TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Winter 2005
Installation Restoration Program Site 2
Vandenberg Air Force Base, California

17 June 2005

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1.0 INTRODUCTION

This report documents the activities and results of the winter 2005 groundwater monitoring at Installation Restoration Program Site 2 (Old Base Service Station, or OBSS), Operable Unit 6, Vandenberg Air Force Base (AFB), Santa Barbara County, California. Samples were collected at Site 2 by Tetra Tech, Inc. (Tetra Tech) during February 2005. The location of Site 2 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 Addendum (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 2004a), 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 (DTSC) and Regional Water Quality Control Board—Central Coast Region (RWQCB).

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 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 2 is located in the main cantonment area, north of the intersection of Wyoming and Summersil Avenues. In early 2000, a Tee-Ball field was constructed that covers the majority of the Site (Figure 1). The Child Development Center playground is located to the northeast.

The OBSS had a service station building and three pump islands on a 200-foot by 200-foot asphalt lot. The site had four 10,000-gallon gasoline underground storage tanks (USTs), a 500-gallon aboveground waste oil tank, and an oil/water separator. The OBSS dispensed leaded and unleaded gasoline from 1941 until 1981.

All structures, tanks, and piping associated with the OBSS were removed between 1981 and 1998 (HydroGeoLogic [HGL] 2001). All four gasoline USTs, which were located at the northwest corner of the site, were removed in 1981. In 1992, Jacobs Engineering Group, Inc. (JEG) removed the concrete oil/water separator and fuel distribution piping (HGL 2001). In 1998, the 500-gallon waste oil tank was removed. During the removal of the OBSS building, the pump islands, and the pavement in 1998, monitoring wells 2-MW-2, and OS-MW-4 reportedly were destroyed and wells OS-MW-3A and OS-MW-2 were damaged (HGL 2001).

In 1999, IT Corporation, Inc. (IT) began investigations at the site. In September 1999, IT conducted a shallow soil investigation. HGL continued the investigation and, in November 1999, removed 170 cubic yards of soil below the former location of the two easternmost pump islands (along the southern portion of the site) (HGL 2001). The Tee-Ball field was built several months after completion of the excavation activities (Martinez 2001).

During the construction of the Tee-Ball field and the realignment of Wyoming Avenue and Utah Avenue, monitoring wells 2-MW-5 through 2-MW-9, OS-MW-3A, and OS-MW-4 were buried under fill material. Wells 2-MW-5 through 2-MW-9 were subsequently found and are not damaged. In September 2000,

Tetra Tech was requested to determine the condition of wells OS-MW-2, OS-MW-3A, and OS-MW-4. Well OS-MW-2 was found and was determined to be undamaged. Tetra Tech was unable to find monitoring wells OS-MW-3A and OS-MW-4 due to the amount of fill material covering them. The condition of these wells is unknown; however, it appears likely they have been destroyed. In a letter dated 06 February 2001 the Air Force recommended no further search for these wells. The RWQCB concurred with this recommendation in a letter dated 15 March 2001.

In February 2002, Tetra Tech installed a remote sampling system for wells 2-MW-5, 2-MW-7, 2-MW-8, and 2-MW-9 at Site 2. The system was designed to facilitate quarterly sampling of these wells, which are buried under the Tee-Ball field, without delaying use of the Tee-Ball field or impacting the condition of the grass on the field or surrounding grounds.

The remote sampling system was installed with watertight well caps and continuous tubing. The static water levels of these wells are measured using a pressure transducer that calculates the height of a water column above an open-ended tube suspended in the casing. The pressure transducer is zeroed to ambient pressure before the first reading is taken. Since the wells are sealed to prevent surface water intrusion, the air inside the casings is no longer at ambient pressure. For this reason the static water levels measured by the remote sampling system may be different from what is measured by the pressure transducer.

2.2 HYDROGEOLOGY

Site 2 is located on Burton Mesa, where groundwater typically occurs unpredictably in small lenses perched on low-permeability layers. At Site 2, groundwater is encountered in apparently discontinuous perched lenses in the unconsolidated sediments overlying Monterey Formation Bedrock and, more importantly, in fractured cherts and porcelanites (HGL 2001). Groundwater occurring in this fractured zone within the Monterey Formation represents the groundwater monitoring network sampled under the BGMP at Site 2.

Groundwater depths range from 14 to 31 feet below ground surface. However, groundwater was encountered during drilling at approximately 10 feet below the static level measured in the monitoring wells (HGL 2001).

Groundwater levels measured in February 2005 indicate that the groundwater elevation ranged from approximately 449 to 453 feet above mean sea level (Table 1). Based on data from this quarter, the interpreted direction of groundwater flow at Site 2 was to the northwest with an average hydraulic gradient of 0.007 feet per foot (Figure 1).

Monitoring wells at Site 2 are screened between 411.3 and 452.5 feet above mean sea level (U.S. Air Force 2004b). According to the Supplemental RI Report completed by HGL, the deep groundwater zone occurs below lenses of relatively impermeable material. The boring logs of monitoring wells sampled as part of the BGMP show groundwater encountered at depths below laminated mudstone, silty clay, or clay layers (HGL 2001). Therefore, the groundwater sampled as part of the BGMP is from the deep groundwater zone.

3.0 SCOPE OF WORK

The work performed during winter 2005 at Site 2 included measuring groundwater elevations, collecting groundwater samples for laboratory analysis, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Eleven wells were sampled at Site 2 during winter 2005. Dedicated MicroPurge pumps were used for purging and sampling groundwater at wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7, 2-MW-8 through 2-MW-12, OS-MW-1, and OS-MW-2. Duplicate samples were collected from wells 2-MW-8 and OS-MW-2. 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 was 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.

3.1.1 MicroPurge Groundwater Sampling

MicroPurge sampling was conducted at all monitoring wells sampled at Site 2 during winter 2005. 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 2-MW-1, 2-MW-10, 2-MW-11, 2-MW-12, and OS-MW-1 were sampled after purging at least five pump and tubing volumes of water.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured during purging and sampling. Field parameter readings measured 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 dissolved metals by U.S. Environmental Protection Agency (EPA) methods SW6010B and SW7470A, total petroleum hydrocarbons as gasoline (TPHg) by EPA method SW8015B, volatile organic compounds (VOCs) by EPA method SW8260B, and semivolatile organic compounds (SVOCs) by EPA method SW8270C. In addition, in response to comments on the winter 2004 report received by the state dated 04 August 2004, samples from wells 2-MW-8 and OS-MW-2 were analyzed for polynuclear aromatic hydrocarbons (PAHs) by EPA method SW8270C with selected ion monitoring (SIM). Laboratory analyses and data validation were conducted according to the QAPP Addendum (U.S. Air Force 2004a). Data validation was performed on 100 percent of the analytical data. Analytical results are presented in Tables 3 through 5 and on Figure 2. A historical summary of key contaminants of concern (COCs) is presented in Table 6 and on Figures 3A and 3B. Figure 3A contains historical data for key COCs from December 1999 through fall 2003 and Figure 3B contains historical data for key COCs from winter 2004 to present. TCE has been removed as a key COC for the BGMP at Site 2 beginning with winter 2005, since it has not been detected in groundwater collected from wells 2-MW-8 and OS-MW-2 for 5 and 15 consecutive quarters, respectively. Chain-of-custody records are provided in Appendix B.

4.1 METALS

Groundwater samples collected from the eleven wells sampled at Site 2 this quarter were analyzed for dissolved metals. Dissolved metal concentrations were compared to the 95th percentile background threshold values (BTVs) for groundwater (JEG 1994).

Aluminum was detected above the BTV of 1,200 micrograms per liter (µg/L) and the primary maximum contaminant level (MCL) of 1,000 µg/L in groundwater collected from well 2-MW-8, at a concentration of 4,630 µg/L in the parent sample and 5,070 µg/L in the duplicate sample (Table 3).

Beryllium was detected above the BTV of 0.3 µg/L in groundwater from wells 2-MW-7, 2-MW-8, and 2-MW-10 and was detected above the primary MCL of 4 µg/L in groundwater from well 2-MW-8, at a concentration of 6.79 µg/L in the parent sample and 7.47 µg/L in the duplicate sample (Figure 2).

Cadmium was detected above the BTV of 5 µg/L and the primary MCL of 5 µg/L in the groundwater samples from 7 of 11 wells at concentrations ranging from 7.06 to 87.2 µg/L.

Selenium was detected above the BTV of 3 µg/L in groundwater samples from 8 of 11 wells at concentrations ranging from 6.56 to 48.3 µg/L.

Thallium was detected above the BTV of 1 µg/L and the primary MCL of 2 µg/L in groundwater collected from 4 wells at concentrations ranging from 6.44 to 9.98 µg/L.

In addition, arsenic, barium, calcium, cobalt, magnesium, molybdenum, potassium, and sodium were detected at concentrations above their respective BTVs in one or more Site 2 wells. The dissolved metals concentrations detected during winter 2005 were within the historic ranges of those detected during previous quarters, with the exception of cadmium in well 2-MW-11 and thallium in well 2-MW-10 (Table 6 and Figures 3A and 3B).

4.2 TOTAL PETROLEUM HYDROCARBONS

The groundwater sample collected from well OS-MW-2 was analyzed for TPHg. TPHg were not detected (Table 4).

4.3 VOLATILE ORGANIC COMPOUNDS

Groundwater samples collected from wells 2-MW-8 and OS-MW-1 were analyzed for VOCs. Benzene was detected above the primary MCL of 1 µg/L in the groundwater sample from well 2-MW-8, at a concentration of 57 µg/L (56 µg/L in the duplicate sample) (Table 5). Ethylbenzene, m,p-xylene, o-xylene, and toluene were detected below their respective MCLs in groundwater collected from well 2-MW-8. Concentrations of benzene, ethylbenzene, and xylenes detected in groundwater from well 2-MW-8 have increased by more than one order of magnitude since December 1999 (Table 6). All of the benzene concentrations detected in groundwater from well 2-MW-8 since December 1999 have been above the MCL of 1 µg/L; however, the largest increase in concentrations was observed between fall 2001 and winter 2002, which coincides with the installation of the MicroPurge pump during winter 2002 (Figures 3A and 3B). The benzene concentration detected during winter 2005 (57 µg/L) is much higher than the concentration detected during the previous quarter and the prior historic high of 39 µg/L (Table 6).

4.4 SEMIVOLATILE ORGANIC COMPOUNDS AND POLYNUCLEAR AROMATIC HYDROCARBONS

Groundwater samples collected from wells 2-MW-1, 2-MW-3, 2-MW-5, 2-MW-7, 2-MW-8, 2-MW-9, OS-MW-1, and OS-MW-2 were analyzed for SVOCs. In addition, groundwater samples collected from wells 2-MW-8 and OS-MW-2 were analyzed for PAHs to verify results from the fall 2004 quarter, since the extractions during fall 2004 were completed past the method specified holding time.

Naphthalene was detected in groundwater from well 2-MW-8, at a concentration of 17 µg/L (16 µg/L in the duplicate sample) using EPA method SW8270C and 15 µg/L using EPA method SW8270 with SIM (Table 4). Groundwater collected from well 2-MW-8 also contained 2-methylnaphthalene at a concentration of 21 µg/L (20 µg/L in the duplicate sample) and indeno(1,2,3-cd)pyrene at a concentration of 0.27 µg/L. No SVOCs or PAHs were detected in the sample from OS-MW-2, with the exception of bis(2-ethylhexyl)phthalate, which is a common laboratory contaminant; its presence in this sample is believed to be a result of laboratory contamination.

Naphthalene has been detected in groundwater collected from well 2-MW-8 since December 1999 at concentrations ranging from 1.07 µg/L (December 1999) to 28.8 µg/L (winter 2004) (Table 6). During that time period, naphthalene was detected at concentrations above the California Department of Health Services (DHS) notification level of 17 µg/L during six quarters. It was detected at the DHS notification level during winter 2005. The compound 2-methylnaphthalene has been detected in groundwater collected from well 2-MW-8 since fall 2000 at concentrations ranging from 5.7 µg/L (fall 2001) to 38.2 µg/L (winter 2004) (Appendix C). The general trend for both compounds has been toward increasing concentrations, although the concentrations of both compounds detected during the winter 2005 quarter were lower than the concentrations detected during winter 2004. Indeno(1,2,3-cd)pyrene was detected previously in groundwater from OS-MW-2 at a concentration of 4.27 µg/L during the winter 2004 sampling round; it was not detected in groundwater from wells 2-MW-8 and OS-MW-2 during fall 2004.

Although naphthalene and 2-methylnaphthalene are not classified as carcinogens by the U.S. EPA (U.S. EPA 2005), the State of California considers naphthalene a carcinogen. However, a benzo(a)pyrene potency equivalency factor (PEF) has not been established by the State of California yet. A benzo(a)pyrene PEF is not available for either compound (DTSC 1999). Thus, the naphthalene and 2-methylnaphthalene results for groundwater from 2-MW-8 cannot be evaluated using PEFs as discussed in the State's comments on the winter 2004 Site 2 report.

Indeno(1,2,3-cd)pyrene is classified as a probable carcinogen (U.S. EPA 2005) and has a PEF of 0.1 (DTSC 1999). Applying the PEF of 0.1 to the concentration detected during winter 2005 (0.27 µg/L) yields a benzo(a)pyrene potency equivalent of 0.027 µg/L, which is below the MCL for benzo(a)pyrene of 0.2 µg/L. An indeno(1,2,3-cd)pyrene-specific MCL is not available. Recommendations are presented in Section 6.

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 2004a). 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.

Chromium was qualified for blank contamination in the samples from wells 2-MW-5 and 2-MW-9 due to its presence in the associated method blanks. In addition, the results for arsenic, lead, selenium, and thallium in the duplicate sample from well OS-MW-2 were rejected through professional judgment, as the data from the parent sample were more consistent with historic results from this well. These discrepancies are considered minor and do not significantly impact the data quality or interpretations presented in this report. The data quality objectives for the winter 2005 sampling at Site 2 were achieved.

6.0 RECOMMENDATIONS

Tetra Tech and the Air Force recommend PAH analyses be continued quarterly at well 2-MW-8 and semiannually during winter and summer quarters at well OS-MW-2. Currently, well 2-MW-8 is sampled quarterly and well OS-MW-2 is sampled semiannually during winter and summer quarters. Indeno(1,2, 3-cd)pyrene was detected in groundwater from OS-MW-2 during winter 2004 by EPA method SW8270C, at a concentration above the MCL for benzo(a)pyrene-equivalents but was not detected in that well during fall 2004 or winter 2005. Indeno(1,2,3-cd)pyrene was detected in groundwater from well 2-MW-8, at a concentration below the MCL for benzo(a)pyrene-equivalents in winter 2005 by EPA method SW8270C SIM but was not detected during any previous quarter (Appendix C). Since the benzo(a)pyrene PEF for indeno(1,2,3-cd)pyrene was above the MCL for benzo(a)pyrene in groundwater collected from well OS-MW-2 during winter 2004, and indeno(1,2,3-cd)pyrene was detected again in well 2-MW-8 during winter 2005, Tetra Tech and the Air Force recommend that the current PAH monitoring regime be continued.

The spring 2005 sampling will be conducted according to the work plan (U.S. Air Force 2000a).

7.0 REFERENCES

California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC)

1999 *Preliminary Endangerment Assessment Guidance Manual.*

HydroGeoLogic, Inc. (HGL)

2001 *Supplemental Remedial Investigation Report, Site 2-Old Base Service Station, Vandenberg AFB, California. Final.* Prepared for the Air Force Center for Environmental Excellence. December.

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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 Air Force Base, Colorado. Prepared by Tetra Tech, Inc. December.

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U.S. Air Force

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U.S. Air Force

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U.S. Air Force

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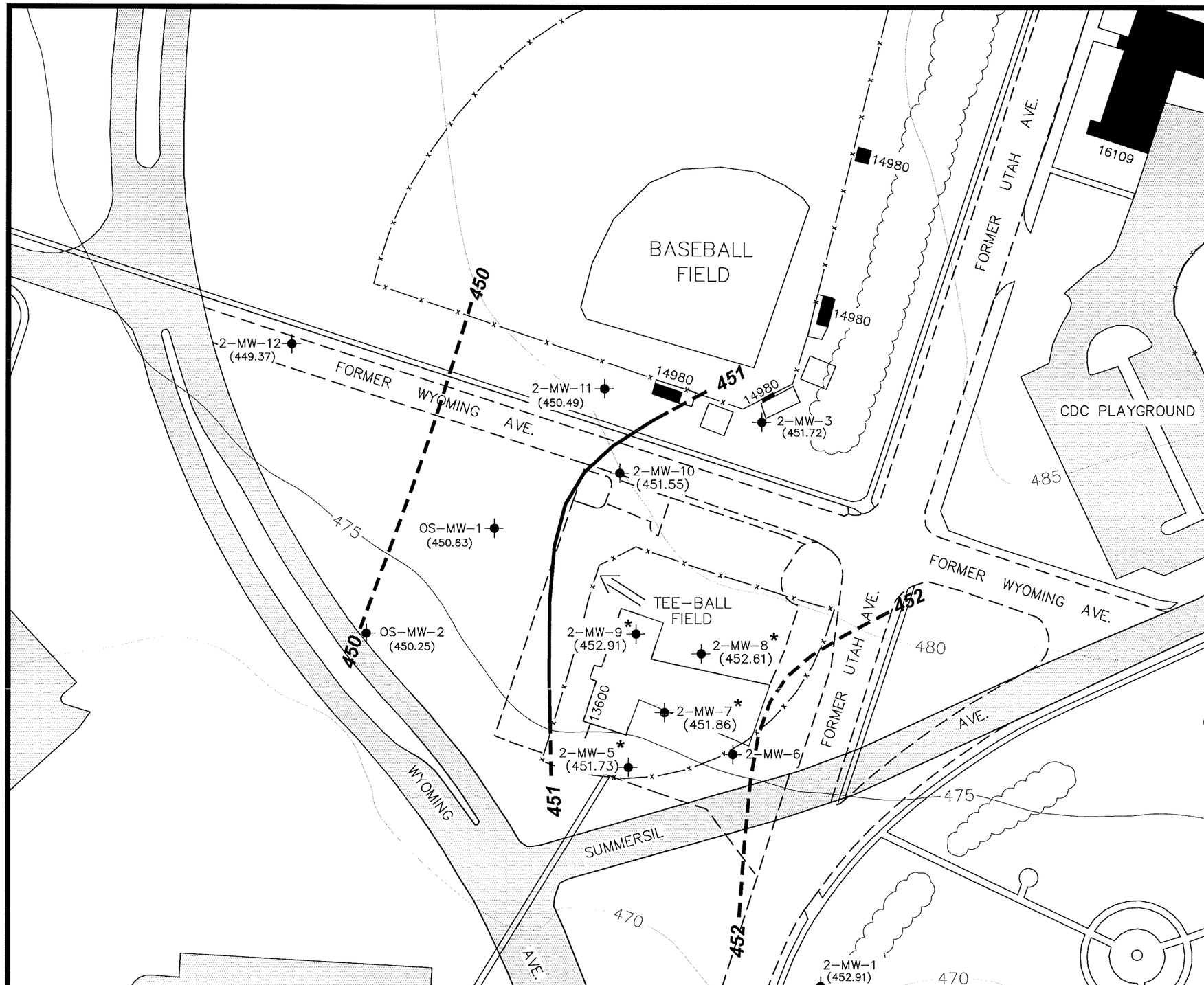
U.S. Environmental Protection Agency (EPA)

2005 Integrated Risk Information System (IRIS). On-line database available at: http://www.epa.gov/iris/.



LEGEND

480	CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
—x—	FENCE
	FORMER ROAD OR STREET
	PAVED ROAD OR STREET
16109	BUILDING
13600	DEMOLISHED BUILDING
	FORMER CONCRETE OR PAVED AREAS
	CONCRETE OR PAVED AREAS
	VEGETATION LINE
2-MW-11 (450.49)	GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION
452 — 452	GROUNDWATER ELEVATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (DASHED WHERE INFERRED)
	INFERRED GROUNDWATER FLOW DIRECTION
—x—	TEE-BALL FIELD FENCE
*	GROUNDWATER ELEVATION NOT USED IN ESTIMATION OF CONTOURS; NON-VENTED WELLS PART OF REMOTE SAMPLING SYSTEM.
NM	NOT MEASURED

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

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
SITE PLAN AND
GROUNDWATER CONTOURS
WINTER 2005

TETRA TECH, INC.
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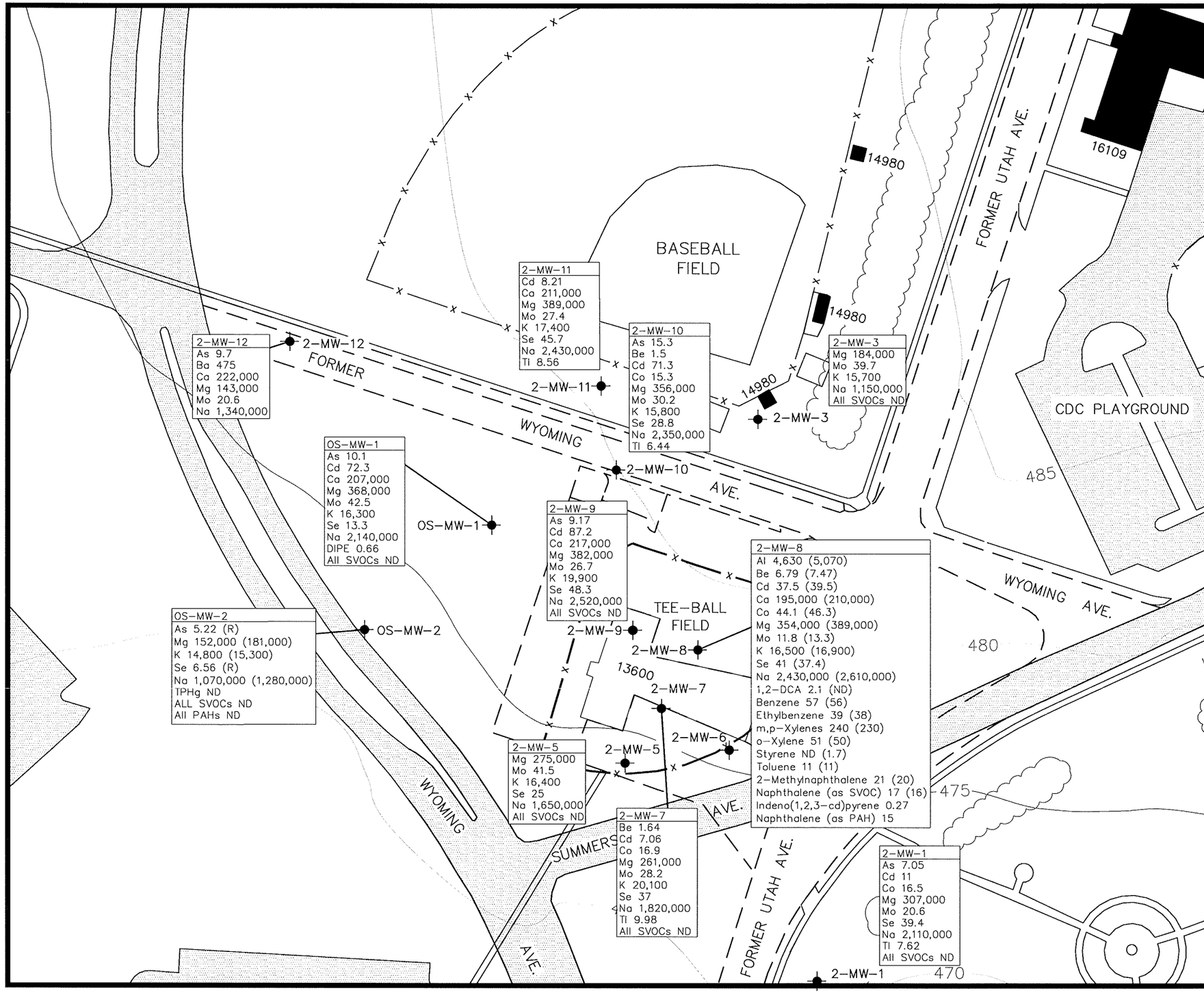
TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99047-17	6/16/05	PRICHARD	TAB21	4813	1



LEGEND

480	CONTOUR OF GROUND SURFACE ELEVATIONS IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
— x —	FENCE
	FORMER ROAD OR STREET
	PAVED ROAD OR STREET
14980	BUILDING
13600	DEMOLISHED BUILDING
	FORMER CONCRETE OR PAVED AREAS
	CONCRETE OR PAVED AREAS
	VEGETATION LINE
2-MW-1	GROUNDWATER MONITORING WELL
ND	NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
R	RESULT WAS REJECTED THROUGH THE VALIDATION PROCESS
— x —	TEE-BALL FIELD FENCE

NOTE(S): RESULTS FOR ALL COMPOUNDS ARE IN µg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER WITH CONCENTRATIONS ABOVE BTVs. RESULTS IN PARENTHESES ARE FROM DUPLICATE SAMPLES. SUSPECTED LABORATORY CONTAMINANTS ARE NOT SHOWN.

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
ANALYTICAL RESULTS
WINTER 2005

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

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99047-17	3/23/05	PRICHARD	TAB21	4865	2

2-MW-10	Benzene	Toluene	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.0472	ND	0.137	NA	NA	60.2	NA	NA
Fall-00	ND	ND	ND	ND	ND	80.4	23.5	ND
Win-01	ND	ND	ND	ND	ND	78.8	14.3	ND
Spr-01	ND	0.53	ND	ND	ND	76.3	20.9	ND
Sum-01	ND	ND	ND	232	ND	77.4	32.3	ND
Fall-01	ND	ND	ND	277	ND	88.1	27.4	71.1
Win-02*	ND	ND	ND	651	ND	71.8	22.6	ND
Sum-02	ND	ND	NA	341	ND	87.5	9.67	ND
Win-03	ND	ND	NA	622	ND	11.3	20.8	ND
Sum-03	ND	ND	NA	939	2.7	59.7	23.9	ND

2-MW-12	Cd	Al	Se	Se	Tl
Spr-01	36.3	ND	ND	ND	ND
Sum-01	36.1	ND	ND	ND	ND
Fall-01	31.6	ND	ND	66.1	69.7
Win-02*	ND	284	ND	ND	ND
Spr-02	12.7	186	ND	ND	ND
Sum-02	17.4	ND	ND	ND	ND
Fall-02	ND	ND	40.7	ND	ND
Win-03	8.12	ND	52.1	ND	ND
Spr-03	1.9	26.6	ND	ND	ND
Fall-03	ND	33.6	3.3	ND	ND

2-MW-11	Cd	Al	Se	Tl
Spr-01	5.87	ND	25.3	ND
Sum-01	5.39	ND	24.1	ND
Fall-01	7.18	ND	25.2	66.1
Win-02*	4.33	341	25.8	ND
Spr-02	5.11	242	55	ND
Sum-02	5.8	ND	23.7	ND
Fall-02	4.56	ND	87.5	ND
Win-03	5.74	ND	148	ND
Spr-03	5	33.2	36.3	ND
Fall-03	6.5	26.2	36.3	ND

2-MW-3	Benzene	Al	Cd	Se	Tl
Dec-99	0.0465	NA	2.32	NA	NA
Fall-00	ND	ND	12	ND	ND
Win-01	ND	ND	ND	ND	ND
Spr-01	ND	ND	4.13	ND	ND
Sum-01	ND	ND	6.6	ND	ND
Fall-01	ND	ND	2.05	ND	44.9
Win-02*	ND	ND	5.84	ND	ND
Spr-02	ND	118	7	ND	ND
Sum-02	ND	ND	5.98	ND	ND
Win-03	ND	ND	4.17	23.1	ND
Sum-03	ND	ND	ND	ND	ND

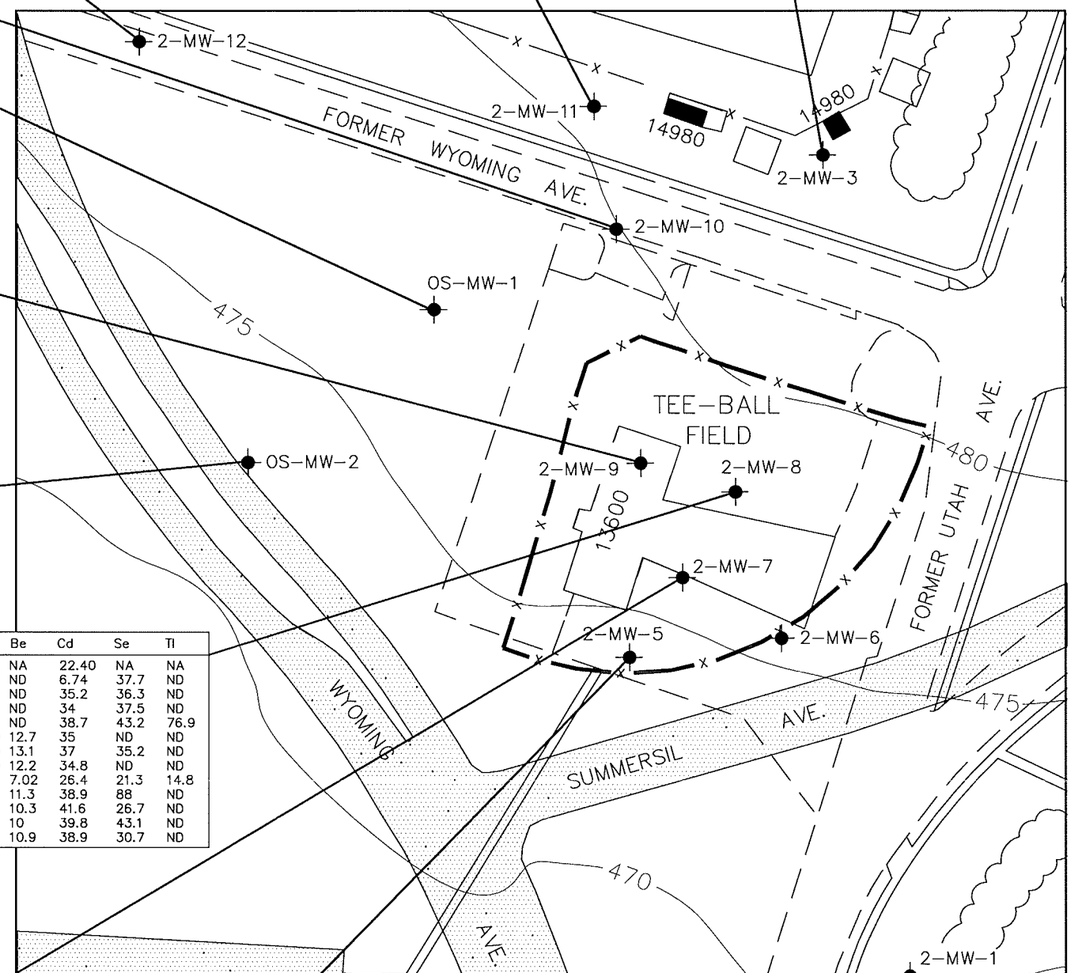
OS-MW-1	Al	Cd	Se	Tl
Dec-99	NA	38.1	NA	NA
Fall-00	ND	85.6	14.8	ND
Win-01	ND	54.7	9.11	ND
Spr-01	ND	54.5	16.3	ND
Sum-01	ND	50.8	15.8	ND
Fall-01	ND	60.5	13.6	65.2
Win-02*	313	46.6	ND	ND
Spr-02	NA	NA	NA	NA
Sum-02	ND	58.8	ND	ND
Fall-02	NA	NA	NA	NA
Win-03	ND	63.2	58.3	ND
Spr-03	NA	NA	NA	NA
Sum-03	42.8	64.7	18	ND
Fall-03	NA	NA	NA	NA

2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.0485	ND	0.205	NA	42.3	NA	NA
Fall-00	ND	ND	ND	ND	34	43.4	ND
Win-01	ND	ND	ND	ND	74.5	37.5	ND
Spr-01	ND	0.59	ND	268	76.5	40.3	ND
Sum-01	ND	ND	ND	ND	81.1	42.0	ND
Fall-01	ND	ND	ND	483	96	47.8	78.4
Win-02*	ND	ND	ND	548	72.1	31.1	ND
Sum-02	ND	ND	ND	ND	73.4	31.2	ND
Win-03	ND	ND	ND	265	12.4	88.6	ND
Sum-03	ND	ND	ND	284	85.8	56.7	ND

OS-MW-2	Cd	Al	Se	Tl
Spr-01	6.82	ND	10.7	ND
Sum-01	13.9	ND	13.6	ND
Fall-01	2.56	ND	ND	38.5
Win-02*	10.9	211	ND	ND
Sum-02	10.3	ND	ND	ND
Win-03	10.4	ND	34.4	ND
Sum-03	9.8	20.1	12.3	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Naphthalene	Al	Be	Cd	Se	Tl
Dec-99	0.375	2.06	1.38	6.26	2.21	1.9	1.07	NA	NA	22.40	NA	NA
Fall-00	3.5	5.3	5.2	29	6.0	0.69	ND	1,380	ND	6.74	37.7	ND
Win-01	4.40	11	10	42	14	0.62	ND	1,260	ND	35.2	36.3	ND
Sum-01	5.1	11	8.7	37	12	0.88	5.3	1,650	ND	34	37.5	ND
Fall-01	5.3	6.4	4.9	37	10	0.64	ND	1,970	ND	38.7	43.2	76.9
Win-02*	36	64	62	250	74	4.9	21	13,500	12.7	35	ND	ND
Spr-02	7.7	12	12	61	21	1.2	10	12,700	13.1	37	35.2	ND
Sum-02	23	35	37	160	53	2.8	18	12,300	12.2	34.8	ND	ND
Fall-02	18	23	31	72	35	2.3	12	3,970	7.02	26.4	21.3	14.8
Win-03	26	37	36	180	52	3.6	16	7,410	11.3	38.9	88	ND
Spr-03	32.5	22.7	34.7	230	56.2	2.72	15.2	8,600	10.3	41.6	26.7	ND
Sum-03	22.5	12.1	32.3	125	24.7	2.12	18.5	8,320	10	39.8	43.1	ND
Fall-03	33.0	24.1	26.9	227	61.6	2.27	25.7	9,300	10.9	38.9	30.7	ND

2-MW-7	Toluene	m,p-Xylenes	TPHg	Al	Be	Cd	Se	Tl
Dec-99	ND	ND	ND	NA	NA	2.79	NA	NA
Fall-00	ND	4.6	0.11	470	ND	4.4	35.1	ND
Win-01	ND	ND	ND	373	ND	6.39	28.8	ND
Spr-01	0.64	ND	ND	423	ND	6.62	34.2	ND
Sum-01	ND	ND	ND	408	ND	6.78	31.2	ND
Fall-01	ND	ND	ND	666	ND	29.7	46.1	59.9
Win-02*	ND	ND	0.27	1,180	ND	17.5	31.3	ND
Sum-02	2.2	22	0.25	200	ND	1.94	22.3	ND
Win-03	1.2	17	0.15	475	ND	8.63	63.1	ND
Sum-03	0.17	7.88	0.09	519	1.5	7.6	57.5	ND



2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Dec-99	0.0675	0.316	0.114	NA	ND	NA	NA
Fall-00	ND	ND	ND	ND	4.9	ND	ND
Win-01	ND	ND	ND	ND	298	ND	ND
Spr-01	ND	ND	ND	ND	141	14.9	ND
Sum-01	ND	ND	ND	ND	59.3	7.08	ND
Fall-01	ND	ND	ND	ND	137	10.7	90.0
Win-02*	ND	ND	ND	209	4.74	ND	ND
Sum-02	ND	ND	ND	ND	13.6	ND	ND
Win-03	ND	ND	ND	ND	6.68	47.6	ND
Sum-03	ND	ND	ND	ND	4.5	62.6	ND

2-MW-1	Naphthalene	Al	Cd	Se	Tl
Dec-99	0.124	NA	10.8	NA	NA
Fall-00	ND	238	55.4	39.8	ND
Win-01	ND	380	12.4	35.8	ND
Spr-01	ND	293	12.7	32.4	ND
Sum-01	ND	ND	10.2	37.6	ND
Fall-01	ND	464	12.4	43.8	66.6
Win-02*	ND	662	11.1	32	ND
Sum-02	ND	288	10.7	23.9	ND
Win-03	ND	ND	79.6	127	ND
Sum-03	ND	383	13.1	42.9	ND

LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- —x— FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-6 GROUNDWATER MONITORING WELL
- —x— TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- * — INSTALLED MICROPURGE PUMP

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Cd-5µg/L
Al-1,200µg/L
Be-0.3µg/L
Se-3µg/L
Tl-1µg/L

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
DECEMBER 1999 THROUGH FALL 2003

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

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99047-17	6/16/05	PRICHARD	TAB21	4956	3A

2-MW-10	Benzene	Toluene	Naphthalene	Al	Be	Cd	Se	Tl
Win-04	ND	ND	NA	505	1.7	69.9	21.1	ND
Sum-04	ND	ND	NA	213	ND	64.5	24.1	ND
Win-05	NA	NA	NA	521	1.5	71.3	28.8	6.44

2-MW-11	Cd	Al	Se	Tl
Win-04	4.9	23	38.6	1.4
Sum-04	4.59	ND	42.8	6.17
Fall-04	7.1	ND	44.1	ND
Win-05	8.21	ND	45.7	8.56

2-MW-3	Benzene	Al	Cd	Se	Tl
Win-04	ND	17.8	ND	ND	ND
Sum-04	ND	ND	ND	ND	6.03
Win-05	NA	ND	ND	ND	ND

2-MW-12	Cd	Al	Se	Tl
Win-04	ND	19	ND	1.80
Sum-04	ND	ND	ND	ND
Fall-04	ND	ND	ND	ND
Win-05	ND	ND	ND	ND

OS-MW-1	Cd	Al	Se	Tl
Win-04	73.8	44.6	17.1	0.85
Spr-04	NA	NA	NA	NA
Sum-04	64.9	ND	15.2	ND
Fall-04	NA	NA	NA	NA
Win-05	72.3	ND	13.3	ND

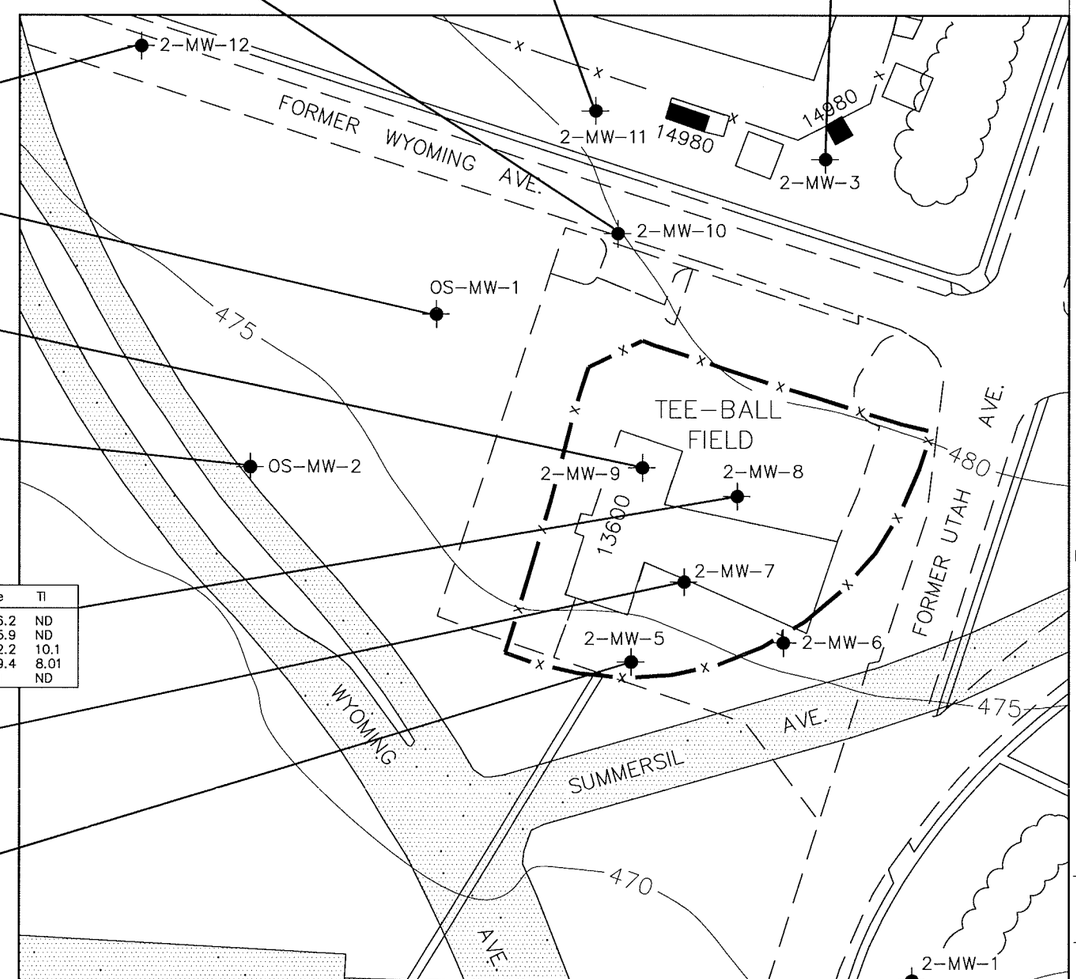
2-MW-9	Benzene	Toluene	Naphthalene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	132	83.5	33.4	1.10
Sum-04	ND	ND	ND	ND	84.4	44.7	10.6
Win-05	NA	NA	ND	104	87.2	48.3	ND

OS-MW-2	Cd	Al	Se	Tl
Win-04	5.2	26.9	8.3	1.30
Sum-04	2.25	ND	15.9	ND
Win-05	2.52	ND	6.56	ND

2-MW-8	Benzene	Toluene	Ethylbenzene	m,p-Xylenes	o-Xylene	TPHg	Cd	Naphthalene	Al	Be	Se	Tl
Win-04	33.8	9.98	34.1	218	48.7	2.55	39.6	28.8	6,880	9.8	26.2	ND
Spr-04	22	6.7	20	110	28	1.5	40.5	9.7	5,330	8.42	35.9	ND
Sum-04	21	5.5	19	90	28	1.2	40.2	9.2	5,100	8.25	32.2	10.1
Fall-04	39	8.9	34	190	48	2.3	39.5	21	5,420	7.79	39.4	8.01
Win-05	57	11	39	240	51	NA	39.5	17	5,070	7.47	41	ND

2-MW-7	Toluene	m,p-Xylenes	TPHg	Cd	Al	Be	Se	Tl
Win-04	ND	8.08	0.09a	6.8	224	ND	27.2	ND
Sum-04	ND	11	0.1	10.3	574	2.43	37.3	9.7
Win-05	NA	NA	NA	7.06	662	1.64	37	9.98

2-MW-5	Benzene	m,p-Xylenes	o-Xylene	Al	Cd	Se	Tl
Win-04	ND	ND	ND	21.9	3.4	16.9	ND
Sum-04	ND	ND	ND	ND	14.1	17.6	5.88
Win-05	NA	NA	NA	ND	4.96	25	ND



2-MW-1	Cd	Naphthalene	Al	Se	Tl
Win-04	14.1	ND	464	35	1.30
Sum-04	12	ND	408	40.1	7.55
Win-05	11	ND	386	39.4	7.62

LEGEND

- 480 — CONTOUR OF GROUND SURFACE ELEVATION IN FEET ABOVE MSL (5-FOOT INTERVALS) (NAVD 1988)
- x — FENCE
- FORMER ROAD OR STREET
- PAVED ROAD OR STREET
- 14980 — BUILDING
- 13600 — DEMOLISHED BUILDING
- FORMER CONCRETE OR PAVED AREAS
- CONCRETE OR PAVED AREAS
- VEGETATION LINE
- 2-MW-6 — GROUNDWATER MONITORING WELL
- x — TEE-BALL FIELD FENCE
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
- a — RESULT WAS QUALIFIED FOR BLANK CONTAMINATION (B-QUALIFIED) AND IS SUSPECTED TO BE A FALSE POSITIVE.

NOTE(S): RESULTS FOR ALL COMPOUNDS EXCEPT TPHg ARE IN µg/L. TPHg RESULTS ARE IN mg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
Cd-5µg/L
Al-1,200µg/L
Be-0.3µg/L
Se-3µg/L
Tl-1µg/L

N

0 37.5' 75' 112.5'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 2
OLD BASE SERVICE STATION
HISTORICAL ANALYTICAL RESULTS OF
BGMP KEY CONTAMINANTS OF CONCERN
WINTER 2004 THROUGH WINTER 2005

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

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99047-17	6/16/05	PRICHARD	TAB21	4866	3B

Table 1
Groundwater Elevations
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured Winter 2005	Groundwater Depth (feet below TOC) Winter 2005	Groundwater Elevation (feet above msl) Winter 2005	Fall 2004	Summer 2004	Spring 2004
2-MW-1	468.26	15-Feb-05	15.35	452.91	452.54	452.88	452.83
2-MW-3	482.84	15-Feb-05	31.12	451.72	451.44	451.60	451.68
2-MW-5[a]	474.50	16-Feb-05	22.77	451.73	451.95	451.69	451.73
2-MW-7[a]	475.39	16-Feb-05	23.53	451.86	452.27	452.29	452.59
2-MW-8[a]	476.51	16-Feb-05	23.90	452.61	452.65	444.86	458.19
2-MW-9[a]	476.24	16-Feb-05	23.33	452.91	452.08	451.59	451.69
2-MW-10	479.94	15-Feb-05	28.39	451.55	451.37	451.54	451.51
2-MW-11	482.10	15-Feb-05	31.61	450.49	450.14	450.52	450.56
2-MW-12	477.77	15-Feb-05	28.40	449.37	449.40	449.73	449.58
OS-MW-1	476.28	15-Feb-05	25.65	450.63	450.29	450.73	450.62
OS-MW-2	471.50	16-Feb-05	21.25	450.25	449.92	450.28	450.22

Definition(s):

msl - mean sea level
TOC - top of well casing

Note(s):

a - Non-vented well; part of remote sampling system.

Table 2
Water Quality Parameters
Winter 2005
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sampling Location	**2-MW-1**	**2-MW-3**	**2-MW-5**	**2-MW-7**	**2-MW-8**	**2-MW-9**
Sample ID	**V2MW1**	**V2MW3**	**V2MW5**	**V2MW7**	**V2MW8**	**V2MW9**
Collection Date	**15-Feb-05**	**15-Feb-05**	**16-Feb-05**	**16-Feb-05**	**16-Feb-05**	**16-Feb-05**
Field Parameters[1]:						
Temperature (°Celsius)	15.87	17.46	14.57	15.25	16.08	15.20
Conductivity (µmhos/cm)	11,051	6,192	7,874	9,287	12,276	11,435
pH	5.37	6.31	6.08	5.28	4.63	5.84
Turbidity (NTUs)	45.0	0.37	4.97	0.89	1.27	4.67

Sampling Location	**2-MW-10**	**2-MW-11**	**2-MW-12**	**OS-MW-1**	**OS-MW-2**
Sample ID	**V2MW10**	**V2MW11**	**V2MW12**	**VOSMW1M**	**VOSMW2**
Collection Date	**15-Feb-05**	**15-Feb-05**	**15-Feb-05**	**15-Feb-05**	**16-Feb-05**
Field Parameters[1]:					
Temperature (°Celsius)	18.06	17.42	18.41	18.71	18.53
Conductivity (µmhos/cm)	12,281	12,563	6,217	11,458	636
pH	5.49	5.92	8.34	5.78	6.99
Turbidity (NTUs)	24.3	12.1	9.56	19.5	3.01

Definition(s):

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

Note(s):

1 - Field parameters measured immediately prior to sampling.

Table 3
Metals in Groundwater
Winter 2005
EPA Methods SW6010B and SW7470A (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					2-MW-1	2-MW-3	2-MW-5	2-MW-7	2-MW-8	2-MW-8	2-MW-9
Sample ID					V2MW1F	V2MW3F	V2MW5F	V2MW7F	V2MW8F	V99W490F (D)	V2MW9F
Collection Date					15-Feb-05	15-Feb-05	16-Feb-05	16-Feb-05	16-Feb-05	16-Feb-05	16-Feb-05
Dissolved Metals	**MDL[1]**	**PQL[1]**	**Primary MCL**	**BTV**							
Aluminum	15	60	1,000	1,200	386 g	60 U g	60 U g	662 g	**4,630** g	**5,070** g	104 J q
Antimony[2]	40	100	6	10	40 U g	40 U g	40 U g	40 U g	40 U g	40 U g	40 U g
Arsenic	4	10	50	7	7.05 J q	6.19 J q	5 U g	5 U g	5.22 J q	5 U g	9.17 J q
Barium	1	5	1,000	276	33.1 g	117 g	220 g	133 g	119 g	133 g	200 g
Beryllium[2]	1	5	4	0.3	1 U g	1 U g	1 U g	1.64 J q	**6.79** g	**7.47** g	1 U g
Cadmium	1	5	5	5	**11** g	2 U g	4.96 J q	**7.06** g	**37.5** g	**39.5** g	**87.2** g
Calcium	22	500	N/A	197,000	155,000 g	136,000 g	183,000 g	156,000 g	195,000 g	210,000 g	217,000 g
Chromium	1	10	50	20	19.5 g	5 U g	13.7 B a	5 U g	5 U g	5 U g	7.17 B J a, q
Cobalt	2	15	N/A	13	16.5 g	8.9 J q	6.03 J q	16.9 g	44.1 g	46.3 g	5 U g
Copper	1	10	1,300	58	5.37 J q	5 U g	5.97 J q	13.6 g	23.9 g	25.1 g	21.5 g
Iron	4	100	N/A	3,530	59.8 J q	1,830 g	59.1 J q	40 U g	120 g	136 g	40 U g
Lead	2	3	15	3	2 U g	2 U g	2 U g	2 U g	2 U g	2 U g	2 U g
Magnesium	26	200	N/A	119,000	307,000 g	184,000 g	275,000 g	261,000 g	354,000 g	389,000 g	382,000 g
Manganese	1	5	N/A	971	220 g	429 g	14.6 g	40.7 g	146 g	161 g	29.9 g
Mercury	0.09	0.3	N/A	0.2	0.153 J q	0.1 U g	0.1 U g	0.195 J q	0.1 U g	0.1 U g	0.191 J q
Molybdenum	2	15	N/A	12	20.6 g	39.7 g	41.5 g	28.2 g	11.8 J q	13.3 J q	26.7 g
Nickel	5	20	100	490	**208** g	**248** g	**124** g	87.6 g	**188** g	**209** g	**257** g
Potassium	41	1,000	N/A	13,300	12,500 g	15,700 g	16,400 g	20,100 g	16,500 g	16,900 g	19,900 g
Selenium[2]	5	10	50	3	39.4 g	5 U g	25 g	37 g	41 g	37.4 g	48.3 g
Silver[2]	1	10	N/A	0.2	5 U g	5 U g	5 U g	5 U g	5 U g	5 U g	5 U g
Sodium	23	500	N/A	420,000	2,110,000 g	1,150,000 g	1,650,000 g	1,820,000 g	2,430,000 g	2,610,000 g	2,520,000 g
Thallium[2]	5	10	2	1	**7.62** J q	5 U g	5 U g	**9.98** J q	5 U g	5 U g	5 U g
Vanadium	1	10	N/A	28	5.71 J q	5.78 J q	7.64 J q	7.07 J q	5 U g	5 U g	7.46 J q
Zinc	2	20	N/A	80	9.2 J q	13 J q	19.5 J q	40.9 g	60 g	63.4 g	34 g

Table 3
Metals in Groundwater
Winter 2005
EPA Methods SW6010B and SW7470A (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location					2-MW-10			2-MW-11			2-MW-12			OS-MW-1			OS-MW-2			OS-MW-2		
Sample ID					V2MW10F			V2MW11F			V2MW12F			VOSMW1F			VOSMW2F			V99W489F (D)		
Collection Date					15-Feb-05			15-Feb-05			15-Feb-05			15-Feb-05			16-Feb-05			16-Feb-05		
Dissolved Metals	**MDL[1]**	**PQL[1]**	**Primary MCL**	**BTV**																		
Aluminum	15	60	1,000	1,200	521		g	60	U	g	60	U	g	60	U	g	60	U	g	60	U	g
Antimony[2]	40	100	6	10	40	U	g	40	U	g	40	U	g	40	U	g	40	U	g	40	U	g
Arsenic	4	10	50	7	15.3		g	6.41	J	q	9.7	J	q	10.1		g	5.22	J	q	**504**	R	p
Barium	1	5	1,000	276	52.6		g	129		g	475		g	186		g	145		g	177		g
Beryllium[2]	1	5	4	0.3	1.5	J	q	1	U	g	1	U	g	1	U	g	1	U	g	1	U	g
Cadmium	1	5	5	5	**71.3**		g	**8.21**		g	2	U	g	**72.3**		g	2.52	J	q	2.27	J	q
Calcium	22	500	N/A	197,000	159,000		g	211,000		g	222,000		g	207,000		g	112,000		g	127,000		g
Chromium	1	10	50	20	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Cobalt	2	15	N/A	13	15.3		g	5	U	g	6.98	J	q	5	U	g	11	J	q	7.88	J	q
Copper	1	10	1,300	58	14.3		g	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Iron	4	100	N/A	3,530	40	U	g	40	U	g	40	U	g	40	U	g	657		g	557		g
Lead	2	3	15	3	2	U	g	2	U	g	2	U	g	2	U	g	2	U	g	**502**	R	p
Magnesium	26	200	N/A	119,000	356,000		g	389,000		g	143,000		g	368,000		g	152,000		g	181,000		g
Manganese	1	5	N/A	971	97.2		g	48.5		g	37.2		g	32		g	263		g	232		g
Mercury	0.09	0.3	N/A	0.2	0.11	J	q	0.1	U	g	0.1	U	g	0.1	U	g	0.1	U	g	0.1	U	g
Molybdenum	2	15	N/A	12	30.2		g	27.4		g	20.6		g	42.5		g	10	U	g	10	U	g
Nickel	5	20	100	490	**280**		g	88.8		g	10	U	g	**226**		g	27.3		g	26.6		g
Potassium	41	1,000	N/A	13,300	15,800		g	17,400		g	11,800		g	16,300		g	14,800		g	15,300		g
Selenium[2]	5	10	50	3	28.8		g	45.7		g	5	U	g	13.3		g	6.56	J	q	**521**	R	p
Silver[2]	1	10	N/A	0.2	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g	5	U	g
Sodium	23	500	N/A	420,000	2,350,000		g	2,430,000		g	1,340,000		g	2,140,000		g	1,070,000		g	1,280,000		g
Thallium[2]	5	10	2	1	**6.44**	J	q	**8.56**	J	q	5	U	g	5	U	g	5	U	g	**508**	R	p
Vanadium	1	10	N/A	28	5.47	J	q	5.24	J	q	5	U	g	5.03	J	q	9.46	J	q	9.03	J	q
Zinc	2	20	N/A	80	42.7		g	24.9		g	5	U	g	31.8		g	5.26	J	q	5	U	g

Table 3
Metals in Groundwater
Winter 2005
EPA Methods SW6010B and SW7470A (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Data Validity Qualifier(s):

B - The sample result is less than 5 times (10 times for common organic laboratory contaminants) the blank contamination. The result is considered not to have originated from the environmental sample, because cross-contamination is suspected.
J - The analyte was positively identified and the result is usable; however, the analyte concentration is an estimated value.
R - The sample result is rejected and not usable for any purpose. The presence or absence of the analyte cannot be verified.
U - The analyte was not detected at or above the MDL.

Data Validity Comment(s):

a - The analyte was found in the method blank.
g - The data met prescribed criteria as detailed in the QAPP.
p - Professional judgement determined the data should be qualified.
q - The analyte detection was below the PQL.

Definition(s):

BTV - background threshold value
(D) - duplicate sample
MCL - maximum contaminant level
MDL - method detection limit
MCL - maximum contaminant level
µg/L - micrograms per liter
N/A - not applicable
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan

Note(s):

Bold type indicates results that were above the MCL.
Shading indicates results that were above the 95th percentile BTV.
1 - Values from QAPP Addendum (U.S. Air Force 2004a).
2 - The BTV was less than the detection limit for this metal.

Table 4
TPH, SVOCs, and PAHs in Groundwater
Winter 2005
EPA Methods SW8015B, SW8270C, and SW8270C SIM
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

			TPH	SVOCs				PAHs		
Sample Location	**Sample ID**	**Collection Date**	**TPH as Gasoline (mg/L)**	**Naphthalene (µg/L)**	**2-Methylnaphthalene (µg/L)**	**bis(2-Ethylhexyl)phthalate (µg/L)**	**SVOCs All Other Target Analytes (µg/L)**	**Indeno(1,2,3-c,d) pyrene (µg/L)**	**Naphthalene (µg/L)**	**PAHs All Other Target Analytes (µg/L)**
		MDL[1]	0.02	1.6	1.8	2.3	N/A	0.014	0.024	N/A
		PQL[1]	0.1	10	10	10	N/A	0.2	1.0	N/A
2-MW-1	V2MW1	15-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
2-MW-3	V2MW3	15-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
2-MW-5	V2MW5	16-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
2-MW-7	V2MW7	16-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
2-MW-8	V2MW8	16-Feb-05	NA	17 g	21 g	4.7 U g	ND	0.27 J q	15 g	ND
2-MW-8	V99W490 (D)	16-Feb-05	NA	16 g	20 g	4.7 U g	ND	NA	NA	NA
2-MW-9	V2MW9	16-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
OS-MW-1	VOSMW1M	15-Feb-05	NA	4.7 U g	4.7 U g	4.7 U g	ND	NA	NA	NA
OS-MW-2	VOSMW2	16-Feb-05	0.02 U g	4.7 U g	4.7 U g	4.7 U g	ND	0.19 U g	0.19 U g	ND
OS-MW-2	V99W489 (D)	16-Feb-05	0.02 U g	4.7 U g	4.7 U g	7 J q	ND	NA	NA	NA

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):

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
µg/L - micrograms per liter
mg/L - milligrams per liter
N/A - not applicable
NA - not analyzed
ND - not detected; result is less than the MDL
PAH - polynuclear aromatic hydrocarbon
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
SIM - selected ion monitoring
SVOC - semivolatile organic compound
TPH - total petroleum hydrocarbons

Note(s):

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

Table 5
VOCs in Groundwater
Winter 2005
EPA Method SW8260B (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Sample Location				**2-MW-8**	**2-MW-8**	**OS-MW-1**
Sample ID				**V2MW8**	**V99W490 (D)**	**VOSMW1M**
Collection Date				**16-Feb-05**	**16-Feb-05**	**15-Feb-05**
	MDL[1]	**PQL[1]**	**Primary MCL**			
1,2-DCA	0.06	1.0	0.5	**2.1** J b	0.2 U g	0.2 U g
Benzene	0.07	0.4	1	**57** J b	**56** J b	0.2 U g
DIPE	0.16	5.0	N/A	0.2 U g	0.2 U g	0.66 J q
Ethylbenzene	0.12	1.0	300	39 J b, q	38 J b, q	0.2 U g
m,p-Xylene	0.25	2.0	1,750[2]	240 J b	230 J b	0.5 U g
o-Xylene	0.13	1.0	1,750[2]	51 J b	50 J b	0.2 U g
Styrene	0.13	1.0	100	0.2 U g	1.7 J b	0.2 U g
Toluene	0.11	1.0	150	11 J b	11 J b	0.2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND

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
DCA - dichloroethane
DIPE - diisopropyl ether
MCL - maximum contaminant level
MDL - method detection limit
µg/L - micrograms per liter
N/A - not applicable
ND - not detected; result is less than the MDL
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan

Note(s):

Bold type indicates results that were above the MCL.
1 - Values from QAPP Addendum (U.S. Air Force 2004a).
2 - MCL of 1,750 µg/L applies to sum of m-xylene, o-xylene, and p-xylene.

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Benzene (µg/L)[a]																		
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	0.0465	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-5	0.0675	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-6	0.0445	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	0.69	NA	ND	NA	0.23	NA	0.32	NA	0.45	NA	NA
2-MW-8	0.375	**3.5**	**4.4**	NA	**5.1**	**5.3**	**36**	**7.7**	**23**	**18**	**26**	**32.5**	**22.5**	**33**	**33.8**	**22**	**21**	**39**	**57**
2-MW-9	0.0485	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-10	0.0472	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA

	Toluene (µg/L)[a]																		
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	0.44	NA	ND	NA	ND	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	0.64	ND	ND	ND	NA	2.2	NA	1.2	NA	0.17	NA	ND	NA	ND	NA	NA
2-MW-8	2.06	5.3	11	NA	11	6.4	64	12	35	23	37	22.7	12.1	24.1	9.98	6.7	5.5	8.9	11
2-MW-9	ND	ND	ND	0.59	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-10	ND	ND	ND	0.53	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Ethylbenzene (µg/L)[a]																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	0.20	NA	ND	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	2.4	NA	1.7	NA	0.1	NA	0.14	NA	0.29	NA	NA
2-MW-8	1.38	5.2	10	NA	8.7	4.9	62	12	37	31	36	34.7	32.3	26.9	34.1	20	19	34	39
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA

	m,p-Xylenes (µg/L)[b]																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-5	0.316	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	4.6	ND	ND	ND	ND	ND	NA	22	NA	17	NA	7.88	NA	8.08	NA	11	NA	NA
2-MW-8	6.26	29	42	NA	37	37	250	61	160	72	180	230	125	227	218	110	90	190	240
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	0.17	NA	ND	NA	ND	NA	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	o-Xylene (µg/L)[b]																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-5	0.114	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	4.9	NA	8.6	NA	6.4	NA	2.59	NA	2.97	NA	4.3	NA	NA
2-MW-8	2.21	6	14	NA	12	10	74	21	53	35	52	56.2	24.7	61.6	48.7	28	28	48	51
2-MW-9	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-10	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	NA

	TPH as gasoline (mg/L)																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	0.11	ND	ND	ND	ND	0.27	NA	0.25	NA	0.15	NA	0.09	NA	0.09[c]	NA	0.1	NA	NA
2-MW-8	0.0719	0.69	0.62	NA	0.88	0.64	4.9	1.2	2.8	2.3	3.6	2.72	2.12	2.27	2.55	1.5	1.2	2.3	NA
2-MW-9	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	ND	NA	ND	NA	0.02[c]	NA	ND	NA	NA
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	0.02[c]	NA	ND	NA	NA
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	0.03[c]	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	TPH as diesel (mg/L)																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-3	0.0349	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-5	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-6	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-8	0.0525	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-9	0.0372	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	0.0883	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	0.153	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	0.0609	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

	Naphthalene (µg/L)																		
	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	0.124	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	1.07	ND	ND	NA	5.3	ND	21	10	18	12	16	15.2	18.5	25.7	28.8	9.7	9.2	21	17
2-MW-9	0.205	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	0.137	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND	NA	ND	NA	ND	ND	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Aluminum (µg/L)[d]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	NA	238	380	293	ND	464	662	NA	288	NA	ND	NA	383	NA	464	NA	408	NA	386
2-MW-3	NA	ND	ND	ND	ND	ND	ND	118	ND	NA	ND	NA	ND	NA	17.8	NA	ND	NA	ND
2-MW-5	NA	ND	ND	ND	ND	ND	209	NA	ND	NA	ND	NA	ND	NA	21.9	NA	ND	NA	ND
2-MW-6	NA	399	ND	ND	ND	229	678	NA	374	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	NA	470	373	423	408	666	**1,180**	NA	200	NA	475	NA	519	NA	224	NA	574	NA	662
2-MW-8	NA	1,380	1,260	NA	1,650	1,970	13,500	12,700	12,300	3,970	7,410	8,600	8,320	9,300	6,880	5,330	5,100	5,420	5,070
2-MW-9	NA	ND	ND	268	ND	483	548	NA	ND	NA	265	NA	284	NA	132	NA	ND	NA	104
2-MW-10	NA	ND	ND	ND	232	277	651	NA	341	NA	622	NA	939	NA	505	NA	213	NA	521
2-MW-11	NA	NA	NA	ND	ND	ND	341	242	ND	ND	ND	33.2[c]	NA	26.2	23	NA	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	ND	284	186	ND	ND	ND	26.6[c]	NA	33.6	19	NA	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	ND	313	NA	ND	NA	ND	NA	42.8	NA	44.6	NA	ND	NA	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	211	NA	ND	NA	ND	NA	20.1	NA	26.9	NA	ND	NA	ND

Dissolved Beryllium (µg/L)[e]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	1.5	NA	ND	NA	2.43	NA	1.64
2-MW-8	NA	ND	ND	NA	ND	ND	12.7	13.1	12.2	7.02	11.3	10.3	10	10.9	9.8	8.42	8.25	7.79	7.47
2-MW-9	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	2.7	NA	1.7	NA	ND	NA	1.5
2-MW-11	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

Dissolved Cadmium (µg/L)[f]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	10.8	55.4	12.4	12.7	10.2	12.4	11.1	NA	10.7	NA	79.6	NA	13.1	NA	14.1	NA	12	NA	11
2-MW-3	2.32	12	ND	4.13	6.6	2.05	5.84	7	5.98	NA	4.17	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	4.9	298	141	59.3	137	4.74	NA	13.6	NA	6.68	NA	4.5	NA	3.4	NA	14.1	NA	4.96
2-MW-6	4.31	ND	41	20.5	8.96	30.2	5.22	NA	4.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	2.79	4.4	6.39	6.62	6.78	29.7	17.5	NA	1.94	NA	8.63	NA	7.6	NA	6.8	NA	10.3	NA	7.06
2-MW-8	22.4	6.74	35.2	NA	34	38.7	35	37	34.8	26.4	38.9	41.6	39.8	38.9	39.6	40.5	40.2	39.5	39.5
2-MW-9	42.3	34	74.5	76.5	81.1	96	72.1	NA	73.4	NA	12.4	NA	85.8	NA	83.5	NA	84.4	NA	87.2
2-MW-10	60.2	80.4	78.8	76.3	77.4	88.1	71.8	NA	87.5	NA	11.3	NA	59.7	NA	69.9	NA	64.5	NA	71.3
2-MW-11	NA	NA	NA	5.87	5.39	7.18	4.33	5.11	5.8	4.56	5.74	5	NA	6.5	4.9	NA	4.59	7.1	8.21
2-MW-12	NA	NA	NA	36.3	36.1	31.6	ND	12.7	17.4	ND	8.12	1.9	NA	ND	ND	NA	ND	ND	ND
OS-MW-1	38.1	85.6	54.7	54.5	50.8	60.5	46.6	NA	58.8	NA	63.2	NA	64.7	NA	73.8	NA	64.9	NA	72.3
OS-MW-2	NA	NA	NA	6.82	13.9	2.56	10.9	NA	10.3	NA	10.4	NA	9.8	NA	5.2	NA	2.25	NA	2.52

Dissolved Selenium (µg/L)[g]

	Dec-99	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02[i]	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	NA	39.8	35.8	32.4	37.6	43.8	32	NA	23.9	NA	127	NA	42.9	NA	35	NA	40.1	NA	39.4
2-MW-3	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	23.1	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	NA	ND	ND	14.9	7.08	10.7	ND	NA	ND	NA	47.6	NA	62.6	NA	16.9	NA	17.6	NA	25
2-MW-6	NA	31.9	29.8	28.5	35.9	6.83	30.1	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	NA	35.1	28.8	34.2	31.2	46.1	31.3	NA	22.3	NA	63.1	NA	57.5	NA	27.2	NA	37.3	NA	37
2-MW-8	NA	37.7	36.3	NA	37.5	43.2	ND	35.2	ND	21.3	88.0	26.7	43.1	30.7	26.2	35.9	32.2	39.4	41
2-MW-9	NA	43.4	37.5	40.3	42.0	47.8	31.1	NA	31.2	NA	88.6	NA	56.7	NA	33.4	NA	44.7	NA	48.3
2-MW-10	NA	23.5	14.3	20.9	32.3	27.4	22.6	NA	9.67	NA	20.8	NA	23.9	NA	21.1	NA	24.1	NA	28.8
2-MW-11	NA	NA	NA	25.3	24.1	25.2	25.8	55	23.7	87.5	148	36.3	NA	36.3	38.6	NA	42.8	44.1	45.7
2-MW-12	NA	NA	NA	ND	ND	ND	ND	ND	ND	40.7	52.1	ND	NA	3.3	ND	NA	ND	ND	ND
OS-MW-1	NA	14.8	9.11	16.3	15.8	13.6	ND	NA	ND	NA	58.3	NA	18	NA	17.1	NA	15.2	NA	13.3
OS-MW-2	NA	NA	NA	10.7	13.6	ND	ND	NA	ND	NA	34.4	NA	12.3	NA	8.3	NA	15.9	NA	6.56

Table 6
Summary of BGMP Key Contaminants of Concern
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Dissolved Thallium (µg/L)[h]																		
	Dec-99	**Fall-00**	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02[i]**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**
2-MW-1	NA	ND	ND	ND	ND	**66.6**	ND	NA	ND	NA	ND	NA	ND	NA	1.30	NA	**7.55**	NA	**7.62**
2-MW-3	NA	ND	ND	ND	ND	**44.9**	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	**6.03**	NA	ND
2-MW-5	NA	ND	ND	ND	ND	**90.0**	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	**5.88**	NA	ND
2-MW-6	NA	ND	ND	ND	ND	**35.9**	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	NA	ND	ND	ND	ND	**59.9**	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	**9.7**	NA	**9.98**
2-MW-8	NA	ND	ND	NA	ND	**76.9**	ND	ND	ND	**14.8**	ND	ND	ND	ND	ND	ND	**10.1**	**8.01**	ND
2-MW-9	NA	ND	ND	ND	ND	**78.4**	ND	NA	ND	NA	ND	NA	ND	NA	1.10	NA	**10.6**	NA	ND
2-MW-10	NA	ND	ND	ND	ND	**71.1**	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	**6.44**
2-MW-11	NA	NA	NA	ND	ND	**66.1**	ND	ND	ND	ND	ND	ND	NA	ND	1.40	NA	**6.17**	ND	**8.56**
2-MW-12	NA	NA	NA	ND	ND	**69.7**	ND	ND	ND	ND	ND	ND	NA	ND	1.80	NA	ND	ND	ND
OS-MW-1	NA	ND	ND	ND	ND	**65.2**	ND	NA	ND	NA	ND	NA	ND	NA	0.85	NA	ND	NA	ND
OS-MW-2	NA	NA	NA	ND	ND	**38.5**	ND	NA	ND	NA	ND	NA	ND	NA	1.30	NA	ND	NA	ND

Definition(s):

BTV - background threshold value
MCL - maximum contaminant level
µg/L - micrograms per liter
mg/L - milligrams per liter
NA - not analyzed
ND - not detected; result is less than the method detection limit
TCE - trichloroethene
TPH - total petroleum hydrocarbons

Note(s):

Bold type indicates results that were above the MCL.
Shading indicates results that were above the 95th percentile BTV.

a - The MCLs for benzene, toluene, and ethylbenzene are 1, 150, and 300 µg/L, respectively.
b - The MCL of 1,750 µg/L applies to the sum of m-xylene, o-xylene, and p-xylene.
c - The data were qualified for blank contamination during the validation process. The laboratory method blank showed the same order of magnitude as the sample results. The sample results are strongly suspected to be false positive.
d - The BTV and MCL for aluminum are 1,200 and 1,000 µg/L, respectively.
e - The BTV and MCL for beryllium are 0.3 and 4 µg/L, respectively.
f - The BTV and MCL for cadmium are 5 and 5 µg/L, respectively.
g - The BTV and MCL for selenium are 3 and 50 µg/L, respectively.
h - The BTV and MCL for thallium are 1 and 2 µg/L, respectively.
i - Dedicated MicroPurge pumps were installed in Site 2 wells during winter 2002.
r - The data were rejected through the validation process. The presence or absence of the analyte cannot be verified.

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 2/15/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-1 PID READING IN CASING (ppm) (initial) ND (vented to) ____

SAMPLE I.D. 1/2 MW1 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ____

STATIC WATER LEVEL (ft btoc) 15.35 TOTAL WELL DEPTH (ft btoc) 36.25 SBD (feet) 10.75

WATER COLUMN (feet) 20.90 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE ____

PUMP & TUBING (V) (L) 0.68 3 V (L) 2.04

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)
9:38	Start purge	15.35	—	—	—	—	—	—	—	∅	∅	0.25
9:41		15.47	15.87	11058	5.33	70.0	0.61	207.9	cloudy	0.75	1.10	
9:44		15.49	15.93	11073	5.31	76.4	0.99	211.2	cloudy	1.50	2.20	
9:47		15.49	15.91	11064	5.36	54.1	0.60	212.8	cloudy	2.25	3.30	
9:50		15.49	15.87	11053	5.36	44.5	0.47	214.0	cloudy	3.0	4.40	
9:53	end purge	15.49	15.87	11051	5.37	45.0	0.43	214.4	cloudy	3.75	5.51	
9:55	sample well	15.49				49.3						
10:00	Filtered sample											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 15.49

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

Comments: pump inlet 26.24
TOS 17.00
discharge 3.0 / refill 27.0 / pressure 30

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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Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/15/05 SITE NUMBER 2

PROGRAM NAME B6 MP

MONITORING WELL IDENTIFICATION 2-MW-3

SAMPLE I.D. V2MW3 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 31.12 TOTAL WELL DEPTH (ft btoc) 63.68

WATER COLUMN (feet) 32.56 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.946 3 V (L) 2.84

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) ND (vented to)

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

SBD (feet) 22.37

SAMPLER'S 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)
10:19	start purge	31.12	—	—	—	—	—	—	—	∅	∅	0.4
10:21		31.27	16.62	6500	6.60	11.3	1.55	47.0	clear	0.8	0.85	
10:23		31.30	17.21	6209	6.40	1.09	0.83	15.7	clear	1.6	1.70	
1025		31.36	17.34	6191	6.35	0.53	0.60	4.9	clear	2.4	2.55	
1027		31.36	17.43	6190	6.31	0.45	0.41	-4.2	clear	3.2	3.35	
1029	end purge	31.36	17.46	6192	6.31	0.37	0.36	-8.0	clear	4.0	4.23	
1031	sample well	31.36										
1036	Filtered sample											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 31.36

PARAMETERS FOR WATER QUALITY STABILIZATION

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

Comments: pump inlet 53.73
TOS 44.50
discharge 5.0 / recharge 25.0 / Pressure 40

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 2/16/05 SITE NUMBER 2

PROGRAM NAME BGMP

MONITORING WELL IDENTIFICATION 2-MW-5

SAMPLE I.D. V2MW5 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 22.77 TOTAL WELL DEPTH (ft btoc) 44.4

WATER COLUMN (feet) 21.63 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 2.49 3 V (L) 7.47

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) — (vented to) —

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

SBD (feet) 14.44

SAMPLER'S SIGNATURE [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)
1347	Begin Purge											0.2
1357		22.90	14.42	7553	6.37	5.24	7.69	126.4	clear	2.0	0.80	0.2
1402		—	14.13	7624	6.21	24.2	2.91	125.1	clear	3.0	1.20	0.2
1407		22.92	14.26	7789	6.11	11.2	1.72	120.8	clear	4.0	1.60	0.2
1412		22.93	14.36	7823	6.09	9.51	1.36	118.0	clear	5.0	2.00	0.2
1417		22.94	14.42	7843	6.08	8.03	1.19	117.8	clear	6.0	2.40	0.2
1422		22.94	14.57	7874	6.08	4.97	1.10	118.3	clear	7.0	2.80	0.2
1425	Sample	22.94										

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 22.94

Comments: Water level is estimated due to remote system.
BID = 32.77

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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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/16/05 SITE NUMBER 2

PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-7

PID READING IN CASING (ppm) (initial) – (vented to) –

SAMPLE I.D. V2MW7 DUPLICATE I.D. –

PID READING IN BREATHING ZONE (ppm) (initial) – (vented to) –

STATIC WATER LEVEL (ft btoc) 23.53 TOTAL WELL DEPTH (ft btoc) 39.4

SBD (feet) 8.65

WATER COLUMN (feet) 15.87 TUBING DIAMETER (in) 3/8

SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 2.00 3 V (L) 6.02

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)
1055	Begin Purge											0.16
1105		23.60	14.59	8984	5.71	1.29	8.41	56.5	clear	1.6	0.80	0.16
1110		23.63	14.49	9097	5.32	0.90	3.16	74.7	clear	2.4	1.20	0.16
1115		23.65	14.83	9193	5.29	0.88	2.19	85.6	clear	3.2	1.60	0.16
1120		23.76	15.25	9287	5.28	0.89	1.74	97.6	clear	4.0	2.00	0.16
1125	Sample											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 23.78

PARAMETERS FOR WATER QUALITY STABILIZATION

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

Comments: BID = 30.46
83.07 - PTR
Remote system, thus all w.l.m. are estimated

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 2/16/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-B PID READING IN CASING (ppm) (initial) — (vented to) —

SAMPLE I.D. V2MWB DUPLICATE I.D. V99W490 PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —

STATIC WATER LEVEL (ft btoc) 23.90 TOTAL WELL DEPTH (ft btoc) 34.~~82~~ 68 SBD (feet) 3.3

WATER COLUMN (feet) 10.9 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 1.48 3 V (L) 4.44

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)
1149	Begin Purge											0.14
1155		24.38	15.12	11867	4.79	1.79	6.51	204.1	clear	0.84	0.57	0.14
1200		24.43	15.39	12083	4.68	1.07	3.04	224.1	clear	1.54	1.04	0.14
1205		24.44	15.95	12244	4.64	0.97	1.44	225.4	clear	2.24	1.51	0.14
1210		24.46	16.08	12276	4.63	1.27	1.15	219.9	clear	2.94	1.99	0.14
1215	Sample	24.52										

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 24.52

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

Comments: Remote system, water levels are estimated
BTM = 26.95

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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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 2/16/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-9 PID READING IN CASING (ppm) (initial) — (vented to) —

SAMPLE I.D. V2MW9 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) — (vented to) —

STATIC WATER LEVEL (ft btoc) 23.33 TOTAL WELL DEPTH (ft btoc) 45.20 SBD (feet) 13.15

WATER COLUMN (feet) 21.87 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 2.01 3 V (L) 6.03

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)
1252	Begin Purge											0.14
1302		24.55	15.75	11770	5.83	1.51	8.43	164.7	clear	1.4	0.69	0.14
1307		24.53	15.12	11575	6.24	5.79	8.01	93.4	clear	2.1	1.05	0.14
1312		24.48	15.02	11457	6.21	7.30	5.36	98.8	clear	2.8	1.39	0.14
1317		24.64	14.83	11364	6.08	7.94	3.99	115.2	clear	3.5	1.74	0.14
1322		24.83	14.89	11360	5.93	5.40	3.17	134.2	clear	4.2	2.09	0.14
1327		24.92	15.03	11397	5.89	4.68	2.96	138.3	clear	4.9	2.43	0.14
1332		25.01	15.20	11435	5.84	4.67	2.75	144.5	clear	5.6	2.78	0.14
1335	Sample	25.04										

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 25.04

Comments: Remote System, W.L.m ~~m~~ are estimated
BID = 34.11

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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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/15/05 SITE NUMBER 2

PROGRAM NAME B6MP

MONITORING WELL IDENTIFICATION 2-MW-10

SAMPLE I.D. V2MW10 DUPLICATE I.D. —

STATIC WATER LEVEL (ft btoc) 28.39 TOTAL WELL DEPTH (ft btoc) 53.65

WATER COLUMN (feet) 25.26 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 0.87 3 V (L) 2.61

PURGING DEVICE MICROPURGE DEDICATED PUMP

SAMPLING DEVICE MICROPURGE DEDICATED PUMP

PID READING IN CASING (ppm) (initial) ND (vented to)

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

SBD (feet) 19.82

SAMPLER'S 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)
1106	start purge	28.39	—	—	—	—	—	—	—	Ø	Ø	0.32
1108		28.77	17.09	10923	5.77	35.3	4.79	111.9	cloudy	0.64	0.74	
1110		28.95	17.67	11838	5.59	44.6	4.39	148.6	cloudy	1.28	1.48	
1112		29.05	17.82	12104	5.48	30.7	4.06	160.5	cloudy	1.92	2.22	
1114		29.25	17.91	12188	5.47	32.3	3.91	170.8	cloudy	2.56	2.96	
1116		29.35	17.95	12233	5.47	25.5	3.57	177.0	cloudy	3.20	3.70	
1118		29.46	18.02	12259	5.47	37.2	3.50	179.9	cloudy	3.84	4.44	
1120	end purge	29.46	18.06	12281	5.49	24.3	3.44	183.7	cloudy	4.48	5.18	—
1124	sample well	29.46				28.5						
	(filtered metals only)											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 29.46

PARAMETERS FOR WATER QUALITY STABILIZATION

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

Comments: inlet 49.28
TOS 45.00
discharge 4.0 / recharge 26.0 / pressure 35

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

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 2/15/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-11 PID READING IN CASING (ppm) (initial) ND (vented to) ____

SAMPLE I.D. V2MW11 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ____

STATIC WATER LEVEL (ft btoc) 31.61 TOTAL WELL DEPTH (ft btoc) 54.85 SBD (feet) 27.29

WATER COLUMN (feet) 23.24 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 0.87 3 V (L) 2.61

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)
1136	start purg	31.61	—						—	0	0	0.20
1139		31.85	16.36	12051	6.29	8.14	3.67	163.2	Clear	0.6	0.68	
1142		32.08	16.64	12381	6.00	11.9	2.52	170.7	clear	1.2	1.38	
1145		32.10	16.97	12401	6.00	9.77	2.29	169.9	Clear	1.8	2.07	
1148		32.18	17.17	12465	5.96	12.6	1.87	167.6	clear	2.4	2.76	
1151		32.25	17.24	12502	5.94	12.0	1.56	165.3	Clear	2.7	3.10	
1154		32.33	17.23	12530	5.93	11.9	1.20	163.7	Clear	3.3	3.79	
1157		32.36	17.41	12555	5.92	18.0	1.06	162.4	clear	3.9	4.48	
1200	end purg	32.46	17.42	12563	5.92	12.1	0.91	161.3	Clear	4.5	5.17	↓
12:04	sample well	32.51				8.97						
	(Silt and metals only)											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 32.51

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

Comments: pump inlet 59.80
TOS 57.00
discharge 3.8 / recharge 26.2 / pressure 30

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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Telephone (805) 681-3100
Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/15/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME B6MD SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 2-MW-12 PID READING IN CASING (ppm) (initial) ND (vented to)

SAMPLE I.D. V2MW12 DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to)

STATIC WATER LEVEL (ft btoc) 28.40 TOTAL WELL DEPTH (ft btoc) 67.80 SBD (feet) 27.70

WATER COLUMN (feet) 39.40 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.98 3 V (L) 2.95

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)
1225	start purge	28.40	—	—	—	—	—	—	—	Ø	Ø	0.28
1229		28.55	17.71	6522	8.33	30.9	0.98	53.3	cloudy	1.12	1.14	
1233		28.74	18.06	6061	8.48	22.1	0.42	-11.6	cloudy	2.24	2.28	
1237		28.84	18.11	5990	8.43	17.8	0.27	-38.3	cloudy	3.36	3.42	
1241		28.95	18.18	6073	8.40	14.2	0.17	-61.2	clear	4.48	4.57	
1245	end purge	29.02	18.41	6217	8.34	9.56	0.15	-77.6	clear	5.60	5.71	
1249	sample well	29.10				8.59						
	(filtered metals only)											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 29.10

PARAMETERS FOR WATER QUALITY STABILIZATION

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

Comments: pump intake 56.80
TOS 57.00
discharge 5 / recharge 10 / pressure 35

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 2/15/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME B6MP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION OS-MW-1 PID READING IN CASING (ppm) (initial) ND (vented to)

SAMPLE I.D. VOSMW1M DUPLICATE I.D. — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to)

STATIC WATER LEVEL (ft btoc) 25.65 TOTAL WELL DEPTH (ft btoc) 48.65 SBD (feet) 14.20

WATER COLUMN (feet) 23.00 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 0.79 3 V (L) 2.37

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)
1307	start purge	25.65	—							∅	∅	0.32
1309		26.06	18.56	11180	5.92	17.6	2.72	90.2	clear	0.64	0.81	
1311		26.16	18.61	11403	5.79	12.4	2.06	101.4	clear	1.28	1.62	
1313		26.30	18.63	11433	5.77	11.5	1.55	106.6	clear	1.92	2.43	
1315		26.35	18.62	11435	5.77	15.8	1.30	108.5	clear	2.56	3.24	
1317		26.40	18.64	11440	5.76	13.2	1.01	108.4	clear	3.20	4.05	
1319		26.45	18.68	11450	5.76	11.6	0.84	107.7	clear	3.84	4.86	
1321		26.48	18.71	11458	5.76	19.5	0.69	107.7	clear	4.48	5.67	
1325	sample well	26.52				17.6						
1330	filtered sample											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 26.32

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

Comments: pump intake 40.72

discharge 4.0 / recharge 26.0 / pressure 30

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

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 2/16/05 SITE NUMBER 2 PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION D5-MW-2 PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

SAMPLE I.D. V05MW2 DUPLICATE I.D. VAAW489 PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 21.25 TOTAL WELL DEPTH (ft btoc) 45.60 SBD (feet) 15.97

WATER COLUMN (feet) 24.35 TUBING DIAMETER (in) 3/4 SAMPLER'S SIGNATURE [illegible]

PUMP & TUBING (V) (L) 0.76 3 V (L) 2.28

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)
0932	Begin Purge											0.30
0934		21.52	18.31	887	7.02	4.23	2.66	-130.6	yellowish	0.6	0.79	0.30
0936		21.53	18.32	786	6.99	4.19	1.82	-146.6	yellowish	1.2	1.58	0.30
0938		21.55	18.31	739	6.98	3.17	1.53	-159.3	yellowish	1.8	2.37	0.30
0940		21.55	18.31	686	6.98	3.14	1.26	-167.6	yellowish	2.4	3.16	0.30
0942		21.55	18.49	664	6.99	3.09	1.09	-172.8	yellowish	3.0	3.95	0.30
0945		21.55	18.53	636	6.99	3.01	0.87	-182.8	yellowish	3.9	5.13	0.30
0950	Sample											

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 21.55

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

Comments:

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

APPENDIX B CHAIN-OF-CUSTODY RECORDS

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

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

05B108

CHAIN OF CUSTODY RECORD

H2/VW01-55

SITE 2 DATE 2/15/05 PAGE 1 OF 1

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99047-06
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	SW8270C SVOCs	SW8270 SIM PAHs	SW6010 / 7470 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	SW8270 SIM 1-4, Dioxane	Matrix Type	Container Type	Number of Containers	Filtered Sample	OBSERVATIONS/COMMENTS
1	V2TB985	2/15/05	805	X														W	G	2	U	
2	V2MW1		955					X										W	G	2	U	
3	V2MW1F		1000							X								W	P	1	F	
4	V2MW3		1031					X										W	G	2	U	
5	V2MW3F		1036							X								W	P	1	F	
6	V2MW10F		1124							X								W	P	1	F	
7	V2MW11F		1204							X								W	P	1	F	
8	V2MW12F		1249							X								W	P	1	F	
9	V05MW1M		1325	X				X										W	G	13	U	MS/MSD
10	V05MW1F		1330							X								W	P	1	F	

MATRIX TYPE: S = Soil, W = Water
CONTAINER TYPE: 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=3.4°C, T=3.0°C
TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:	
L Leonard	L Leonard	TETRA TECH, INC.	2/16/05	1044	TOTAL NUMBER OF CONTAINERS 25
RECEIVED BY: Phil Hatcher	SIGNATURE: Phil Hatcher	COMPANY: EMAX	DATE: 2-16-05	TIME: 1045	METHOD OF SHIPMENT Courier
RELINQUISHED BY: Phil Hatcher	SIGNATURE: Phil Hatcher	COMPANY: EMAX	DATE: 2 16 05	TIME: 1430	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: SONLUNA	SIGNATURE: MUNA	COMPANY: EMAX	DATE: 2-16-05	TIME: 1430	

2001

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

J8/VW01-32

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

05B123

CHAIN OF CUSTODY RECORD

SITE 2 DATE 2/16/05 PAGE 1 OF 2

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99047-06
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	SW8270C SVOCs	SW8270 SIM PAHs	SW6010 / 7470 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	SW8270 SIM 1-4, Dioxane	Matrix Type	Container Type	Number of Containers	Filtered Sample	OBSERVATIONS/COMMENTS
1	V2TB 988	2/16/05	0805	X														w	g	2		
2	V2MW7		1125					X										w	g	2		
3	V2MW7F		1130							X								w	p	1	X	
4	V2MW9		1335					X										w	g	1		only 1 1L Amber for SVOCs
5	V2MW9F		1340							X								w	p	1	X	
6	V99W489		1700		X			X										w	g	5		
7	V99W489F		1705							X								w	p	1	X	
8	V99W490		1710	X	~~X~~			X										w	g	5		Do not analyze for 8015.
9	V99W490F		1715							X								w	p	1	X	
10	V2MW5		1425					X										w	g	1		only 1 1L Amber for SVOCs

MATRIX TYPE: S = Soil, W = Water
CONTAINER TYPE: 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 (0) NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:
Joachim E.		TETRA TECH, INC.	2/17/05	1100
RECEIVED BY: Phil Hatcher	SIGNATURE:	COMPANY: EMAX	DATE: 2 17 05	TIME: 1105
RELINQUISHED BY: Phil Hatcher	SIGNATURE:	COMPANY: EMAX	DATE: 2 17 05	TIME: 1425
RECEIVED BY: INDRA PATEL	SIGNATURE:	COMPANY: EMAX	DATE: 2-17-05	TIME: 1425

TOTAL NUMBER OF CONTAINERS: 20 of 33
METHOD OF SHIPMENT: Courier
SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:

1002

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

05B123

CHAIN OF CUSTODY RECORD

SITE 2 DATE 2/16/05 PAGE 2 OF 2

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99047-06
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	SW8270C SVOCs	SW8270 SIM PAHs	SW6010 / 7470 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	SW8270 SIM 1-4, Dioxane	Matrix Type	Container Type	Number of Containers	Filtered Sample
11	V2MW5F	2/16/05	1430							X								W	P	1	X
12	V2MWB		1215	X				X	X	JC	4/19/05							W	G	5	
13	V2MWBF		1220							X								W	P	1	X
14	V05MW2		0950		X			X	X	JC 4/19/04								W	G	5	
15	V05MW2F		0955							X								W	P	1	X

MATRIX TYPE: S = Soil, W = Water
CONTAINER TYPE: 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
Joaquim E.		TETRA TECH, INC.	2/17/05	1100	13 of 35
RECEIVED BY: Phil Hatcher	SIGNATURE:	COMPANY: EMAX	DATE: 2 17 05	TIME: 1105	METHOD OF SHIPMENT: Courier
RELINQUISHED BY: Phil Hatcher	SIGNATURE:	COMPANY: EMAX	DATE: 2 17 05	TIME: 1425	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: INDRA PATEL	SIGNATURE:	COMPANY: EMAX	DATE: 2-17-05	TIME: 1425	

1003

Tt-IRP-008 (03/04)

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

APPENDIX C SUPPORTING TABLES

Table C-1
Summary of SVOCs and PAHs by EPA Methods SW8270C and SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Indeno(1,2,3-cd)pyrene (by SW8270C)																	
	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	NA	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	4.27	NA	ND	ND	ND

	2-Methylnaphthalene (by SW8270C)																	
	Fall-00	Win-01	Spr-01	Sum-01	Fall-01	Win-02	Spr-02	Sum-02	Fall-02	Win-03	Spr-03	Sum-03	Fall-03	Win-04	Spr-04	Sum-04	Fall-04	Win-05
2-MW-1	NA	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	ND	ND	ND	6.3	5.7	23	ND	21	ND	28	21.3	25.1	32.0	38.2	9.5	9.7	25	21
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

Table C-1
Summary of SVOCs and PAHs by EPA Methods SW8270C and SW8270C SIM (µg/L)
IRP Site 2 (Old Base Service Station)
Vandenberg AFB, California

	Naphthalene [a] (by SW8270C)																	
	Fall-00	**Win-01**	**Spr-01**	**Sum-01**	**Fall-01**	**Win-02**	**Spr-02**	**Sum-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**
2-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-3	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-5	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-6	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-7	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-8	ND	ND	NA	5.3	ND	21	10	18	12	16	15.2	18.5	25.7	28.8	9.7	9.2	21	17
2-MW-9	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND
2-MW-10	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-11	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-MW-12	NA	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OS-MW-1	ND	ND	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	ND	ND
OS-MW-2	NA	NA	ND	ND	ND	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND	NA	ND

	Naphthalene [a] (by SW8270C SIM)	
	Fall-04	**Win-05**
2-MW-8	14	15
OS-MW-2	ND	ND

	Indeno(1,2,3-cd)pyrene (by SW8270C SIM)	
	Fall-04	**Win-05**
2-MW-8	ND	0.27
OS-MW-2	ND	ND

Definition(s):

µg/L - micrograms per liter
NA - not analyzed
ND - not detected; result is less than the method detection limit

Note(s):

a - The California Department of Health Services (DHS) notification level for naphthalene is 17 µg/L.