check Verification (ICV)	N	N						
Continuing Calibration Verification (CCV)	A	A						
Laboratory Control Sample (LCS)	A	A						
Laboratory Control Sample Duplicate (LCSD)	N	N						
Matrix Spike/Matrix Spike Dup. (MS/MSD)	A	A						
Matrix Duplicate	N/A	N/A						
Initial Calibration	N	N						
Analysis Time(s)	N	N						
EDD vs. Hardcopy	N	N						
EDD vs. Chain of Custody	N	N						

(a) List QC batch identification if different than Batch ID
A indicates validation criteria were met
A/L indicates validation criteria met based upon Laboratory's QC Summary Form
X indicates validation criteria were not met
N indicates data review were not a project specific requirement
N/A indicates criteria are not applicable for the specified analytical method or sample
N/R indicates data not available for review

NOTES:

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 220013 Project Name: San Juan River Basin Client: MWH

Location: Blanco Well No: MW-18 Development ☐ Sampling ☑

Project Manager Ashley Lowe Date 09/24/02 Start Time 12:53 Weather 80°, Sunny

Depth to Water 10.46 Depth to Product ~~NA~~ Product Thickness ~~NA~~ NA Measuring Point TOC

Water Column Height 0.48' Well Dia. 2" TD 10.94

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☑ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☑ Sabilization of Indicator Parameters ☐ Other er bail dry

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
0.16 x 0.48	0.077 x 3		0.23gal = 14oz

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. (gal.)	Comments/ Flow rate
12:59	7.11	2340	30.9				8oz	light brown, silt particles
	6.85	2150	28.4				12oz	

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
13:21	6.85	2150	28.4						almost dry

COMMENTS: water well was dry after purging 12 oz. Came back to sample @ 13:41 Filled 1/4 bottle; left & came back at 14:06 & filled 1/2 bottle. - Eric at APCL said

INSTRUMENTATION: pH Meter ☑ _____ Temperature Meter ☑ _____

DO Monitor ☐ _____ Other ☐ _____

Conductivity Meter ☑ _____

Water Disposal Kutz Plant

Sample ID Blanco MW-18 Sample Time 13:41 BTEX ☑ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☑ Nitrite ☑ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐

MS/MSD _____ BD _____ BD Name/Time _____ TB _____

WELL DEVELOPMENT AND SAMPLING LOG

Project No: 220013 Project Name: San Juan River Basin Client: MWH

Location: Blanco Well No: MW-6 Development ☐ Sampling ☑

Project Manager Ashley Lowe Date 09/24/02 Start Time 11:40 Weather 80° Sunny

Depth to Water 29.12 Depth to Product — Product Thickness — Measuring Point TOC

Water Column Height 2.102' Well Dia. 4" TD 31.222

Sampling Method: Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Other ☐

Bottom Valve Bailer ☑ Double Check Valve Bailer ☐ Stainless-Steel Kemmerer ☐

Criteria: 3 to 5 Casing Volumes of Water Removal ☑ Sabilization of Indicator Parameters ☐ Other or bail dry

Gal/ft x ft of water	Water Volume In Well		Gal/oz to be removed
	Gallons	Ounces	
0.65 x 2.102	1.37 x 3		4.1 gal

Time (military)	pH	SC (umhos/cm)	Temp (°C)	Eh-ORP (millivolts)	D.O. (mg/L)	Turbidity (NTU)	Vol Evac. ~~(gal.)~~	Comments/ Flow rate
11:45	7.01	5340	24.8				24 oz	light yellow, clear
	7.00	5020	24.1				32	
	6.87	5020	22.9				48	
	6.84	4910	21.6				60	
	6.84	4950	21.5				72	bailing down
	6.84	4870	21.4				80	
	6.84	4880	21.6				85	almost dry
							DRY	

Final:

Time	pH	SC	Temp	Eh-ORP	D.O.	Turbidity	Ferrous Iron	Vol Evac.	Comments/Flow rate
13:16	6.84	4880	21.6					85 oz	

COMMENTS: Bailed dry, then returned 30 mins later to collect sample.

INSTRUMENTATION: pH Meter ☑ ____ Temperature Meter ☑ ____

DO Monitor ☐ ____ Other ☐ ____

Conductivity Meter ☑ ____

Water Disposal Kutz Plant

Sample ID Blanco MW-6 Sample Time 13:48 BTEX ☐ VOCs ☐ Alkilinity ☐

TDS ☐ Cations ☐ Anions ☐ Nitrate ☑ Nitrite ☑ Ammonia ☐ TKN ☐ NM WQCC Metals ☐

Total Phosphorus ☐ ____ ☐ ____ ☐ ____ ☐ ____ ☐

MS/MSD ____ BD ____ BD Name/Time ____ TB ____

CHAIN OF CUSTODY RECORD/LAB WORK REQUEST

LABORATORY APCL
Contract El Paso Corp., San Jaun River Basin

Chain of Custody ID 020924AL01
Page 1 of 1
Air Bill No. 836557901522

MWH
Phone (801) 617-3200 FAX (801) 617-4200
MWH Contact Brian Buttars

Project San Juan River Basin
Project Number 220013
Date Due 21 Days
Sampler's Name Ashley Lowe
(print clearly)

Location ID	Sample ID	Depth Interval (ft)	Date Collected	Time Collected	Matrix [a]	Sampling Technique [b]	BTEX SW-846 8021B	Alkalinity SM 2320B	TDS USEPA 160.1	NM WQCC Metals SW-846 6010B & 7470A	Cations SW-846 6010B	Anions USEPA 300.0	Nitrate USEPA 300.0	Nitrite USEPA 300.0				
							ANALYSES REQUESTED											
Blanco	MW-6		9/24/02	13:48	WG	B							✓	✓				
Blanco	MW-18		9/24/02	13:41	WG	B							✓	✓				
												5076						

[a] **Matrix:**
SO – Soil
WS – Surface Water
WG – Ground Water
AA – Air
WQ – Trip Blank/ Equipment Blanks
WW – Wastewater

[b] **Sampling Technique:**
Composite=C
Grab=G
Hand Auger=HA
Submersible Pump=SP
Bladder Pump=BP
Bailer=B
Wellhead Faucet=WF
Hydropunch=HP

Location IDs:
Groundwater Sites=GW
Bisti=BI
Jaquez=JA
North Flare Pit=NF
South Flare Pit=SF
San Juan River Plant=SJ

Relinquished by/Affiliation	Received by/Affiliation	Date	Time
Ashley Lowe / AESE	Paul C	9/24/02	4:00
	Paul C	9/25/02	10:00

LABORATORY USE ONLY

SAMPLES WERE:

1 Shipped or hand delivered
Notes:

2 Ambient or Chilled
Notes:

3 Temperature _____

4 Received Broken/Leaking (Improperly Sealed)
Y N
Notes:

5 Properly Preserved
Y N
Notes:

6 Received Within Holding Times
Y N
Notes:

COC Tape Was:

1 Present on Outer Package
Y N NA

2 Unbroken on Outer Package
Y N NA

3 Present on Sample
Y N NA

4 Unbroken on Sample
Y N NA
Notes:

Discrepancies Between Sample Labels and COC Record?
Y N
Notes:

SOIL LEACHATE ANALYSIS

ANALYTICAL DATA REPORT
NOVEMBER 2002

EL PASO BLANCO PLANT

Inter-Mountain Laboratories, I

2506 West Main Street
Farmington, NM 87401

Client: El Paso Natural Gas
Sample ID: 1127020845
Lab ID: 0302W04992
Matrix: Soil
Condition: Cool/Intact

Date Received: 11/27/02
Date Reported: 12/10/02
Date Sampled: 11/27/02
Time Sampled: 0845

Parameter	Analytical Result	Units
1+1 SOIL WATER EXTRACT		
PH	7.8	s.u.
Electrical Conductivity	0.70	mmhos/cm
Solids - Total Dissolved (Calc)	420	mg/Kg
Alkalinity (CaCO3)	20	mg/Kg
Hardness (CaCO3)	128	mg/Kg
Major Cations		
Calcium	46.0	mg/Kg
Magnesium	3.2	mg/Kg
Potassium	5.8	mg/Kg
Sodium	126	mg/Kg
Major Anions		
Bicarbonate (HCO3)	24	mg/Kg
Carbonate (CO3)	<1	mg/Kg
Chloride	24	mg/Kg
Nitrate (IC)	8	mg/Kg
Fluoride	2.20	mg/Kg
Sulfate	199	mg/Kg

Reference: EPA - "Methods for Chemical Analysis of Water and Wastes (MCAWW)" - EPA/600/4-79-020 - March, 1983.
SM - "Standard Methods for the Examination of Water and Wastewater", APHA-AWWA-WEF,19th Edition, 1995.
EPA - "Methods for the Determination of Metals in Environmental Samples" - Supplement I - 600/R-94-111 - May, 1994.

Reviewed By: