TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Spring 2005
Installation Restoration Program Site 1
Vandenberg Air Force Base, California

01 September 2005

Prepared by:
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Santa Barbara, California 93110

1.0 INTRODUCTION

This report documents the activities and results of the spring 2005 groundwater monitoring at Installation Restoration Program (IRP) Site 1 (Base Exchange Service Station [BXSS]), Operable Unit 6, Vandenberg Air Force Base (AFB), Santa Barbara County, California. Samples were collected at Site 1 by Tetra Tech, Inc. (Tetra Tech) during May 2005. The location of Site 1 is shown on Figure 1.

The groundwater monitoring is being completed in accordance with the Basewide Groundwater Monitoring Program (BGMP) Work Plan (U.S. Air Force 2000a), the BGMP Health and Safety Plan (U.S. Air Force 2000b), the Basewide Sampling and Analysis Plan (U.S. Air Force 2003), the BGMP Quality Assurance Project Plan (QAPP) Addendum (U.S. Air Force 2004), the Vandenberg AFB Hazardous Waste Management Plan (U.S. Air Force 2002), and the Waste Management Plan Addendum (U.S. Air Force 2005). Regulatory oversight of the work is being performed by the California Department of Toxic Substances Control and Regional Water Quality Control Board—Central Coast Region.

Site background information is summarized in Section 2.0. The scope of work and methodology for groundwater monitoring are presented in Section 3.0. The results of the quarterly monitoring are presented in Section 4.0. Quality Assurance/Quality Control (QA/QC) is discussed in Section 5.0. Recommendations for future sampling are presented in Section 6.0.

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND HISTORY

Installation Restoration Program Site 1 is located on the corner of California Boulevard and Herado Avenue in the main cantonment area at Vandenberg AFB. The BXSS has been in operation since 1967 and provides motor vehicle fuel to base residents. The site currently consists of a main office building and three gasoline dispensing islands, six automobile service bays, a four-bay car wash building, and a car wash oil-water separator (OWS).

Four 10,000-gallon, single-walled fuel underground storage tanks (USTs); one 250-gallon, single-walled waste oil UST; associated piping; and the automobile service bay OWS were installed at the BXSS in 1967 (IT Corporation [IT] 1999; U.S. Air Force 1996). The automobile service bay OWS was removed in 1999 (U.S. Air Force 1999). The car wash OWS, which was installed in 1976, does not produce a hazardous waste stream and is still in place (U.S. Air Force 1999). Petroleum products leaked from the single-walled USTs and associated piping into the surrounding soil and groundwater. Two of the 10,000-gallon fuel USTs were subsequently removed and replaced with two 10,000-gallon, double-walled, fiberglass tanks in 1985. The two remaining 10,000-gallon, single-walled USTs and the waste oil UST were replaced with 10,000-gallon, double-walled USTs in 1991. An unknown volume of soil was also excavated during replacement of the tanks (IT 1999).

From 1980 to 1985, Battelle Corporation conducted environmental investigations at Site 1 and installed monitoring wells 1-MW-1 through 1-MW-5. After the single-walled USTs were removed from the site, the Bureau of Reclamation (BR) continued the environmental investigations to determine the extent of soil and groundwater contamination. The BR installed seven monitoring wells (BXS-MW-1 through BXS-MW-7) and drilled nine soil borings. The BR found that the highest concentration of hydrocarbon contaminated soil was in a zone approximately 10 feet below ground surface (bgs) and extending around the USTs, the old pump island, the south half of the BXSS building, and north to the cashier's booth. Pilot tests have since been conducted at the site to assess the effectiveness of site dewatering in

conjunction with bioventing of impacted soil. In 1999, IT published a feasibility study to identify, develop, and analyze remedial action alternatives and to address gasoline, benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl *tert*-butyl ether (MTBE) detected in soil and groundwater surrounding the former USTs.

A new service station is expected to open in March 2006, and remediation is scheduled to coincide with the opening of the new station. The existing service station will be demolished at that time. In spring 2004, Water Resource Development Corporation (WPSI) conducted a demonstration project using their Advanced Phase Separation System for MTBE and volatile organic compound (VOC) removal from selected wells. Results from the demonstration project can be obtained by contacting the 30th Space Wing Civil Engineer Squadron, Environmental Flight, IRP (30 CES/CEVR).

2.2 HYDROGEOLOGY

Site 1 is located on an uplifted late-Pleistocene marine terrace within the Burton Mesa physiogeographic province. Groundwater typically occurs unpredictably in small lenses perched on low-permeability layers on Burton Mesa. Site geology consists of poorly graded, fine-grained sand from the surface to approximately 19 to 28 feet bgs. Within the sand, a discontinuous clay layer was encountered. The 2- to 4-foot-thick clay layer is found at depths of 12 to 16 feet and consists of silty clay and clayey sand. The upper clay layer is not expected to act as a barrier to groundwater movement within the perched aquifer due to its discontinuity. A deeper, continuous clay bed, which ranges in thickness from 4 to 5 feet, was encountered at a depth of approximately 19 feet under the east side of the site and extends to a depth of 28 feet northwest of the BXSS (IT 1999). The perched groundwater at Site 1 is typically found from approximately 9 feet bgs to the deep clay bed, which slopes toward the northwest (IT 1999). Sand and gravel encountered during drilling investigations below the deep clay bed were found to be unsaturated.

The shallow saturated zone below Site 1 is unconfined and ranges in thickness from approximately 10 to 21 feet. Based on site groundwater monitoring data collected from 1997 to 2004, groundwater generally flows northwest with elevations ranging from approximately 444 to 449 feet above mean sea level (msl). Groundwater levels measured in April 2005 indicate that the groundwater elevation ranged from approximately 445 to 451 feet above msl (Table 1); groundwater elevations rose during spring 2005 as a result of spring rains. During spring 2005, the interpreted direction of groundwater flow was to the northwest with a gradient of approximately 0.02 feet per foot (Figure 1).

3.0 SCOPE OF WORK

The work performed during spring 2005 at Site 1 included measuring groundwater elevations, collecting groundwater samples for laboratory analyses, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Thirteen wells were sampled at Site 1 during spring 2005. Dedicated MicroPurge pumps and Grundfos pumps were used for purging wells BXS-MW-1 through BXS-MW-3, BXS-MW-5 through BXS-MW-7, and BXS-MW-13 through BXS-MW-19. A duplicate sample was collected from well BXS-MW-15. Sampling was conducted in accordance with the documents cited in Section 1.0. Measured groundwater elevations are presented in Table 1 and groundwater contours are illustrated on Figure 1. Purge records are provided in Appendix A.

In general, wells were purged until a minimum of one pump and tubing volume of water (for MicroPurge pumps) or a minimum of three well volumes of water (for Grundfos pumps) were removed and water

quality parameters had stabilized. Criteria for determining stabilization are three successive measurements of temperature within ±0.1 degree Celsius, pH within ±0.1, conductivity within ±5 percent, and a turbidity reading of less than 5 nephelometric turbidity units (NTUs). In cases where stability or a turbidity reading of less than 5 NTUs was not obtained, samples were collected after purging a minimum of five pump and tubing volumes of water (for MicroPurge pumps) or a minimum of five well volumes of water (for Grundfos pumps).

3.1.1 MicroPurge Groundwater Sampling

MicroPurge sampling was conducted at monitoring wells BXS-MW-1, BXS-MW-6, BXS-MW-13, BXS-MW-14, and BXS-MW-16 through BXS-MW-18. The pumping rates were calibrated for each well prior to purging to maintain a static water level (i.e., minimal drawdown). Due to high turbidity, wells BXS-MW-1, BXS-MW-6, BXS-MW-13, and BXS-MW-18 were sampled after purging a minimum of five pump and tubing volumes of water.

3.1.2 Standard Groundwater Sampling

A 2-inch Grundfos pump was used for purging groundwater at wells BXS-MW-2, BXS-MW-3, BXS-MW-5, BXS-MW-7, BXS-MW-15, and BXS-MW-19. Wells BXS-MW-3, BXS-MW-5, BXS-MW-15, and BXS-MW-19 were purged dry and sampled after sufficient recharge. Samples were collected using disposable Teflon bailers.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured in the field during purging. Field measurements are presented in Appendix A. Readings taken immediately prior to sampling are presented in Table 2. Fixed laboratory analyses were performed by EMAX Laboratories, Inc. in Torrance, California. Samples were analyzed according to the work plan (U.S. Air Force 2000a) for total petroleum hydrocarbons as gasoline (TPHg) by U.S. Environmental Protection Agency (EPA) method SW8015B and VOCs by EPA method SW8260B. Laboratory analyses and data validation were conducted according to the QAPP Addendum (U.S. Air Force 2004). Data validation was performed on 100 percent of the analytical data. Results are presented in Tables 3 and 4, and on Figure 2. Historical data for key contaminants of concern are presented in Table 5 and on Figures 3A and 3B. Figure 3A contains data for key COCs from October 1998 through fall 2003 and Figure 3B contains data for key COCs from spring 2004 to present. Hydrographs showing historical benzene concentrations for wells BXS-MW-1, BXS-MW-5, BXS-MW-6, and BXS-MW-18 are presented on Figure 4. Chain-of-custody records are provided in Appendix B.

4.1 TOTAL PETROLEUM HYDROCARBONS

Total petroleum hydrocarbons as gasoline were detected in groundwater collected from seven of thirteen wells at Site 1. Concentrations ranged from 0.058 to 73 milligrams per liter (mg/L) (Table 3). The highest concentration (73 mg/L) was detected in groundwater from well BXS-MW-2. These concentrations were within the ranges of those detected during previous quarters (Table 5). Well BXS-MW-2 was added to the BGMP during spring 2004. Prior to being sampled under the BGMP, groundwater from well BXS-MW-2 had not been analyzed since the September 1996 sampling event by IT.

4.2 VOLATILE ORGANIC COMPOUNDS

Groundwater from eight of thirteen wells sampled contained VOCs at concentrations above the primary maximum contaminant levels (MCLs) (Table 4). The highest concentrations of VOCs detected during spring 2005 were centered around wells BXS-MW-2 and BXS-MW-5 (Figure 2). Well BXS-MW-2 was added to the BGMP during spring 2004 and has relatively high concentrations of BTEX (Table 5). Benzene concentrations detected in groundwater from wells BXS-MW-1 through BXS-MW-3, BXS-MW-5, BXS-MW-6, BXS-MW-7, and BXS-MW-18 were above the MCL of 1 microgram per liter (μg/L). The highest concentration was detected in groundwater from well BXS-MW-2 (4,100 μg/L). MTBE concentrations detected in groundwater from wells BXS-MW-1, BXS-MW-5, BXS-MW-6, BXS-MW-7, BXS-MW-18, and BXS-MW-19 were above the MCL of 13 μg/L. The highest concentration of MTBE was detected in groundwater from well BXS-MW-5 (1,500 μg/L). In addition, concentrations of *cis*-1,2-DCE, ethylbenzene, total xylenes, and toluene exceeded the respective MCLs of 6, 300, 1,750, and 150 μg/L in groundwater from one or more of the eight wells in which VOCs were detected above MCLs. The highest concentration of toluene was detected in groundwater from well BXS-MW-2 (11,000 μg/L). The compound *tert*-butanol (TBA) was detected above the Department of Health Services (DHS) notification level of 12 μg/L in groundwater from three wells.

The approximate distribution of benzene in groundwater is shown on Figure 3B. A hydrograph presenting a visual comparison of groundwater elevations and benzene concentrations for wells BXS-MW-1, BXS-MW-5, BXS-MW-6, and BXS-MW-18 has been included to expedite your review (Figure 4). A strong correlation with the groundwater elevation seasonality and benzene concentration is not visible, although benzene concentrations in these four wells increased in spring 2005 following the rains.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

All of the analytical data presented in this report have been validated according to the QAPP Addendum (U.S. Air Force 2004). The data validation process includes review of sample preservation, temperature, and hold times; detection and quantitation limits; instrument calibration; and equipment blank, trip blank, method blank, laboratory control sample, and matrix spike/matrix spike duplicate. Data validation qualifiers and comments are provided on the data tables to indicate the results of the data validation and to quantitatively indicate the usability of the data. In addition, field sampling records are reviewed to assess the potential for any field conditions to adversely impact the data quality.

There were no significant quality assurance/quality control discrepancies with the data presented in this report. The data quality objectives for the spring 2005 sampling at Site 1 were achieved.

6.0 RECOMMENDATIONS

Semiannual monitoring at Site 1 will continue in fall 2005 according to the Final BGMP Work Plan (U.S. Air Force 2000a).

7.0 REFERENCES

IT Corporation (IT)

1999 *Feasibility Study for the Base Exchange Service Station, Operable Unit 6, Vandenberg Air Force Base (AFB), California. Draft Final.* Prepared for the United States Army Corps of Engineers.

U.S. Air Force

1996 *Compliance Sampling at Tiered Permitted Sites.* 30 CES/CEVCC, Vandenberg AFB, California, Wing Environmental Services Contract, Task Assignment No. 425. Prepared by Tetra Tech, Inc.

U.S. Air Force

1999 *Tiered Permit Unit Wastewater Effluent Characterization. Draft* 30 CES/CEV, Vandenberg AFB, California, Wing Environmental Services Contract, Task Assignment No. 19. Prepared by Tetra Tech, Inc.

U.S. Air Force

2000a *Basewide Groundwater Monitoring Program Work Plan.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson AFB, Colorado. Prepared by Tetra Tech, Inc. December.

U.S. Air Force

2000b *Basewide Groundwater Monitoring Program Health and Safety Plan Addendum.* Prepared for 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarters Air Force Space Command, Peterson AFB, Colorado. Prepared by Tetra Tech, Inc. December.

U.S. Air Force

2002 *Headquarters Thirtieth Space Wing, Vandenberg AFB, California. Hazardous Waste Management Plan, 30 SW Plan 32-7043-A, Change 1.* HQ 30th Space Wing, Vandenberg Air Force Base, California 93437-6261. April.

U.S. Air Force

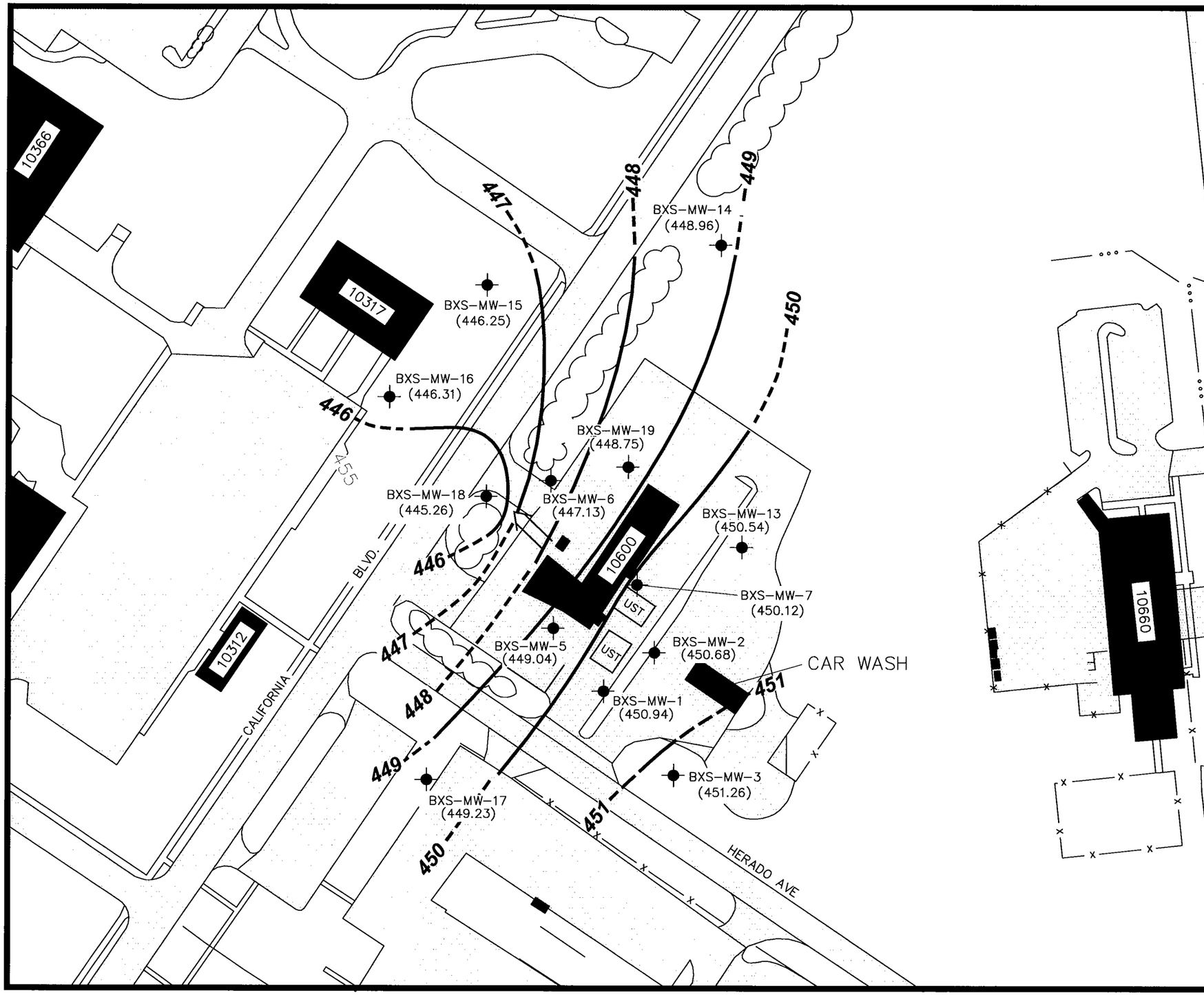
2003 *Final Basewide Sampling and Analysis Plan.* Prepared for 30 CES/CEV Installation Restoration Program, Vandenberg Air Force Base, California, and Headquarter Air Force Space Command, Peterson Air Force Base, Colorado. Prepared by Tetra Tech, Inc. September.

U.S. Air Force

2004 *Basewide Groundwater Monitoring Program Quality Assurance Project Plan Addendum. Final.* Prepared for Department of the Air Force 30 CES/CEVR, 806 13th Street, Suite 116, Vandenberg Air Force Base, California and Department of the Air Force, Air Force Center for Environmental Excellence, DERA Restoration Division, 3300 Sidney Brooks, Brooks City-Base, Texas. Prepared by Tetra Tech, Inc. July.

U.S. Air Force

2005 *Waste Management Plan Addendum. Final.* 730 CES/CEVR, Installation Restoration Program, Vandenberg AFB, California, and Headquarters Air Force Space Command, Peterson Air Force Base, Colorado. Prepared by Tetra Tech, Inc. February.



LEGEND

- 455 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- — x — FENCE
- PAVED ROAD OR STREET
- 10600 — BUILDING
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- DRAINAGE ROUTE
- BXS-MW-14 (448.96) — GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATIONS
- 446 — 446 — GROUNDWATER ELEVATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (DASHED WHERE INFERRED)
- INFERRED GROUNDWATER FLOW DIRECTION

NOTE(S): GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL AS MEASURED IN APRIL 2005.

N

0 50' 100' 150'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 1
SITE PLAN AND
GROUNDWATER CONTOUR MAP
SPRING 2005

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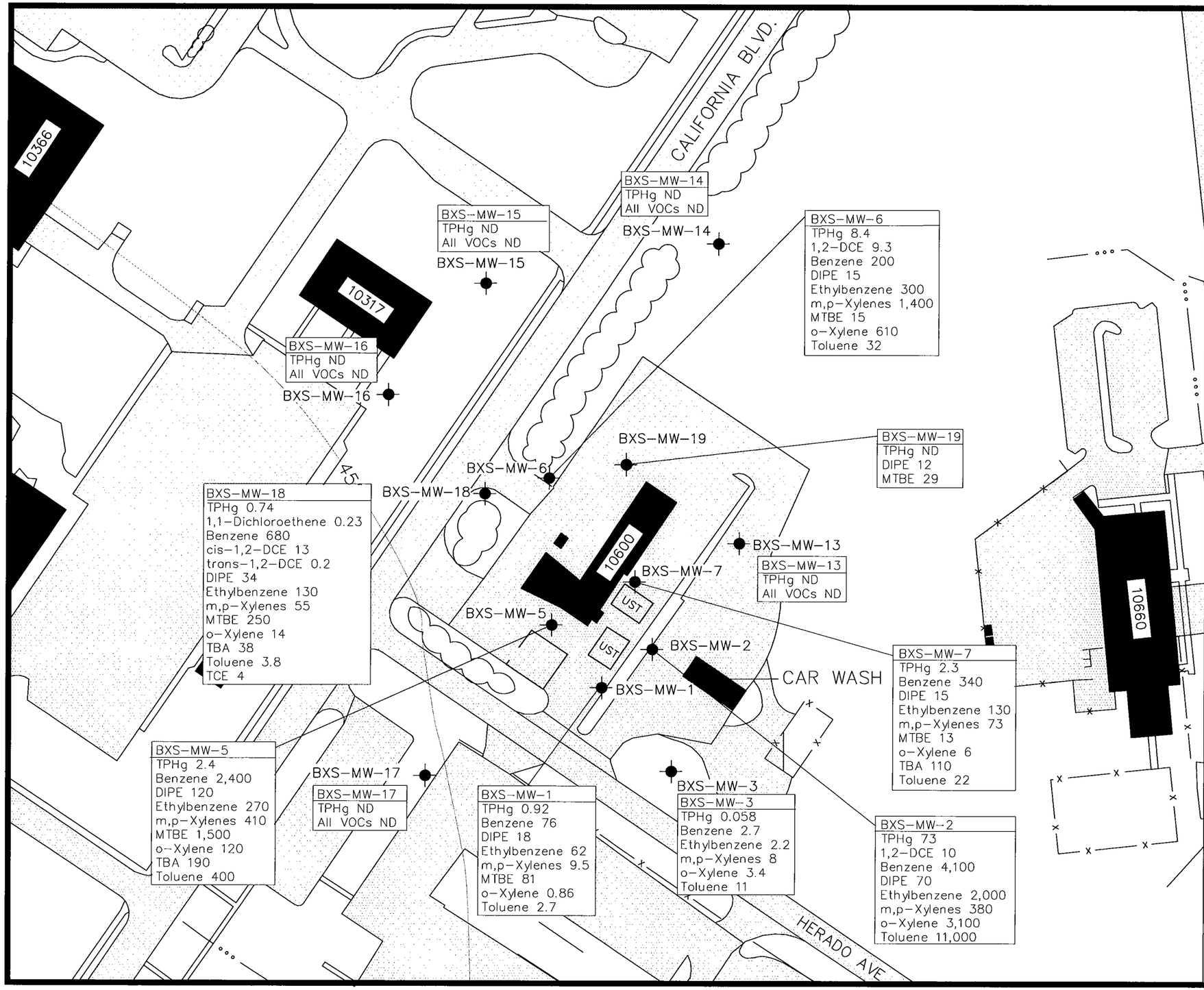
TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	8/18/05	RANDALL	TAB21	5015	1



LEGEND

455 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)

— x — FENCE

PAVED ROAD OR STREET

10600 — BUILDING

CONCRETE OR PAVED AREAS

VEGETATION LINE

DRAINAGE ROUTE

BXS-MW-16 — GROUNDWATER MONITORING WELL

ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L.

N

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SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 1
ANALYTICAL RESULTS
SPRING 2005

TETRA TECH, INC.
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Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	8/18/05	RANDALL	TAB21	5085	2

BSX-MW-19	Benzene	Toluene	Ethylbenzene	m,p-xylenes	o-xylenes	MTBE	TPHg
Spr-02	ND	ND	ND	ND	ND	34	0.18
Fall-02	ND	ND	ND	ND	ND	22	ND
Spr-03	3.53	0.27	1.02	2.61	0.37	40.9	0.05
Fall-03	ND	ND	ND	ND	ND	11.1	0.03

BXS-MW-15	Benzene	Toluene	m,p-xylenes	TPHg
Oct-98	NA	ND	NA	NA
May-99	ND	ND	NA	0.06
Oct-99	0.5	0.3	NA	0.043
Apr-00	ND	ND	NA	ND
Spr-01	ND	ND	ND	ND
Fall-01	ND	ND	ND	ND
Spr-02	ND	ND	ND	ND
Fall-02	ND	ND	ND	ND
Spr-03	0.44	ND	0.46	0.06
Fall-03	ND	ND	ND	ND

BXS-MW-14	Benzene	Total Xylenes	TPHg
Oct-98	3.7	1.24	NA
May-99	ND	ND	NA
Oct-99	ND	ND	0.057
Apr-00	0.31	ND	NA
Spr-01	ND	NA	ND
Fall-01	ND	NA	ND
Spr-02*	ND	NA	ND
Fall-02	ND	NA	ND
Spr-03	ND	NA	ND
Fall-03	ND	NA	ND

BXS-MW-16	Benzene	Toluene	MTBE	TPHg	Ethylbenzene
May-99	ND	ND	ND	0.085	ND
Oct-99	0.3	0.2	ND	0.054	ND
Apr-00	ND	ND	ND	ND	ND
Spr-01	ND	ND	5.7	ND	ND
Fall-01	ND	ND	ND	ND	ND
Spr-02*	ND	ND	ND	ND	ND
Fall-02	ND	ND	ND	ND	ND
Spr-03	1.97	0.12	0.22	ND	0.28
Fall-03	ND	ND	ND	ND	ND

BXS-MW-6	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	TPHg
Oct-98	3,200	150	56	940	NA	NA	240	6.6
May-99	3,200	360	140	1,410	NA	NA	130	6
Oct-99	2,300	800	130	1,490	NA	NA	65	8.9
Apr-00	2,000	1,900	370	3,300	NA	NA	83	12
Spr-01	870	3,200	680	NA	3,500	2,000	45	23
Fall-01	460	1,600	360	NA	1,900	1,200	61	7.9
Spr-02*	1,300	6,300	1,100	NA	5,500	3,100	15	53
Fall-02	300	550	600	NA	2,700	1,300	120	18
Spr-03	1,360	5,130	863	NA	5,530	2,690	34.0	37.1
Fall-03	1,400	5,670	878	NA	5,480	2,960	28.7	34.4

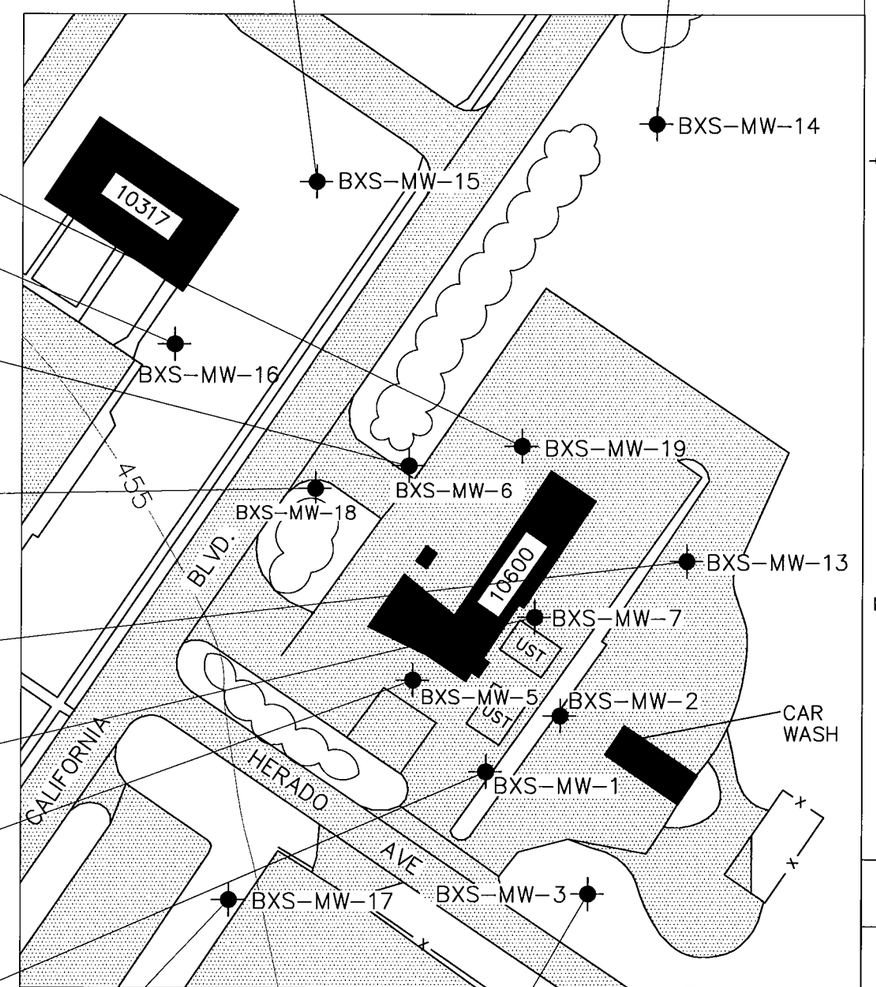
BXS-MW-18	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	TPHg
Oct-98	7,900	ND	1,800	2,610	NA	NA	11,000	15
May-99	11,000	240	2,100	4,220	NA	NA	8,100	22
Oct-99	6,200	69	1,400	610	NA	NA	3,400	14
Apr-00	3,500	6.5	1,300	81.8	NA	NA	3,200	9.7
Spr-01	1,000	7.6	840	NA	17	19	1,200	1.10
Fall-01	3,600	7.2	1,800	NA	130	4.9	2,000	4.5
Spr-02*	410	1.2	250	NA	ND	ND	660	2.1
Fall-02	270	4.9	130	NA	38	6.1	330	10
Spr-03	303	0.94	88.9	NA	1.13	0.70	233	7.9
Fall-03	552	0.89	53.3	NA	41.0	1.92	232	1.27

BSX-MW-13	Benzene
Spr-02	ND
Fall-02	ND
Spr-03	0.32
Fall-03	ND

BXS-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-02	260	11	220	48	10	660	4.7
Fall-02	70	2.3	26	11	2.8	290	1.3
Spr-03	225	8.89	61.0	24.2	1.82	491	1.88

BXS-MW-5	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	TPHg
Oct-98	9,900	5,800	900	3,220	NA	NA	3,900	21
May-99	13,000	7,900	1,400	4,600	NA	NA	3,200	22
Oct-99	9,400	5,400	1,100	2,930	NA	NA	3,000	17
Apr-00	4,800	910	490	460	NA	NA	3,300	14
Spr-01	12,000	6,900	1,100	NA	3,100	850	2,400	33
Fall-01	2,700	9.4	230	NA	30	3	2,400	10
Spr-02	3,500	50	210	NA	200	23	2,500	28
Fall-02	3,700	59	430	NA	260	62	1,700	10
Spr-03	5,110	32.6	369	NA	176	19.9	2,120	9.03

BXS-MW-1	Benzene	Toluene	Ethylbenzene	Total Xylenes	m,p-Xylenes	o-Xylene	MTBE	TPHg
Oct-98	1,500	140	600	900	NA	NA	540	7.9
May-99	1,000	62	500	920	NA	NA	810	4.3
Oct-99	390	29	57	72	NA	NA	680	3.7
Apr-00	500	17	130	131.2	NA	NA	350	3
Spr-01	250	21	270	NA	370	3.9	180	5.8
Fall-01	400	21	500	NA	280	5.6	220	7.8
Spr-02*	13	ND	5	NA	ND	ND	190	2.6
Fall-02	32	4.2	8.1	NA	9.4	5.5	250	1.5
Spr-03	628	14.3	95.8	NA	40.2	1.16	260	2.81



BXS-MW-17	Benzene	MTBE	TPHg
Oct-98	0.23	ND	ND
May-99	ND	ND	0.06
Oct-99	ND	1	0.059
Spr-01	ND	ND	ND
Fall-01	ND	ND	ND
Spr-02*	ND	ND	ND
Fall-02	ND	ND	ND
Spr-03	1.11	0.11	ND
Fall-03	ND	ND	ND

BXS-MW-3	Benzene	Toluene	Ethybenzene	m,p-xylenes	o-xylenes	TPHg
Spr-02	ND	ND	ND	ND	ND	ND
Fall-02	5.5	ND	ND	ND	ND	ND
Spr-03	0.42	ND	0.18	ND	ND	0.03
Fall-03	ND	ND	ND	ND	ND	ND

LEGEND

- 455 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (NAVD 1988)
- — x — FENCE
- PAVED ROAD OR STREET
- 10600 — BUILDING
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- BXS-MW-16 — GROUNDWATER MONITORING WELL
- * — INSTALLED MICROPURGE PUMP
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L.

N

0 50' 100' 150'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 1
HISTORICAL ANALYTICAL RESULTS OF KEY CONTAMINANTS OF CONCERN
OCTOBER 1998 THROUGH FALL 2003

TETRA TECH, INC.
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TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	8/8/05	PRICHARD	TAB21	5086	3A

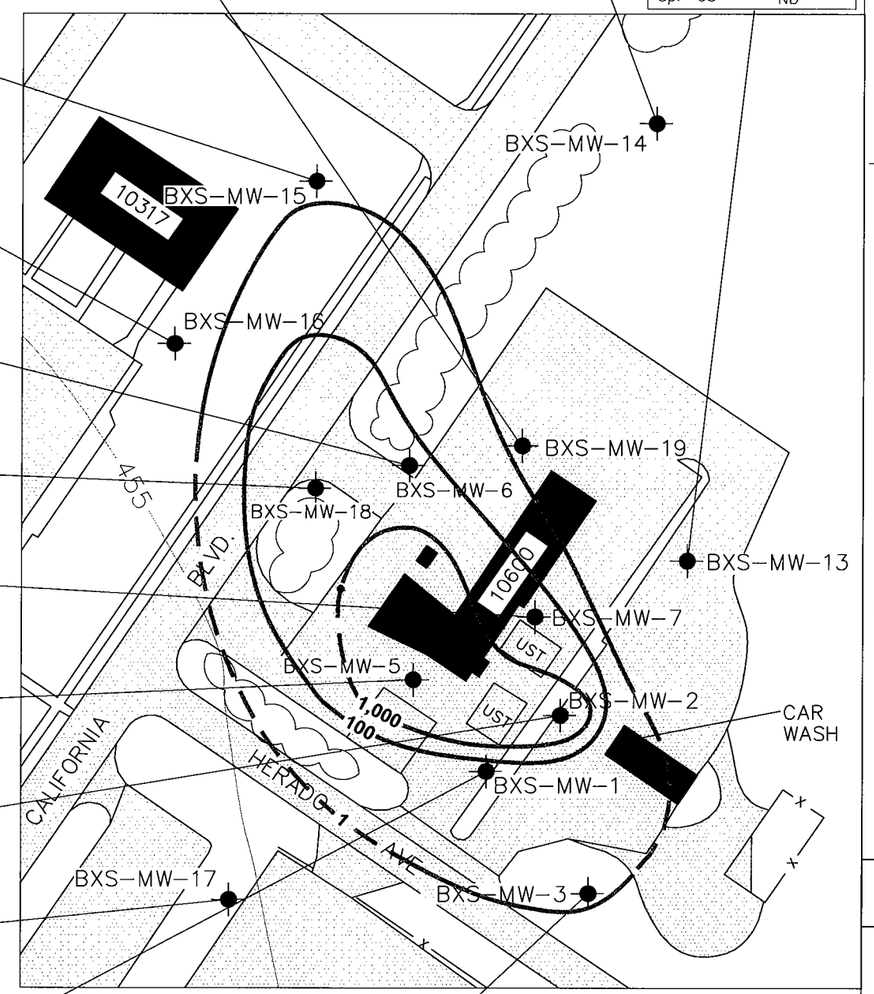
BXS-MW-19	Benzene	Toluene	Ethylbenzene	m,p-xylenes	o-xylenes	MTBE	TPHg
Spr-04	ND	ND	ND	ND	ND	15	ND
Fall-04	1.9	2.1	1.4	2.7	0.78	20	ND
Spr-05	ND	ND	ND	ND	ND	29	ND

BXS-MW-14	Benzene	TPHg
Spr-04	ND	ND
Fall-04	ND	ND
Spr-05	ND	ND

BXS-MW-15	Benzene	Toluene	m,p-xylenes	TPHg
Spr-04	0.38	0.22	0.55	ND
Fall-04	ND	ND	ND	ND
Spr-05	ND	ND	ND	ND

BSX-MW-13	Benzene
Spr-04*	ND
Fall-04	ND
Spr-05	ND

BXS-MW-16	Benzene	Toluene	MTBE	TPHg	Ethylbenzene
Spr-04	ND	ND	ND	ND	ND
Fall-04	ND	ND	ND	ND	ND
Spr-05	ND	ND	ND	ND	ND



BXS-MW-6	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	930	4,600	800	4,600	2,400	47	39
Fall-04	850	4,900	800	5,200	2,800	46	35
Spr-05	200	32	300	1,400	610	15	8.4

BXS-MW-18	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	200	0.54	22	1	0.34	110	0.12
Fall-04	320	0.86	32	2.4	0.22	200	0.42
Spr-05	680	3.8	130	55	14	250	0.74

BXS-MW-7	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	100	3.3	66	66	1.1	240	0.33
Fall-04	170	14	110	27	4.6	230	1.6
Spr-05	340	22	130	73	6	13	2.3

BXS-MW-5	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	2,200	21	100	79	7.5	2,100	1.6
Fall-04	1,900	22	110	43	9.7	1,900	2.3
Spr-05	2,400	400	270	410	120	1,500	2.4

BXS-MW-2	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	5,300	11,000	2,400	10,000	3,700	ND	60
Fall-04	4,500	12,000	1,700	3,900	3,400	ND	77
Spr-05	4,100	11,000	2,000	380	3,100	ND	73

BXS-MW-17	Benzene	MTBE	TPHg
Spr-04	ND	ND	ND
Fall-04	ND	ND	ND
Spr-05	ND	ND	ND

BXS-MW-1	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	MTBE	TPHg
Spr-04	79	1.9	83	2.7	0.37	200	0.68
Fall-04	210	7.6	81	41	0.7	130	1.4
Spr-05	76	2.7	62	9.5	0.86	81	0.92

BXS-MW-3	Benzene	Toluene	Ethylbenzene	m,p-xylenes	o-xylenes	TPHg
Spr-04	1.4	6.5	2.8	14	4.6	0.063
Fall-04	1.4	3.3	1.9	5.4	1.7	0.035
Spr-05	2.7	11	2.2	8	3.4	0.058

LEGEND

- 455 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (NAVD 1988)
- x — FENCE
- PAVED ROAD OR STREET
- 10600 — BUILDING
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- BXS-MW-16 — GROUNDWATER MONITORING WELL
- * — INSTALLED MICROPURGE PUMP
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT
- BENZENE CONCENTRATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (µg/L) (DASHED WHERE INFERRED)

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L.

N

0 50' 100' 150'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 1
HISTORICAL ANALYTICAL RESULTS OF KEY CONTAMINANTS OF CONCERN
SPRING 2004 THROUGH SPRING 2005

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	8/18/05	RANDALL	TAB21	5087	3B

Table 1
Groundwater Elevations
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured	Groundwater Depth (feet below TOC)	Groundwater Elevation (feet above msl)			
				Spring 2005	Fall 2004	Spring 2004	Fall 2003
		Spring 2005	Spring 2005				
BXS-MW-1	454.09	27-Apr-05	3.15	450.94	447.44	448.29	NM
BXS-MW-2	453.17	27-Apr-05	2.49	450.68	447.10	448.19	NM
BXS-MW-3	452.99	27-Apr-05	1.73	451.26	447.09	448.69	446.80
BXS-MW-5	454.61	27-Apr-05	5.57	449.04	446.32	446.90	NM
BXS-MW-6	453.52	27-Apr-05	6.39	447.13	444.93	445.11	444.86
BXS-MW-7	455.39	27-Apr-05	5.27	450.12	446.91	447.70	NM
BXS-MW-13	453.81	27-Apr-05	3.27	450.54	446.69	447.73	446.57
BXS-MW-14	454.52	27-Apr-05	5.56	448.96	445.78	446.18	445.44
BXS-MW-15	453.17	27-Apr-05	6.92	446.25	444.91	445.13	444.51
BXS-MW-16	451.63	27-Apr-05	5.32	446.31	445.10	445.83	445.10
BXS-MW-17	453.15	27-Apr-05	3.92	449.23	447.27	447.57	447.34
BXS-MW-18	453.09	27-Apr-05	7.83	445.26	444.37	444.59	444.37
BXS-MW-19	453.99	27-Apr-05	5.24	448.75	445.80	446.17	445.72

Definition(s):

msl - mean sea level
NM - not measured
TOC - top of well casing

Table 2
Water Quality Parameters
Spring 2005
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sampling Location	**BXS-MW-1**	**BXS-MW-2**	**BXS-MW-3**	**BXS-MW-5**	**BXS-MW-6**	**BXS-MW-7**	**BXS-MW-13**
Sample ID	**VBXSMW1**	**VBXSMW2**	**VBXSMW3**	**VBXSMW5**	**VBXSMW6**	**VBXSMW7**	**VBXSMW13**
Collection Date	**23-May-05**	**23-May-05**	**23-May-05**	**23-May-05**	**23-May-05**	**24-May-05**	**23-May-05**
Field Parameters[1]:							
Temperature (° Celsius)	18.99	20.22	19.64	20.12	18.27	20.75	20.85
Conductivity (µmhos/cm)	2,646	1,002	1,955	1,397	2,065	838	979
pH	6.89	6.53	6.22	6.28	6.88	6.80	6.60
Turbidity (NTUs)	4.23	3.53	44.2	57.5	37.3	2.62	5.55

Sampling Location	**BXS-MW-14**	**BXS-MW-15**	**BXS-MW-16**	**BXS-MW-17**	**BXS-MW-18**	**BXS-MW-19**
Sample ID	**VBXSMW14**	**VBXSMW15**	**VBXSMW16M**	**VBXSMW17**	**VBXSMW18**	**VBXSMW19**
Collection Date	**23-May-05**	**24-May-05**	**23-May-05**	**23-May-05**	**23-May-05**	**24-May-05**
Field Parameters[1]:						
Temperature (° Celsius)	19.23	20.26	19.64	17.70	17.18	20.23
Conductivity (µmhos/cm)	2,833	2,662	1,990	581	1,878	2,432
pH	6.97	6.70	6.39	6.64	6.25	6.67
Turbidity (NTUs)	1.16	3.50	2.58	4.71	4.73	7.55

Definition(s):

µmhos/cm - micromhos per centimeter
NTU - nephelometric turbidity unit

Note(s):

1 - All field parameters were measured immediately before sampling.

Table 3
TPH in Groundwater
Spring 2005
EPA Method SW8015B (mg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date		TPH as Gasoline		
			MDL[1]	0.02		
			PQL[1]	0.1		
BXS-MW-1	VBXSMW1	23-May-05		0.92	J	b
BXS-MW-2	VBXSMW2	23-May-05		73		g
BXS-MW-3	VBXSMW3	23-May-05		0.058	J	q
BXS-MW-5	VBXSMW5	23-May-05		2.4		g
BXS-MW-6	VBXSMW6	23-May-05		8.4		g
BXS-MW-7	VBXSMW7	24-May-05		2.3		g
BXS-MW-13	VBXSMW13	23-May-05		0.02	U	g
BXS-MW-14	VBXSMW14	23-May-05		0.02	U	g
BXS-MW-15	VBXSMW15	24-May-05		0.02	U	g
BXS-MW-15	V99W533 (D)	24-May-05		0.02	U	g
BXS-MW-16	VBXSMW16M	23-May-05		0.02	U	g
BXS-MW-17	VBXSMW17	23-May-05		0.02	U	g
BXS-MW-18	VBXSMW18	23-May-05		0.74		g
BXS-MW-19	VBXSMW19	24-May-05		0.02	U	g

Data Validity Qualifier(s):

J - The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

b - The surrogate spike recovery was outside quality control criteria.
g - The data met prescribed criteria as detailed in the QAPP.
q - The analyte detection was below the PQL.

Definition(s):

(D) - duplicate sample
MDL - method detection limit
mg/L - milligrams per liter
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
TPH - total petroleum hydrocarbons

Note(s):

1 - Values from QAPP Addendum (U.S. Air Force 2004).

Table 4
VOCs in Groundwater
Spring 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location				**BXS-MW-1**	**BXS-MW-2**	**BXS-MW-3**	**BXS-MW-5**	**BXS-MW-6**
Sample ID				**VBXSMW1**	**VBXSMW2**	**VBXSMW3**	**VBXSMW5**	**VBXSMW6**
Collection Date				**23-May-05**	**23-May-05**	**23-May-05**	**23-May-05**	**23-May-05**
	MDL [1]	**PQL [1]**	**Primary MCL**					
1,1-DCE	0.32	1.0	6	0.2 UJ b	1 U g	0.2 U g	1 U g	2 U g
TBA	4.4	10	N/A	5 UJ b	25 U g	5 U g	190 g	50 U g
Benzene	0.07	0.4	1	**76** J b	**4,100** g	**2.7** g	**2,400** g	**200** g
Carbon disulfide	0.48	1.0	N/A	0.2 UJ b	6 g	0.2 U g	1 U g	2 U g
cis-1,2-DCE	0.21	1.0	6	0.2 UJ b	1 U g	0.2 U g	1 U g	2 U g
DIPE	0.16	5.0	N/A	18 J b	70 g	0.2 U g	120 g	15 J q
Ethylbenzene	0.12	1.0	300	62 J b	**2,000** g	2.2 g	270 g	300 g
m,p-Xylenes	0.25	2.0	1,750 [2]	9.5 J b	**380** g	8 g	**410** J q	**1,400** g
MTBE	0.3	1.0	13 [3]	**81** J b	1 U g	0.2 U g	**1,500** g	**15** g
o-Xylene	0.13	1.0	1,750 [2]	0.86 J b, q	**3,100** g	3.4 g	120 g	**610** g
Toluene	0.11	1.0	150	2.7 J b	**11,000** g	11 g	**400** g	32 g
trans-1,2-DCE	0.27	1.0	10	0.2 UJ b	1 U g	0.2 U g	1 U g	2 U g
TCE	0.18	1.0	5	0.2 UJ b	1 U g	0.2 U g	1 U g	2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND	ND	ND

Table 4
VOCs in Groundwater
Spring 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location				**BXS-MW-7**	**BXS-MW-13**	**BXS-MW-14**	**BXS-MW-15**	**BXS-MW-15**
Sample ID				**VBXSMW7**	**VBXSMW13**	**VBXSMW14**	**VBXSMW15**	**V99W533 (D)**
Collection Date				**24-May-05**	**23-May-05**	**23-May-05**	**24-May-05**	**24-May-05**
	MDL [1]	**PQL [1]**	**Primary MCL**					
1,1-DCE	0.32	1.0	6	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
TBA	4.4	10	N/A	110 J b	5 U g	5 U g	5 U g	5 U g
Benzene	0.07	0.4	1	**340** J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
Carbon disulfide	0.48	1.0	N/A	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
cis-1,2-DCE	0.21	1.0	6	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
DIPE	0.16	5.0	N/A	15 J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
Ethylbenzene	0.12	1.0	300	130 J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
m,p-Xylenes	0.25	2.0	1,750 [2]	73 J b	0.5 U g	0.5 U g	0.5 U g	0.5 U g
MTBE	0.3	1.0	13 [3]	13 J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
o-Xylene	0.13	1.0	1,750 [2]	6 J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
Toluene	0.11	1.0	150	22 J b	0.2 U g	0.2 U g	0.2 U g	0.2 U g
trans-1,2-DCE	0.27	1.0	10	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
TCE	0.18	1.0	5	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND	ND	ND

Table 4
VOCs in Groundwater
Spring 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Sample Location				**BXS-MW-16**	**BXS-MW-17**	**BXS-MW-18**	**BXS-MW-19**
Sample ID				**VBXSMW16M**	**VBXSMW17**	**VBXSMW18**	**VBXSMW19**
Collection Date				**23-May-05**	**23-May-05**	**23-May-05**	**24-May-05**
	MDL [1]	**PQL [1]**	**Primary MCL**				
1,1-DCE	0.32	1.0	6	0.2 U g	0.2 U g	0.23 J q	0.2 U g
TBA	4.4	10	N/A	5 U g	5 U g	38 g	5 U g
Benzene	0.07	0.4	1	0.2 U g	0.2 U g	**680** g	0.2 U g
Carbon disulfide	0.48	1.0	N/A	0.2 U g	0.2 U g	0.2 U g	0.2 U g
cis-1,2-DCE	0.21	1.0	6	0.2 U g	0.2 U g	**13** g	0.2 U g
DIPE	0.16	5.0	N/A	0.2 U g	0.2 U g	34 g	12 g
Ethylbenzene	0.12	1.0	300	0.2 U g	0.2 U g	130 g	0.2 U g
m,p-Xylenes	0.25	2.0	1,750 [2]	0.5 U g	0.5 U g	55 g	0.5 U g
MTBE	0.3	1.0	13 [3]	0.2 U g	0.2 U g	**250** g	**29** g
o-Xylene	0.13	1.0	1,750 [2]	0.2 U g	0.2 U g	14 g	0.2 U g
Toluene	0.11	1.0	150	0.2 U g	0.2 U g	3.8 g	0.2 U g
trans-1,2-DCE	0.27	1.0	10	0.2 U g	0.2 U g	0.2 J q	0.2 U g
TCE	0.18	1.0	5	0.2 U g	0.2 U g	4 g	0.2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND	ND

Table 4
VOCs in Groundwater
Spring 2005
EPA Method SW8260B (µg/L)
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Data Validity Qualifier(s):

J	- The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
U	- The analyte was not detected at or above the MDL.
UJ	- The analyte was not detected above the MDL; however, the MDL is uncertain and may be elevated above normal levels.

Data Validity Comment(s):

b	- The surrogate spike recovery was outside quality control criteria.
g	- The data met prescribed criteria as detailed in the QAPP.
q	- The analyte detection was below the PQL.

Definition(s):

(D)	- duplicate sample
DCE	- dichloroethene
DIPE	- diisopropyl ether
MCL	- maximum contaminant level
MDL	- method detection limit
µg/L	- micrograms per liter
MTBE	- methyl *tert*-butyl ether
N/A	- not applicable
ND	- not detected; result is less than the MDL
PQL	- practical quantitation limit
QAPP	- Quality Assurance Project Plan
TBA	- *tert*-Butanol
TCE	- trichloroethene

Note(s):

Bold type indicates results that were above the MCL.
The California Department of Health Services notification level for TBA is 12 µg/L.

1	- Values from QAPP Addendum (U.S. Air Force 2004).
2	- MCL of 1,750 µg/L applies to sum of m-xylene, o-xylene, and p-xylene.
3	- The secondary MCL for MTBE is 5 µg/L.

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	Benzene (µg/L) [a]												
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05
BXS-MW-1	1,500	1,000	390	500	250	400	13	32	628	NA	79	210	76
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,300	4,500	4,100
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	5.5	0.42	ND	1.4	1.4	2.7
BXS-MW-5	9,900	13,000	9,400	4,800	12,000	2,700	3,500	3,700	5,110	NA	2,200	1,900	2,400
BXS-MW-6	3,200	3,200	2,300	2,000	870	460	1,300	300	1,360	1,400	930	850	200
BXS-MW-7	NA	NA	NA	NA	NA	NA	260	70	225	NA	100	170	340
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	0.32	ND	ND	ND	ND
BXS-MW-14	3.7	ND	ND	0.31	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	0.5	ND	ND	ND	ND	ND	0.44	ND	0.38	ND	ND
BXS-MW-16	NA	ND	0.3	ND	ND	ND	ND	ND	1.97	ND	ND	ND	ND
BXS-MW-17	0.23	ND	ND	NA	ND	ND	ND	ND	1.11	ND	ND	ND	ND
BXS-MW-18	7,900	11,000	6,200	3,500	1,000	3,600	410	270	303.0	552	200	320	680
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	3.53	ND	ND	1.9	ND

	Ethylbenzene (µg/L) [b]												
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05
BXS-MW-1	600	500	57	130	270	500	5	8.1	95.8	NA	83	81	62
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,400	1,700	2,000
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	0.18	ND	2.8	1.9	2.2
BXS-MW-5	900	1,400	1,100	490	1,100	230	210	430	369	NA	100	110	270
BXS-MW-6	56	140	130	370	680	360	1,100	600	863	878	800	800	300
BXS-MW-7	NA	NA	NA	NA	NA	NA	220	26	61.0	NA	66	110	130
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	ND	ND	ND	ND	0.28	ND	ND	ND	ND
BXS-MW-17	ND	ND	ND	NA	ND	ND	ND	ND	0.15	ND	ND	ND	ND
BXS-MW-18	1,800	2,100	1,400	1,300	840	1,800	250	130	88.9	53.3	22	32	130
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	1.02	ND	ND	1.4	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	MTBE (µg/L) [c]												
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05
BXS-MW-1	**540**	**810**	**680**	**350**	**180**	**220**	**190**	**250**	**260**	NA	**200**	**130**	**81**
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
BXS-MW-3	0.5	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-5	**3,900**	**3,200**	**3,000**	**3,300**	**2,400**	**2,400**	**2,500**	**1,700**	**2,120**	NA	**2,100**	**1,900**	**1,500**
BXS-MW-6	**240**	**130**	**65**	**83**	**45**	**61**	**15**	**120**	**34.0**	**28.7**	**47**	**46**	**15**
BXS-MW-7	NA	NA	NA	NA	NA	NA	**660**	**290**	**491**	NA	**240**	**230**	**13**
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-16	NA	ND	ND	ND	5.7	ND	ND	ND	0.22	ND	ND	ND	ND
BXS-MW-17	ND	ND	1	NA	ND	ND	ND	ND	0.11	ND	ND	ND	ND
BXS-MW-18	**11,000**	**8,100**	**3,400**	**3,200**	**1,200**	**2,000**	**660**	**330**	**233**	**232**	**110**	**200**	**250**
BXS-MW-19	NA	NA	NA	NA	NA	NA	**34**	**22**	**40.9**	11.1	**15**	**20**	**29**

	Toluene (µg/L) [d]												
	Oct-98	May-99	Oct-99	Apr-00	Spr-01	Fall-01	Spr-02	Fall-02	Spr-03	Fall-03	Spr-04	Fall-04	Spr-05
BXS-MW-1	140	62	29	17	21	21	ND	4.2	14.3	NA	1.9	7.6	2.7
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11,000**	**12,000**	**11,000**
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	6.5	3.3	11.0
BXS-MW-5	**5,800**	**7,900**	**5,400**	**910**	**6,900**	9.4	50	59	32.6	NA	21	22	**400**
BXS-MW-6	**150**	**360**	**800**	**1,900**	**3,200**	**1,600**	**6,300**	**550**	**5,130**	**5,670**	**4,600**	**4,900**	32
BXS-MW-7	NA	NA	NA	NA	NA	NA	11	2.3	8.89	NA	3.3	14	22
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	ND	0.3	ND	ND	ND	ND	ND	ND	ND	0.22	ND	ND
BXS-MW-16	NA	ND	0.2	ND	ND	ND	ND	ND	0.12	ND	ND	ND	ND
BXS-MW-17	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	ND	**240**	69	6.5	7.6	7.2	1.2	4.9	0.94	0.89	0.54	0.86	3.80
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	0.27	ND	ND	2.1	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	Total Xylenes (µg/L) [e]												
	Oct-98	**May-99**	**Oct-99**	**Apr-00**	**Spr-01**	**Fall-01**	**Spr-02**	**Fall-02**	**Spr-03**	**Fall-03**	**Spr-04**	**Fall-04**	**Spr-05**
BXS-MW-1	900	920	72	131.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-5	**3,220**	**4,600**	**2,930**	460	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-6	940	1,410	1,490	**3,300**	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-14	1.24	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-15	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-16	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-17	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-18	**2,610**	**4,220**	610	81.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
BXS-MW-19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

	m,p-Xylene (µg/L) [f]												
	Oct-98	**May-99**	**Oct-99**	**Apr-00**	**Spr-01**	**Fall-01**	**Spr-02**	**Fall-02**	**Spr-03**	**Fall-03**	**Spr-04**	**Fall-04**	**Spr-05**
BXS-MW-1	NA	NA	NA	NA	370	280	ND	9.4	40.2	NA	2.7	41	**950**
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**10,000**	**3,900**	380
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	14	5.4	8
BXS-MW-5	NA	NA	NA	NA	**3,100**	30	200	260	176	NA	79	43	410
BXS-MW-6	NA	NA	NA	NA	**3,500**	**1,900**	**5,500**	**2,700**	**5,530**	**5,480**	**4,600**	**5,200**	**1,400**
BXS-MW-7	NA	NA	NA	NA	NA	NA	48	11	24.2	NA	6.6	27	73
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	NA	NA	NA	ND	ND	ND	ND	0.46	ND	0.55	ND	ND
BXS-MW-16	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	NA	NA	NA	NA	17	130	ND	38	1.13	41.0	1	2.4	55
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	2.61	ND	ND	2.7	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

	o-Xylene (µg/L) [f]												
	Oct-98	**May-99**	**Oct-99**	**Apr-00**	**Spr-01**	**Fall-01**	**Spr-02**	**Fall-02**	**Spr-03**	**Fall-03**	**Spr-04**	**Fall-04**	**Spr-05**
BXS-MW-1	NA	NA	NA	NA	3.9	5.6	ND	5.5	1.16	NA	0.37	0.7	0.86
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3,700**	**3,400**	**3,100**
BXS-MW-3	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	4.6	1.7	3.4
BXS-MW-5	NA	NA	NA	NA	**850**	3	23	62	19.9	NA	7.5	9.7	120
BXS-MW-6	NA	NA	NA	NA	**2,000**	**1,200**	**3,100**	**1,300**	**2,690**	**2,960**	**2,400**	**2,800**	**610**
BXS-MW-7	NA	NA	NA	NA	NA	NA	10	2.8	1.82	NA	1.1	4.6	6
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-16	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	NA	NA	NA	NA	19	4.9	ND	6.1	0.70	1.92	0.34	0.22	14
BXS-MW-19	NA	NA	NA	NA	NA	NA	ND	ND	0.37	ND	ND	0.78	ND

	TPH as Gasoline (mg/L)												
	Oct-98	**May-99**	**Oct-99**	**Apr-00**	**Spr-01**	**Fall-01**	**Spr-02**	**Fall-02**	**Spr-03**	**Fall-03**	**Spr-04**	**Fall-04**	**Spr-05**
BXS-MW-1	7.9	4.3	3.7	3	5.8	7.8	2.6	1.5	2.81	NA	0.68	1.4	0.92
BXS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	60	77	73
BXS-MW-3	50	NA	NA	NA	NA	NA	ND	ND	0.03	ND	0.063	0.035	0.058
BXS-MW-5	21	22	17	14	33	10	28	10	9.03	NA	1.6	2.3	2.4
BXS-MW-6	6.6	6	8.9	12	23	7.9	53	18	37.1	34.4	39	35	8.4
BXS-MW-7	NA	NA	NA	NA	NA	NA	4.7	1.3	1.88	NA	0.33	1.6	2.3
BXS-MW-13	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
BXS-MW-14	NA	NA	0.057	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-15	NA	0.06	0.043	ND	ND	ND	ND	ND	0.06	ND	ND	ND	ND
BXS-MW-16	NA	0.085	0.054	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-17	ND	0.06	0.059	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
BXS-MW-18	15	22	14	9.7	10	7.9	4.5	2.1	1.10	1.27	0.12	0.42	0.74
BXS-MW-19	NA	NA	NA	NA	NA	NA	0.18	ND	0.05	0.03	ND	ND	ND

Table 5
Summary of Key Contaminants of Concern
IRP Site 1 (Base Exchange Service Station)
Vandenberg AFB, California

Definition(s):

µg/L	-	micrograms per liter
mg/L	-	milligrams per liter
MTBE	-	methyl *tert*-butyl ether
NA	-	not analyzed
ND	-	not detected; result is less than the method detection limit.
TPH	-	total petroleum hydrocarbons

Note(s):

Bold type indicates results that were above the MCL.

a	-	The MCL for benzene is 5 µg/L.
b	-	The MCL for ethylbenzene is 300 µg/L.
c	-	The MCL for MTBE is 13 µg/L.
d	-	The MCL for toluene is 150 µg/L.
e	-	The MCL for total xylenes is 1,750 µg/L.
f	-	MCL of 1,750 µg/L applies to sum of m-xylene, o-xylene, and p-xylene.

APPENDIX A PURGE RECORDS

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION BXS-MW-1 PID READING IN CASING (ppm) (initial) 13.2 (vented to) –

SAMPLE I.D. VBXSMW1 DUPLICATE I.D. – PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) –

STATIC WATER LEVEL (ft btoc) 3.34 TOTAL WELL DEPTH (ft btoc) 15.08 SBD (feet) 5.85

WATER COLUMN (feet) 11.7 TUBING DIAMETER (in) 1/4 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.59 3 V (L) 1.77

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
0911	Begin Purge											0.15
0914		3.78	19.61	2707	6.86	14.4	2.29	-51.4	clear	0.45	0.76	
0917		3.86	19.45	2674	6.86	11.4	1.59	-62.7	clear	0.90	1.5	
0920		3.86	19.16	2653	6.86	8.93	0.94	-69.9	clear	1.35	2.28	
0923		3.93	19.08	2656	6.87	7.30	0.69	-74.3	clear	1.80	3.05	
0926		3.93	19.00	2653	6.87	5.77	0.63	-77.0	clear	2.25	3.81	
0929		4.01	18.99	2645	6.88	4.23	0.51	-81.4	clear	2.70	4.57	
0931	END PURGE	3.99	18.99	2646	6.89	4.23	0.50	-81.3	clear	3.15	5.33	
0935	Sample											

Form number Tt-O-049 (8/02)

Fe+2 (ppm) – Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 5.99

Comments: PI: 2.54

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

18 0 2 0 0 4 9 TIME OF SAMPLING Bhg Nrd sampling activities and the PI

TETRA TECH, INC.
4213 State Street STE 100
Santa Barbara, CA 93110
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Telefax (805) 681-3108

GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME BGMP SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION ~~BG~~ or BXS-MW-2 PID READING IN CASING (ppm) (initial) 139 (vented to) –

SAMPLE I.D. VBXSMW02 DUPLICATE I.D. – PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) –

STATIC WATER LEVEL (ft btoc) 2.68 TOTAL WELL DEPTH (ft btoc) 18.8

WATER COLUMN (feet) 16.12 CASING DIAMETER (in) 2 SAMPLER'S SIGNATURE [signature]

WELL VOLUME (V) (gals) 16.12 x 0.16 = 2.58 3 V (gals) 7.74

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1049	start purge	2.68	15	–							Ø	Ø	0.5
1054	raise pump	6.75	15	18.97	985	6.56	17.2	1.95	-108.9	clear	2.5	0.97	
1059		7.58	10	19.81	1003	6.53	5.10	0.95	-93.3	clear	5.0	1.94	
1104		**	10	20.13	1005	6.53	4.13	0.85	-88.7	clear	7.5	2.91	
1106	end purge	**	10	20.22	1002	6.53	3.53	0.74	-88.8	clear	8.5	3.29	↓
1110	sample well	3.40	–	19.04	916	6.78	27.6	1.29	-92.0	cloudy	–	–	–

Form number Tt-O-050 (6/02) Fe+2 (ppm) – Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 3.40

PARAMETERS FOR WATER QUALITY STABILIZATION
Temperature ±1 C (1.8 F) Conductivity ± 5%
pH ± 0.1 Turbidity 5 NTUs

Comments: strong fuel odor

** unable to get WL meter past check valve

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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TETRA TECH, INC.
4213 State Street STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME BGMP SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION BXS-MW-3 PID READING IN CASING (ppm) (initial) ND (vented to) -

SAMPLE I.D. VBXSMW3 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) -

STATIC WATER LEVEL (ft btoc) 2.03 TOTAL WELL DEPTH (ft btoc) 21.00

WATER COLUMN (feet) 18.97 CASING DIAMETER (in) 2 SAMPLER'S SIGNATURE [signature]

WELL VOLUME (V) (gals) 18.97 x 0.16 = 3.04 3 V (gals) 9.12

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1137	start purge	2.03	20.5								∅	∅	0.5
1142		8.40	20.5	18.82	1668	6.51	54.0	4.77	30.0	cloudy	2.5	0.82	
1147		11.10	20.5	17.11	2014	6.25	71.7	0.45	69.7	cloudy	5.0	1.64	
1152		14.33	20.5	16.96	2045	6.28	100.0	0.42	46.0	cloudy	7.5	2.47	
1157		17.20	20.5	17.05	1961	6.23	37.8	0.36	80.1	cloudy	10.0	3.29	
1202		~~17.20~~ **	20.5	19.64	1955	6.22	44.2	0.37	87.9	cloud	12.5	4.11	
1203	well purged dry										13.0	4.28	↓
1215	sample well	18.00	—	17.34	1960	6.42	+200	2.58	73.6	cloudy	—	—	—

Form number Tt-O-050 (6/02) Fe+2 (ppm) — Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 18.00

Comments: ** unable to get WL meter past check valve

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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TETRA TECH, INC.
4213 State Street STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1

PROGRAM NAME BGMP

MONITORING WELL IDENTIFICATION BXS - MW-5

SAMPLE I.D. V BXSMW5 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 5.61 TOTAL WELL DEPTH (ft btoc) 21.5

WATER COLUMN (feet) 15.89 CASING DIAMETER (in) 2

WELL VOLUME (V) (gals) 15.89 X0.16= 2.54 3 V (gals) 7.63

PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

SAMPLING DEVICE DISPOSABLE TEFLON BAILER

PID READING IN CASING (ppm) (initial) 28.5 (vented to) 40

PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

SAMPLER'S SIGNATURE [signature] Jugsok Cin

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1227	start purge	5.61	21.0								Ø	Ø	0.5
1232		10.75	21.0	19.11	1341	6.25	35.9	1.33	-57.9	cloudy	2.5	0.98	
1237		12.80	21.0	19.70	1412	6.28	58.9	1.42	-59.5	cloudy	5.0	1.97	
1241		15.12	21.0	20.11	1430	6.32	40.4	0.82	-57.7	cloudy	7.0	2.76	
1246	well purged	dry	21.0	20.12	1397	6.28	57.5	0.51	-54.6	cloudy	9.5	3.74	
1305	sample well	11.22	—	19.14	1405	6.70	43.0	3.12	-70.3	cloudy	—	—	—

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Form number Tt-O-050 (6/02)

Fe+2 (ppm) — Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 11.22

Comments: strong fuel odor

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1

PROGRAM NAME B6MP

MONITORING WELL IDENTIFICATION BXS-MW-6

SAMPLE I.D. VBXSMW6 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 6.29 TOTAL WELL DEPTH (ft btoc) 16.6

WATER COLUMN (feet) 10.31 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.59 3 V (L) 1.77

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) 13.8 (vented to) 0.0

PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

SBD (feet) 7.07

SAMPLER'S SIGNATURE P. Leonard
Mark M. Hoker

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1048	Begin Purge											0.21
1044		6.59	18.49	2230	6.63	58.1	0.56	-46.0	clear	0.63	1.06	
1047		6.61	18.26	2200	6.75	65.7	0.27	-59.9	clear	1.26	2.13	
1050		6.66	18.21	2147	6.81	53.5	0.19	-67.9	clear	1.89	3.20	
1053		6.76	18.24	2102	6.85	43.8	0.15	-73.1	clear	2.52	4.27	
1056	End Purge	6.79	18.27	2065	6.88	37.3	0.13	-77.2	clear	3.15	5.33	
1100	Sample											

Form number Tt-O-049 (8/02) Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 6.79

Comments: PI: 14.58

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature	±1 C (1.8 F)	Conductivity	± 5%
pH	± 0.1	Turbidity	5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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TETRA TECH, INC.
4213 State Street STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/24/05 SITE NUMBER 1 PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME B6MP SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION BXS-MW-7 PID READING IN CASING (ppm) (initial) 30 (vented to) ND

SAMPLE I.D. VBXSMW7 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 5.45 TOTAL WELL DEPTH (ft btoc) 21.0

WATER COLUMN (feet) 15.55 CASING DIAMETER (in) 2 SAMPLER'S SIGNATURE

WELL VOLUME (V) (gals) 15.55 x0.16 = 2.49 3 V (gals) 7.46

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1103	start purge	5.45	20	—	—	—	—	—	—	—	∅	∅	0.5
1108		8.95	20	20.26	900	6.77	61.5	1.39	-42.3	brn	2.5	1.00	
1113		11.10	20	21.04	1018	6.59	13.7	0.90	-35.5	brn	5.0	2.01	
1118		13.90	20	21.00	884	6.75	5.90	0.77	-86.4	clear	7.5	3.01	
1121		14.70	20	20.80	858	6.77	3.23	0.75	-100.4	clear	9.0	3.61	
1124		15.75	20	20.77	842	6.79	2.37	0.67	-107.5	clear	10.5	4.22	
1127	end purg	16.35	20	20.75	838	6.80	2.62	0.67	-109.2	clear	12.0	4.82	
1135	sample only	14.51	—	19.30	809	6.94	12.6	1.91	-102.1	clear	—	—	—

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Form number Tt-O-050 (6/02)

Fe+2 (ppm) — Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 14.51

Comments: none

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

TETRA TECH, INC.
4213 State Street, STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1

PROGRAM NAME BGMP

MONITORING WELL IDENTIFICATION BXS-MW-13

SAMPLE I.D. UBXSMW13 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 3.90 TOTAL WELL DEPTH (ft btoc) 20.11

WATER COLUMN (feet) 16.21 TUBING DIAMETER (in) 1/4

PUMP & TUBING (V) (L) 0.16 3 V (L) 0.48

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) 5.70 (vented to) 0.0

PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

SBD (feet) 9.1

SAMPLER'S SIGNATURE [signature] Martin M. Nesbit

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1000	Begin Purge											0.210
1002		4.02	20.81	1535	6.99	6.15	2.63	-61.3	Clear	0.42	2.62	
1004		4.12	20.75	1150	6.83	5.44	2.94	-34.3	Clear	0.84	5.25	
1006	End Purge	4.12	20.85	979	6.60	5.55	3.12	-7.5	Clear	1.26	7.87	
1010	Sample											

Form number Tt-O-049 (6/02) Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 4.12

Comments: PI: 13.22

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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Santa Barbara, CA 93110
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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME DGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION BXS-MW-14 PID READING IN CASING (ppm) (initial) 13.8 (vented to) —

SAMPLE I.D. VBXSMW14 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 5.73 TOTAL WELL DEPTH (ft btoc) 20.14 SBD (feet) 7.17

WATER COLUMN (feet) 14.41 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE Mark M. Nahl

PUMP & TUBING (V) (L) 0.59 3 V (L) 1.77

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1140	Begin Purge											0.21
1143		5.84	19.55	2830	6.98	7.47	0.31	-70.0	clear	0.63	1.06	↓
1146		5.87	19.21	2857	6.96	1.97	0.21	-56.2	clear	1.26	2.13	↓
1149	End Purge	5.88	19.23	2833	6.97	1.16	0.15	-44.0	clear	1.89	3.20	↓
1155	Sample											

Form number Tt-O-049 (8/02) Fe+2 (ppm) •—• Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 5.88

Comments: PI : 13.05

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature	±1 C (1.8 F)	Conductivity	± 5%
pH	± 0.1	Turbidity	5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

18 0 2)) A 7 T I M E O F S A M P L I N G Nd sampling activities and the PI

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Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/24/05 SITE NUMBER 1 PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME BGMP SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION BXS-MW-15 PID READING IN CASING (ppm) (initial) ND (vented to) —

SAMPLE I.D. VBXSMW15 DUPLICATE I.D. V99W533 PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 6.82 TOTAL WELL DEPTH (ft btoc) 20.0

WATER COLUMN (feet) 13.18 CASING DIAMETER (in) 4"

WELL VOLUME (V) (gals) 13.18 X0.65= 8.57 3 V (gals) 25.70

SAMPLER'S SIGNATURE

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
12:06	start purge	6.82	19.5	—	—	—	—	—	—	—	Ø	Ø	1.0
1211		9.55	19.5	19.98	2627	6.64	6.99	0.70	17.6	clear	5.0	0.58	
1216		11.30	19.5	20.29	2581	6.65	1.97	0.54	27.7	clear	10.0	1.17	
1221		14.50	19.5	20.44	2636	6.68	7.78	0.45	24.4	clear	15.0	1.75	
1226		17.60	19.5	20.26	2662	6.70	3.50	0.67	19.4	clear	20.0	2.33	
1229	well purged dry										23.0	2.68	
1240	sample well	18.05	—	19.77	2617	6.84	21.4	1.26	-3.1	cloudy	—	—	—
1200	dup sample time												

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Form number Tt-O-050 (6/02)

Fe+2 (ppm) — Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 18.05

Comments: none

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature	±1 C (1.8 F)	Conductivity	±5%
pH	±0.1	Turbidity	5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BG MP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION BXS-MW-16 PID READING IN CASING (ppm) (initial) ND (vented to) —

SAMPLE I.D. VBXSMW16M DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 5.32 TOTAL WELL DEPTH (ft btoc) 20.06 SBD (feet) 7.44

WATER COLUMN (feet) 14.74 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 0.6 3 V (L) 1.8 [signature]

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1351	Begin Purge	—										0.21
1354		5.47	20.13	2000	6.45	5.50	0.46	0.8	clear	0.63	1.05	
1357		5.51	19.81	1991	6.43	3.28	0.25	8.2	clear	1.26	2.1	
1400	End Purge	5.51	19.64	1990	6.39	2.58	0.15	16.8	clear	1.89	3.15	
1410	Sample	—										

Form number Tt-O-049 (8/02) Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 5.61

Comments: PI: 13.05

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

18 0 2 0 1 A 9 T I M E O F S A M P L I N G N o d sampling activities and the PI

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Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/04 SITE NUMBER 1 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION BXS-MW-17 PID READING IN CASING (ppm) (initial) 15.2 (vented to) —

SAMPLE I.D. ~~BXS~~ UBXSMW17 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 4.05 TOTAL WELL DEPTH (ft btoc) 20.10 SBD (feet) 8.83

WATER COLUMN (feet) 15.61 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.64 3 V (L) 1.96

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1219	Begin Purge											0.18
1222		4.20	18.69	1241	6.96	11.9	2.68	-26.4	clear	0.54	0.84	
1225		4.22	18.02	791	6.82	6.94	1.89	-14.0	clear	1.08	1.68	
1228		4.22	17.82	693	6.72	5.24	1.37	-7.0	clear	1.62	2.53	
1231		4.22	17.71	639	6.70	4.64	1.05	-0.4	clear	2.16	3.37	
1234		4.24	17.58	601	6.69	4.45	0.77	5.4	clear	2.70	4.21	
1237	End Purge	4.27	17.70	581	6.64	4.71	0.57	10.1	clear	3.24	5.06	
1240	Sample											

Form number Tt-O-049 (8/02) Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 4.27

Comments: PI: 13.10

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

18 0 2)) A V T I M E O F S A M P L I N G

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/23/05 SITE NUMBER 1 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION BXS-MW-18 PID READING IN CASING (ppm) (initial) ND (vented to) —

SAMPLE I.D. UBXSMW18 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 7.88 TOTAL WELL DEPTH (ft btoc) 14.3 SBD (feet) 5.83

WATER COLUMN (feet) 6.42 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 0.6 3 V (L) 1.8

Time	Activity	Water Level (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (L)	Pump & Tubing Volumes Purged	Flow Rate (LPM)
1304	Begin Purge											0.23
1307		8.14	17.34	1783	6.25	8.51	1.08	33.1	clear	0.69	1.15	
1310		8.20	17.22	1838	6.21	5.86	0.64	27.9	clear	1.38	2.30	
1313		8.21	17.23	1852	6.21	5.65	0.49	24.0	clear	2.07	3.45	
1316		8.27	17.21	1870	6.22	5.73	0.36	16.8	clear	2.76	4.60	
1319	End Purge	8.28	17.18	1878	6.25	4.73	0.27	9.3	clear	3.45	5.75	
1325	Sample											

Form number Tt-O-049 (8/02) Fe+2 (ppm) — Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 8.32

Comments: PI: 14.15

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ± 5%
pH ± 0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be periodically monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

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4213 State Street STE 100
Santa Barbara, CA 93110
Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 5/24/05 SITE NUMBER 1 PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME B6MP SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION BXS-MW-19 PID READING IN CASING (ppm) (initial) 25 (vented to) ND

SAMPLE I.D. VBXSMW19 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 5.25 TOTAL WELL DEPTH (ft btoc) 20.10

WATER COLUMN (feet) 14.85 CASING DIAMETER (in) 4 SAMPLER'S SIGNATURE

WELL VOLUME (V) (gals) 14.85 x 0.65 = 9.65 3 V (gals) 28.96

Time	Activity	Water Level (ft btoc)	Pump Depth (ft btoc)	Temp (Deg. C)	EC (µmhos/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)	ORP (mV)	Color	Volume Purged (gals)	Well Volumes Purged	Flow Rate (GPM)
1002	start pump	5.25	19.5	—	—	—	—	—	—	—	Ø	Ø	1.0
1006		7.10	19.5	19.10	2781	6.66	80.8	0.88	22.3	cloudy	4	0.41	
1011	raise pump	8.99	19.5	19.85	2074	6.45	10.06	0.67	58.9	cloudy	9	0.93	
1016		10.65	15.0	20.68	1950	6.44	5.71	0.55	74.2	clear	14	1.45	
1021		12.10	15.0	20.48	1885	6.44	4.82	0.47	79.0	clear	19	1.97	
1026	lower pump	13.75	15.0	20.30	2017	6.50	3.45	1.11	79.8	clear	24	2.49	
1031	lower pump	15.50	18.0	20.34	2185	6.58	1.83	1.67	73.0	clear	29	3.01	
1036		17.35	19.5	20.23	2432	6.67	7.55	1.48	52.3	clear	34	3.52	
1041	well purged dry										39	4.04	
1050	sample well	16.90	—	18.88	4149	6.63	2.62	2.02	58.7	clear	—	—	—

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Form number Tt-O-050 (6/02)

Fe+2 (ppm) — Taken from first bailer, immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 16.90

Comments: none

PARAMETERS FOR WATER QUALITY STABILIZATION

Temperature ±1 C (1.8 F)	Conductivity ±5%
pH ±0.1	Turbidity 5 NTUs

Note: All water levels and pump depths are measured from the notch in the top of the well casing. If volatiles are detected above background in the breathing zone during the initial screening, the breathing zone will be monitored during purging and sampling activities and the PID readings will be recorded in the logbook.

APPENDIX B CHAIN-OF-CUSTODY RECORDS

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

05E212

CHAIN OF CUSTODY RECORD

VW09-06 / VW09-14

SITE 1 DATE 05/23/05 PAGE 1 OF 2

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures): X X

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS:

ANALYTICAL METHODS

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 ~~Diesel~~ Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 / 7470 / 7471 Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample
1	VBXSMW5	05/23/05	1305	X	X												W	G	6	
2	VBXSMW2		1010	X	X													G	6	
3	VBXSMW3		1215	X	X													G	6	
4	VITB1054		0805	X														G	2	
5	VBXSMW18		1325	X	X													G	6	
6	VBXSMW17		1240	X	X													G	6	
7	VBXSMW14		1155	X	X													G	6	
8	VBXSMW6		1100	X	X													G	6	
9	VBXSMW13		1010	X	X													G	6	
10	VBXSMW1		0935	X	X													G	6	

MATRIX TYPE: S = Soil, W = Water, SD = Sediment

CONTAINER TYPE: E = Encore; G = Glass, SS = Stainless Steel, P = Plastic

PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.

T = 3.5°C

TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:
Joachim Eberhardt		TETRA TECH, INC.	5/24/05	1045
RECEIVED BY: Ed CARR	SIGNATURE: Edward Carr	COMPANY: Preferred	DATE: 5-24-05	TIME: 1045
RELINQUISHED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:
RECEIVED BY: INDRA PATEL	SIGNATURE:	COMPANY: EMAX	DATE: 5/24/05	TIME: 1300

TOTAL NUMBER OF CONTAINERS: 56 of 74

METHOD OF SHIPMENT: Courier

SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:

1002

Tt-IRP-009 (04/26/05)

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

05E212

CHAIN OF CUSTODY RECORD

SITE 1 DATE 5/23/05 PAGE 2 OF 2

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures)
X
X

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS:

ANALYTICAL METHODS

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 ~~Diesel~~ / Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 / 7470 / 7471 Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate				Matrix Type	Container Type	Number of Containers	Filtered Sample	OBSERVATIONS/COMMENTS
11	VBXSMW16M	5/23/05	1410	X	X															W	G	18		MS/MSD

MATRIX TYPE: S = Soil, W = Water, SD = Sediment
CONTAINER TYPE: E = Encore; G = Glass, SS = Stainless Steel, P = Plastic
PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.
TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:	TOTAL NUMBER OF CONTAINERS
Joachim Eberhardt		TETRA TECH, INC.	5/24/05	1045	18 of 74
RECEIVED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	METHOD OF SHIPMENT
Ed CARR	Edward Carr	Preferred	5-24-05	10,45	Courier
RELINQUISHED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: INDRA PATEL	SIGNATURE:	COMPANY: EMAX	DATE: 5/24/05	TIME: 1300	

1003

Tt-IRP-009 (04/26/05)

DISTRIBUTION: White = Lab Canary = Client Pink = Tetra Tech, Inc.

TETRA TECH, INC.
4213 State Street, Suite 100
Santa Barbara, CA 93110
Phone (805) 681-3100
FAX (805) 681-3108

SHIPPED TO: EMAX Labs
1835 West 205th Street
Torrance, CA 90501

05E230

CHAIN OF CUSTODY RECORD

VW01-02

SITE 1 DATE 5/24/05 PAGE 1 OF 1

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures): X [signature] X [signature]

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS:

ANALYTICAL METHODS

	SAMPLE NO.	DATE	TIME	SW8260 Volatile Organics	SW8015 ~~Diesel~~ / Gasoline	SW8081 Pesticides	SW8082 PCBs	SW8270 SVOCs	SW8270 SIM PAHs	SW6010 / 7470 / 7471 Metals	E218.6 Chromium VI	E300/310.1/160.1 CL/S/ALK/TDS	E353.3/E415.1 N / TOC	RSK 175	E376.2 Sulfide	E314.0 Perchlorate	Matrix Type	Container Type	Number of Containers	Filtered Sample
1	VBXSMW7	5/24/05	1135	X	X												W	G	6	
2	VBXSMW19		1050	X	X														6	
3	VBXSMW15		1240	X	X														6	
4	V99WS33		1700	X	X														6	
5	VITB1058		0815	X															2	

MATRIX TYPE: S = Soil, W = Water, SD = Sediment

CONTAINER TYPE: E = Encore; G = Glass, SS = Stainless Steel, P = Plastic

PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.

TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:	TOTAL NUMBER OF CONTAINERS
K. Simon	[signature]	TETRA TECH, INC.	5/25/05	1030	26
RECEIVED BY:	**SIGNATURE:**	**COMPANY:**	**DATE:**	**TIME:**	**METHOD OF SHIPMENT**
Ed CARR	Edward Carr	Preferred	5-25-05	10:30	Courier
RELINQUISHED BY:	**SIGNATURE:**	**COMPANY:**	**DATE:**	**TIME:**	**SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:**
RECEIVED BY:	**SIGNATURE:**	**COMPANY:**	**DATE:**	**TIME:**	
SITNIKOV	[signature]	EMAX LAB.	05.25.05.	14:30	

T=3.4°C

1001

Tt-IRP-009 (04/26/05)

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