TETRA TECH, INC.

TECHNICAL MEMORANDUM

Basewide Groundwater Monitoring Program Report
Fall 2005 (Q4)
Installation Restoration Program Site 5 Cluster
Vandenberg Air Force Base, California

09 March 2006

Prepared by:
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1.0 INTRODUCTION

This report documents the activities and results of the fall 2005 groundwater monitoring at Installation Restoration Program (IRP) Site 5 Cluster, Operable Unit 5, Vandenberg Air Force Base (AFB), Santa Barbara County, California. The Site 5 Cluster comprises Site 5 (Space Launch Complex [SLC] 3 East [3E] and the unnamed tributary), Site 6 (SLC 3 West [3W]), and Site 7 (Bear Creek Pond and a portion of Bear Creek Canyon). Tetra Tech, Inc. (Tetra Tech) collected groundwater samples at the Site 5 Cluster during November 2005. The location of the Site 5 Cluster is shown on Figure 1.

The groundwater monitoring is being completed in accordance with the Basewide Groundwater Monitoring Program (BGMP) Work Plan (Tetra Tech 2000a), the BGMP Work Plan Addendum for Site 5 Cluster (Tetra Tech 2002a), the BGMP Health and Safety Plan Addendum (Tetra Tech 2000b), the Basewide Sampling and Analysis Plan (Tetra Tech 2003), the BGMP Quality Assurance Project Plan (QAPP) Addendum (Tetra Tech 2004), the Vandenberg AFB Hazardous Waste Management Plan (U.S. Air Force 2002), and the Waste Management Plan Addendum (Tetra Tech 2005a). 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 groundwater 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.

A complete description and history of the Site 5 Cluster and the results of previous environmental investigations can be found in the electronic version of the Final Remedial Investigation Report (Tetra Tech 2005b).

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The IRP Site 5 Cluster comprises Site 5 (SLC 3E), Site 6 (SLC 3W), and Site 7 (Bear Creek Pond) (Figure 1). The Site 5 Cluster is located on south Vandenberg AFB in the Lompoc Terrace physiographic region south of Bear Creek Road and east of Coast Road.

Site 5 consists of a missile launch pad, a retention basin and associated deluge water channel, and support and control centers. Site 5 also encompasses a portion of Bear Creek Canyon and the unnamed tributary to Bear Creek Canyon located south-southeast of the SLC 3E missile launch pad (Figure 1). A total of 30 Atlas missiles have been launched from SLC 3E. The Atlas missile engines were flushed with trichloroethene (TCE) prior to fueling. TCE engine flushing and possibly other degreasing activities have resulted in releases of TCE to groundwater at the site. The first missile was launched on 12 July 1961, and the most recent missile was launched during December 2003. Launch deluge water was channeled away from the pad to a retention basin. Historically, the deluge water was discharged into the unnamed tributary to Bear Creek, southeast of the site, but this practice has been discontinued. The SLC 3E launch pad is currently being modified to launch a new Atlas 5 missile.

Site 6 consists of the former SLC 3W launch facility, which was demolished on 22 January 2000. The remaining launch pad and single-level, concrete building are located on the northeastern slope of Bear Creek Canyon, approximately 1,200 feet northwest of the intersection of Napa and Alden Roads (Figure 1). Eighty-four missiles were launched from SLC 3W from 11 October 1960 through 24 March

1995. Launch deluge water from the site was channeled away from the pad to a retention basin and was discharged toward Bear Creek Canyon.

Site 7 is located within a northwest-trending canyon southwest of Bear Creek Road and west-northwest of Sites 5 and 6 (Figure 1). The site includes Bear Creek Pond (a federally designated wetland that covers approximately 0.25 square mile), the portion of Bear Creek Canyon between SLC 3 and the pond, and the drainage channels adjacent to the southern edge of Site 6. The site's eastern edge is adjacent to Sites 5 and 6.

The primary contaminants of concern (COCs) in groundwater from the Site 5 Cluster are TCE and its breakdown products, which have been detected at concentrations above maximum contaminant levels (MCLs). Additional COCs have included metals, one of which is hexavalent chromium. Groundwater samples collected by Tetra Tech during the remedial investigation did not contain semivolatile organic compounds (other than phthalate esters), total petroleum hydrocarbons, or polynuclear aromatic hydrocarbons (Tetra Tech 2005b).

2.2 HYDROGEOLOGY

Sites 5, 6, and 7 are located in the central portion of the Lompoc Terrace sub-basin, bordered on the north by the Santa Ynez River and on the south by the Santa Ynez Mountains. Sites 5 and 6 overlie a paleo-marine terrace and are bordered on the south and west by slopes and drainages including an unnamed tributary to Bear Creek, which drains to the west into Bear Creek, and Bear Creek proper, which drains northwesterly into Bear Creek Pond (Site 7). Perennial surface water is limited to Bear Creek Pond and seeps along Bear Creek Canyon, located within approximately 2,500 feet of Bear Creek Pond. Sites 5 and 6 have no perennial surface water. Ephemeral surface water may exist at each site in the form of locally ponded precipitation or runoff in the unnamed tributary and Bear Creek.

Groundwater occurs beneath SLC 3E and SLC 3W in silts of the Careaga Formation, at depths of approximately 180 to over 300 feet below ground surface. Groundwater occurring within the Careaga Formation has been separated into three zones: the shallow groundwater zone, intermediate groundwater zone, and the deep groundwater zone (Tetra Tech 2005c). Recharge to Site 5 Cluster groundwater is primarily from creek discharge of Bear Creek Canyon located to the southeast.

Groundwater occurs beneath the unnamed tributary to Bear Creek above a clayey sand layer that may serve as a perching unit in what has been designated the perched groundwater zone. Recharge to the unnamed tributary is from seasonal flow and discharge is to Bear Creek Canyon to the west. Groundwater elevations in wells installed at the unnamed tributary (5-MW-1, 5-MW-3, 5-MW-5, and 5-MW-6) exhibit marked fluctuations depending on the season.

Groundwater beneath Bear Creek Canyon exists at relatively shallow depth in what has been designated the alluvial groundwater zone (generally within 30 feet of ground surface) and is fed from the portion of Bear Creek south of Site 5 Cluster, which is underlain by shale bedrock of the Monterey Formation.

Groundwater levels measured in November 2005 indicate groundwater elevation ranged from approximately 62 to 279 feet above mean sea level (msl) (Table 1). During fall 2005 the interpreted direction of groundwater flow at Site 5 Cluster was to the northwest with an average hydraulic gradient of 0.02 feet per foot (Figure 1).

3.0 SCOPE OF WORK

The work performed for the fall 2005 groundwater monitoring at the Site 5 Cluster included measuring groundwater levels, collecting groundwater samples for laboratory analysis, and preparing this report.

3.1 GROUNDWATER MONITORING METHODOLOGY

Eleven wells were sampled at Site 5 Cluster during fall 2005. MicroPurge pumps and Grundfos pumps were used for purging groundwater at wells 5-MW-4, 5-MW-7 (T and B), 5-MW-11, 5-MW-15, 5-MW-17, 5-MW-18, 5-MW-20, 5-MW-21, 5-MW-23, 6-MW-1, and 6-MW-3. Discrete groundwater samples were taken from the top and bottom of the screened interval from well 5-MW-7. A duplicate sample was collected from well 5-MW-18. Wells 5-MW-5 and 5-MW-6 were dry and were not sampled. 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 ±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 5-MW-4, 5-MW-7 (T and B), 5-MW-11, 5-MW-15, 5-MW-17, 5-MW-18, 5-MW-20, 5-MW-21, 5-MW-23, and 6-MW-3. Pumping rates were calibrated for each well prior to purging to maintain a static water level (i.e., no drawdown). Due to high turbidity, wells 5-MW-4 and 5-MW-21 were sampled after purging at least five pump and tubing volumes of water.

3.1.2 Standard Groundwater Sampling

A 2-inch Grundfos pump was used for purging groundwater at monitoring well 6-MW-1. The sample was collected using a disposable Teflon bailer. Due to high turbidity, well 6-MW-1 was sampled after purging five well volumes of water.

4.0 RESULTS

Temperature, conductivity, pH, and turbidity were measured in the field during purging and sampling. Readings measured immediately prior to sampling are presented in Table 2. Additionally, dissolved oxygen (DO), ferrous iron (Fe II), and oxidation-reduction potential (ORP) were measured during purging at monitoring wells where natural attenuation parameters were measured. These measurements are also presented in Table 2. Fixed laboratory analyses were performed by EMAX Laboratories, Inc. in Torrance, California. Samples were analyzed according to the work plan (Tetra Tech 2000a) for hexavalent chromium by U.S. Environmental Protection Agency (EPA) method E218.6, volatile organic compounds (VOCs) by EPA method SW8260B, and water quality parameters by EPA methods E300.0, E310.1, E353.3, E376.2, E415.1, and RSK175. Laboratory analyses and data validation were conducted

according to the QAPP Addendum (Tetra Tech 2004a). Data validation was performed on 100 percent of the analytical data. Results are presented in Tables 2 through 4 and on Figure 2. Historical data for key COCs are presented in Table 5 and on Figures 3A and 3B. Figure 3A contains historical data for key COCs from January 2002 through spring 2004 and Figure 3B contains historical data for key COCs for summer 2004 through the present. Hydrographs showing historical TCE and *cis*-1,2-dichloroethene (DCE) concentrations for wells 5-MW-7 (T and B), 5-MW-15, 15-MW-18, 5-MW-20, and 6-MW-3 are presented on Figure 4. Chain-of-custody records are provided in Appendix B.

4.1 MONITORED NATURAL ATTENUATION

Numerous physical and chemical groundwater parameters were measured to assess the potential for intrinsic biodegradation of chlorinated aliphatics. Parameters measured in the field and used in the natural attenuation evaluation include pH, DO, ORP, temperature, Fe II. The chemical parameters analyzed by fixed laboratory analysis include chloride, nitrate, sulfate, alkalinity (as calcium carbonate), total organic carbon (TOC), total sulfide, ethane, ethene, and methane.

Chlorinated aliphatic hydrocarbons will intrinsically biodegrade only under certain environmental (*in situ*) chemical conditions. Anaerobic conditions (low DO) are favorable for the initial degradation of TCE and its daughter products (*cis*-1,2-DCE, *trans*-1,2-DCE, and 1,1-DCE). Low nitrate (<1 milligram per liter [mg/L]) and low ORP values (<50 millivolts) greatly increase the possibility of degradation. High values of Fe II (>1 mg/L), TOC (>20 mg/L), and the presence of ethane, ethene, and methane indicate subsurface conditions potentially favorable for the natural attenuation of chlorinated aliphatics (U.S. EPA 1998).

The highest concentrations of TCE have been detected in groundwater from wells 5-MW-7 and 5-MW-18 (Table 6). Well 5-MW-7 is located downgradient of the deluge pipe leading from the retention basin for SLC 3E. Groundwater from this well has had an average TCE concentration of approximately 3,986 micrograms per liter (μg/L) since January 2002. Well 5-MW-18 is outside of the SLC 3W fenceline and downgradient from the retention basin. Groundwater from this well has had an average TCE concentration of approximately 4,222 μg/L since January 2002.

Samples from wells 5-MW-15 and 5-MW-18 were analyzed for monitored natural attenuation parameters (Table 2). Groundwater samples from these wells had an average DO concentration of 1.7 mg/L, an average ORP of 6.35 millivolts, low average total organic carbon concentrations (1.58 mg/L), low average nitrogen as nitrite and nitrate concentrations (0.39 mg/L), and high Fe II (3.0 mg/L, only in well 5-MW-15) indicating mixed subsurface conditions. However, the most direct evidence of intrinsic degradation of TCE in the Site 5 Cluster groundwater plume area is the consistent presence of all three degradation daughter products (*cis*-1,2-DCE, *trans*-1,2-DCE, and 1,1-DCE).

4.2 METALS

Groundwater samples from shallow zone wells 5-MW-7 (T and B) and 6-MW-3 were analyzed for hexavalent chromium. Results for these samples are presented in Table 3 and on Figure 2. Concentrations ranged from 9.09 to 13.6 μg/L and were similar to those detected during previous quarters (Table 5).

An evaluation of metals concentrations in groundwater, the results of the baseline risk assessment, and the usefulness of continuing metals analyses at Site 5 Cluster under the BGMP was conducted during fall 2005 report preparation. During this evaluation, risks identified for dissolved metals in groundwater in the streamlined electronic version of the Draft RI Report (U.S. Air Force 2005) were reviewed. Elevated

concentrations of arsenic in groundwater were identified as a primary contributor to carcinogenic risks greater than 1 x 10^{-6} and Hazard Indices greater than 1 (U.S. Air Force 2005: 7-10).

4.3 VOLATILE ORGANIC COMPOUNDS

Groundwater samples collected from wells 5-MW-4, 5-MW-7 (T and B), 5-MW-11, 5-MW-15, 5-MW-17, 5-MW-18, 5-MW-20, 5-MW-21, 5-MW-23, 6-MW-1, and 6-MW-3 were analyzed for VOCs. Volatile organic compounds were detected in groundwater from 8 of the 11 monitoring wells sampled for VOCs (Table 4). Trichloroethene was detected above the MCL of 5 µg/L in groundwater from 7 of 11 wells. The highest concentrations were detected in groundwater from shallow zone wells 5-MW-7 (T and B) and 5-MW-18 at concentrations of 3,900, 3,600, and 5,400 µg/L (5,000 µg/L in the duplicate sample from well 5-MW-18), respectively (Figure 2). The compound *cis*-1,2-DCE was detected above the MCL of 6 µg/L in groundwater from 4 of 11 wells. The highest concentration (2,500 µg/L) was detected in groundwater from shallow zone well 5-MW-15. All TCE and *cis*-1,2-DCE concentrations above MCLs were detected in the shallow and perched groundwater zone and were within the respective historic ranges for each well, with the exception of a steadily decreasing trend in TCE concentrations in groundwater from well 5-MW-17 (Table 5 and Figures 3A and 3B).

Hydrographs presenting a visual comparison of groundwater elevations and TCE and *cis*-1,2-DCE concentrations for wells 5-MW-7 (T and B), 5-MW-15, 5-MW-18, 5-MW-20, and 6-MW-3 have been included to expedite review of concentration trends (Figure 4). There is no apparent correlation between contaminant concentrations and groundwater elevations at these wells, with the exception of a moderate inverse correlation between groundwater elevations and TCE concentrations in groundwater from well 5-MW-7 from summer 2003 to summer 2005.

Concentrations of TCE in groundwater samples from well 5-MW-7 (T and B) were within the ranges of those previously detected. A review of *cis*-1,2-DCE concentrations in groundwater samples from well 5-MW-7 (T and B) indicated an overall increasing trend, although *cis*-1,2-DCE concentrations have remained below the MCL of 6 µg/L (Table 5).

A review of TCE concentrations in groundwater from well 5-MW-15 indicated an increasing trend since winter 2003 and a review of *cis*-1,2-DCE concentrations indicated a generally decreasing trend during the same time period.

A review of TCE concentrations in groundwater from well 5-MW-18 indicated a generally increasing trend from fall 2003 to fall 2005; however, *cis*-1,2-DCE concentrations have remained stable during this same time period.

A review of TCE concentrations in groundwater from wells 5-MW-20 and 6-MW-3 indicated an overall increasing trend since January 2002; however, TCE concentrations in groundwater from well 6-MW-3 decreased from 2,700 µg/L during winter 2005 to 1,800 µg/L during fall 2005. The concentrations of *cis*-1,2-DCE detected in groundwater from wells 5-MW-20 and 6-MW-3 are similar to those previously detected (Table 5).

5.0 QUALITY ASSURANCE/QUALITY CONTROL

All of the analytical data presented in this report have been validated according to the QAPP Addendum (Tetra Tech 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 fall 2005 sampling at Site 5 Cluster were achieved.

6.0 RECOMMENDATIONS

Recommendations for the fall 2005 Groundwater Monitoring Reports are presented below:

1. Pursuant to recommendations for sampling for emergent compounds under the BGMP from the Final Supplemental Basewide Preliminary Assessment for Identification of Emergent Compounds of Concern Usage prepared by Metcalf & Eddy (2005), Tetra Tech and the Air Force recommend adding analysis for 1,2,3-trichloropropane (TCP) for wells 5-MW-7 (sampled at the top and bottom of the screened interval), 5-MW-15, 5-MW-18, 5-MW-23, and 6-MW-1 beginning with spring 2006. During the sampling round following collection of TCP screening samples, Tetra Tech and the Air Force recommend that TCP analysis be discontinued for wells in which TCP is not detected and continued quarterly for wells in which TCP is detected. Wells 5-MW-7 (sampled at the top and bottom of the screened interval), 5-MW-15, 5-MW-18, 5-MW-23 were among the ones selected for 1,4-dioxane screening at Site 5 Cluster during fall 2002 (Tetra Tech 2003). In addition, well 6-MW-1 was selected because it represents Site 6 in Bear Creek Canyon. Based on TCP concentrations detected in groundwater from these wells, recommendations for TCP analysis at Site 7 will be presented in a subsequent BGMP report.

2. Tetra Tech and the Air Force recommend removing total dissolved solids (TDS) analyses from the sampling program at Site 5 Cluster beginning with spring 2006. The TDS groundwater data collected during previous quarters are now considered adequate since the streamlined electronic version of the Draft RI Report (U.S. Air Force 2005) has been submitted and additional data are not required to complete the baseline risk assessment. If additional TDS data are required in the future, TDS analyses will be reinstated at that time.

3. Tetra Tech and the Air Force recommend removing hexavalent chromium analysis for well 5-MW-18 from the sampling program at Site 5 Cluster beginning with spring 2006. Hexavalent chromium has not been detected since January 2002 in groundwater from well 5-MW-18 (Table 5).

4. Tetra Tech and the Air Force recommend reducing the hexavalent chromium sampling frequency from quarterly to annually during winter quarters for wells 5-MW-7 (T and B) and 6-MW-3 beginning with spring 2006. Hexavalent chromium concentrations have been generally decreasing in groundwater from these wells (Table 5). Hydrographs illustrating these trends are presented in Appendix C.

5. Tetra Tech and the Air Force recommend reducing the analyte list for dissolved metals at Site 5 Cluster to arsenic only. Arsenic was a primary contributor to carcinogenic risks greater than 1×10^{-6} and Hazard Indices greater than 1, as described in the streamlined electronic version of the Draft RI Report (U.S. Air Force 2005: 7-10). Hydrographs for the two other BGMP key COCs that are metals (nickel and selenium) were prepared for wells where concentrations of these metals were above the BTVs and MCLs during the last four sampling rounds. These

hydrographs are included in Appendix C. Historical concentrations of nickel and selenium are included in Table 5.

All recommendations were developed in accordance with the Air Force Center for Environmental Excellence Long-Term Monitoring Optimization Guide (U.S. Air Force 1997) and the decision tree developed by Tetra Tech for the BGMP at Vandenberg AFB (Tetra Tech 2002b).

The winter 2006 sampling will be conducted according to the Site 5 Cluster BGMP Work Plan Addendum (Tetra Tech 2002a).

7.0 REFERENCES

Metcalf & Eddy

2005 *Supplemental Basewide Preliminary Assessment (PA) for Identification of Emergent Compounds of Concern Usage, Installation Restoration Program, Vandenberg Air Force Base, California.* Prepared for Department of the Air Force 30 CES/CEV, Installation Restoration Program, Vandenberg Air Force Base, California, Headquarters Air Force Space Command, Peterson Air Force Base, Colorado, and the Air Force Center for Environmental Excellence, 3300 Sidney Brooks, Brooks City-Base, Texas. December.

Tetra Tech, Inc.

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Tetra Tech, Inc.

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. December.

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Tetra Tech, Inc.

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Tetra Tech, Inc.
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Tetra Tech, Inc.
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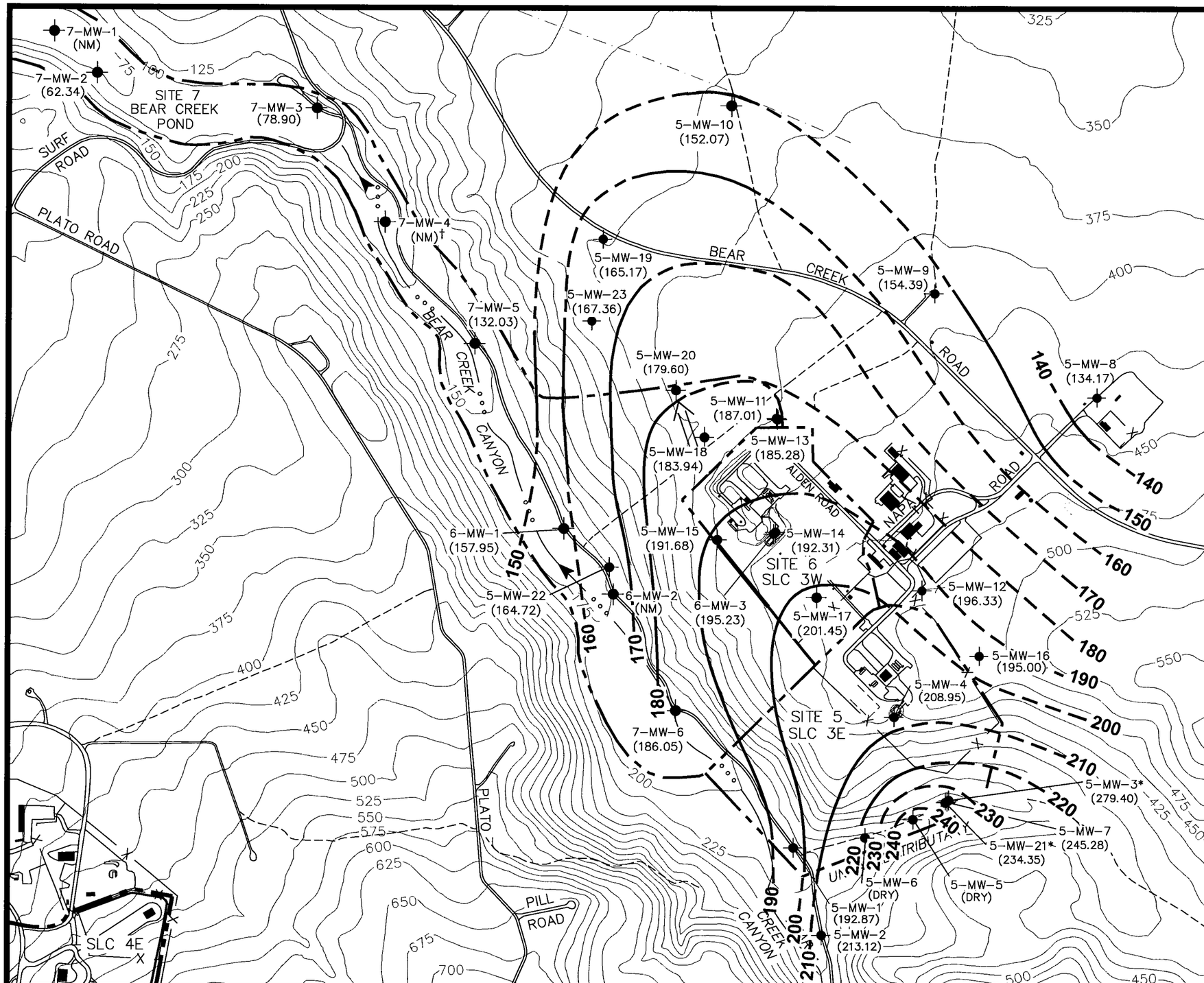
U.S. Air Force
1997 *Long-Term Monitoring Optimization Guide, Final, Version 1.1.* Headquarters Air Force Center for Environmental Excellence, Brooks Air Force Base, Texas. October.

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

U.S. Environmental Protection Agency (U.S. EPA)
1998 *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater.* Prepared for National Risk Management Research Laboratory, Office of Research and Development, Ada, Oklahoma. Prepared by Parsons Engineering Science, Inc. EPA Report No. EPA/600/R-98/128. September.



LEGEND

375	CONTOUR LINE, 25-FOOT INTERVALS (FEET ABOVE MSL, NAVD 1988)
—— X ——	FENCE
	PAVED ROAD OR STREET
	DIRT ROAD
	DIRT TRAIL
	BUILDING
	CONCRETE OR PAVED AREAS
	UNLINED DRAINAGE ROUTE AND FLOW DIRECTION
	SITE BOUNDARY
5-MW-1 (192.87)	GROUNDWATER MONITORING WELL WITH GROUNDWATER ELEVATION
†	ARTESIAN FLOW OBSERVED
*	GROUNDWATER ELEVATION NOT USED IN APPROXIMATION OF CONTOURS (WELL 5-MW-3 IS SCREENED IN THE PERCHED ZONE AND 5-MW-21 IS SCREENED IN THE INTERMEDIATE ZONE)
170 —— 170	GROUNDWATER ELEVATION CONTOUR APPROXIMATED BY LINEAR INTERPOLATION (DASHED WHERE INFERRED)
	INFERRED GROUNDWATER FLOW DIRECTION
NM	NOT MEASURED
DRY	WELL WAS DRY OR HAD INSUFFICIENT WATER FOR SAMPLING

NOTE(S): GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL AS MEASURED IN NOVEMBER 2005. THE DIFFERENCE IN GROUNDWATER ELEVATIONS BETWEEN ADJACENT WELLS 5-MW-7 AND 5-MW-21 IS SUSPECTED TO BE DUE TO A NEARBY FAULT ZONE.

N

0 400' 800' 1200'

SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 5 CLUSTER
SITE PLAN AND
GROUNDWATER CONTOURS
FALL 2005

TETRA TECH, INC.

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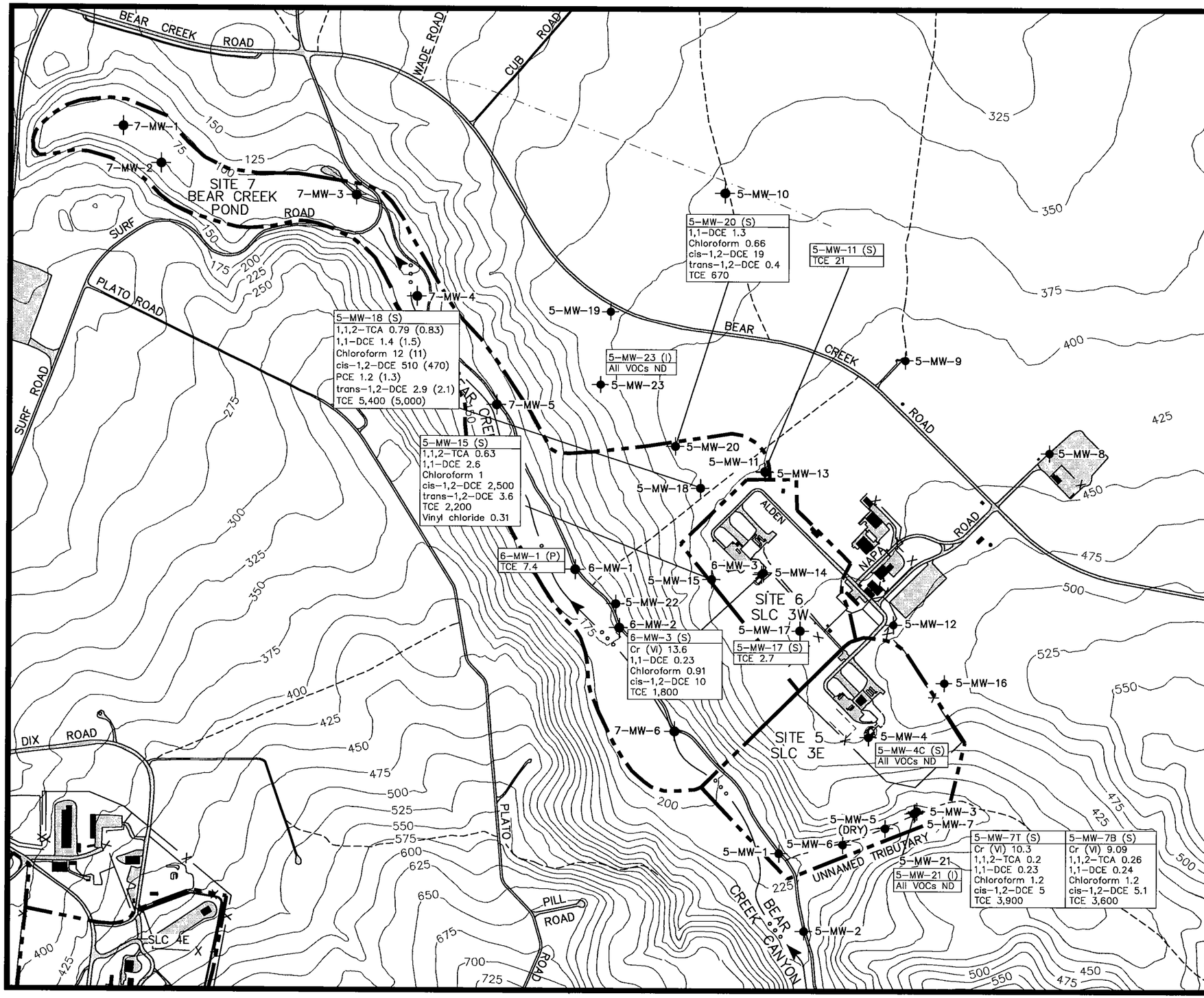
Santa Barbara, CA 93110-2847

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
99105-18	2/10/06	PRICHARD	TAB32 TAB35	5387	1



LEGEND

275	CONTOUR LINE, 25-FOOT INTERVALS (FEET ABOVE MSL, NAVD 1988)
—x—	FENCE
	PAVED ROAD OR STREET
- - - - -	DIRT ROAD
- · - · -	DIRT TRAIL
	BUILDING
	CONCRETE OR PAVED AREAS
— ◦ ◦ ◦ ←	UNLINED DRAINAGE ROUTE AND FLOW DIRECTION
———	SITE BOUNDARY
5-MW-5	GROUNDWATER MONITORING WELL
ND	NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT.
DRY	WELL WAS DRY OR HAD INSUFFICIENT WATER FOR SAMPLING.

(A) SCREENED IN THE ALLUVIAL GROUNDWATER ZONE
(P) SCREENED IN THE PERCHED GROUNDWATER ZONE
(S) SCREENED IN THE SHALLOW GROUNDWATER ZONE
(I) SCREENED IN THE INTERMEDIATE GROUNDWATER ZONE
(D) SCREENED IN THE DEEP GROUNDWATER ZONE

NOTE(S): RESULTS FOR ALL COMPOUNDS ARE IN µg/L. RESULTS IN PARENTHESES ARE FROM DUPLICATE SAMPLES.

N

0 450' 900' 1350'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 5 CLUSTER
ANALYTICAL RESULTS
FALL 2005

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

TASK NO.	DATE	DRAWN BY	MADE FROM	DWG NO.	Figure
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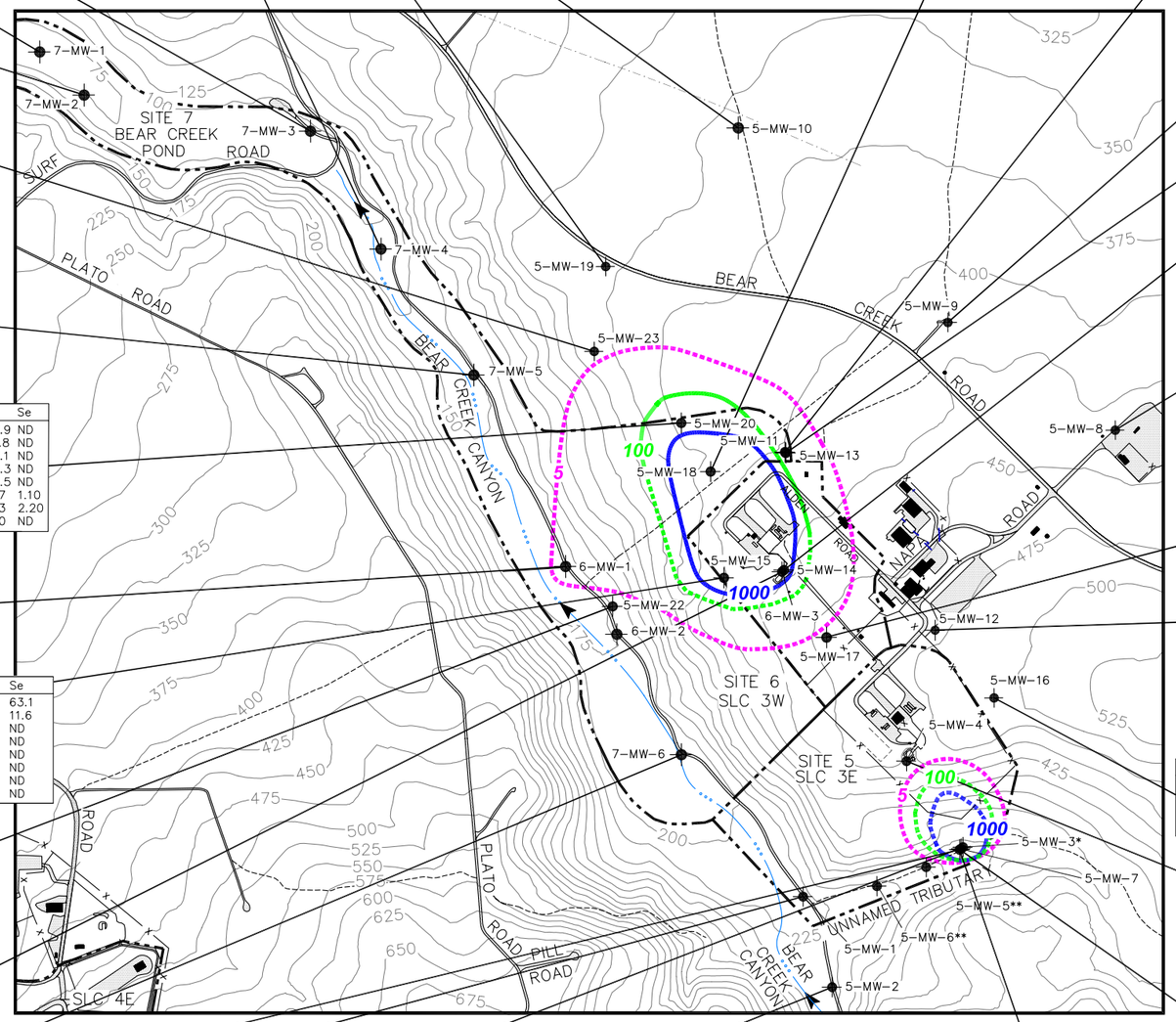


5-MW-19 (I) Key COCs	
May-02	ND

7-MW-1 (A)	As	Ni	Se
Fall-02	14.1	ND	ND
Spr-03	2.6	10.7	ND

7-MW-3 (A)	Ni	Se
Jan-02	ND	ND
Fall-02	ND	9.29
Spr-03	6.9	ND

7-MW-4 (A)	As	Ni	Se
Jan-02	28.7	ND	58.4
Fall-02	7.71	ND	ND
Spr-03	1.7	4,640[a]	ND
Spr-04	ND	ND	ND

5-MW-10 (S)	As	Cr(VI)	Ni	Se
Jan-02*	7.48	18	ND	26.5
Fall-02	ND	11.1	ND	ND
Spr-03	1.3	12.6	ND	2.50
Spr-04	ND	13.5	ND	5.49

5-MW-18 (S)	TCE	cis-1,2-DCE	As	Cr(VI)	Ni	Se
Jan-02*	4,900	270	ND	13	ND	25
Fall-02	3,800	330	7.37	ND	ND	ND
Win-03	4,100	550	ND	ND	ND	7.78
Spr-03	3,870	638	3.1	ND	ND	ND
Sum-03	3,560	562	ND	ND	7.3	ND
Fall-03	2,670	544	ND	ND	ND	ND
Win-04	3,110	636	ND	ND	ND	1.20
Spr-04	3,600	570	ND	ND	ND	ND

5-MW-11 (S)	TCE	As	Ni	Se
Jan-02*	25	13.2	ND	22.3
Fall-02	18	ND	ND	ND
Win-03	17	ND	ND	ND
Spr-03	17.8	ND	11.1	ND
Sum-03	17.3	ND	7	ND
Fall-03	15.5	ND	10.1	1.10
Win-04	15.2	ND	ND	ND
Spr-04	19	ND	ND	ND

5-MW-9 (S)	As	Cr(VI)	Ni	Se
Jan-02*	7.85	NA	ND	16.2
Fall-02	ND	3.27	ND	ND
Spr-03	2.4	3.49	ND	1.20
Spr-04	ND	3.53	ND	ND

7-MW-2 (A)	As	Ni	Se
Fall-02	10.4	ND	ND
Spr-03	6.9	ND	ND

5-MW-13 (D)	As	Ni	Se
Jan-02*	ND	ND	112
Fall-02	ND	ND	ND
Win-03	ND	ND	ND
Spr-03	1.7	ND	ND
Sum-03	ND	5.1	ND
Fall-03	ND	ND	ND
Win-04	ND	ND	ND
Spr-04	ND	ND	ND

5-MW-23 (I)	TCE	As	Ni	Se
May-02*	ND	ND	ND	ND
Fall-02	ND	12.1	ND	ND
Win-03	ND	8.54	12.1	ND
Spr-03	ND	9.4	89.3	ND
Sum-03	0.13[a]	ND	72.6	ND
Fall-03	ND	7.5	131	ND
Win-04	ND	6.2	101	ND
Spr-04	ND	7.86	81.2	ND

6-MW-3 (S)	TCE	cis-1,2-DCE	As	Cr(VI)	Ni	Se
Jan-02*	950	4.0	11.8	14	ND	16.9
Fall-02	1,000	9.1	5.19	15.3	ND	8.96
Win-03	1,600	16	ND	13.9	ND	13.2
Spr-03	1,150	7.16	1.1	14.2	5.4	8.60
Sum-03	1,300	7.21	ND	14.4	6.8	ND
Fall-03	1,370	10.6	1.4	14.3	ND	4.50
Win-04	1,480	8.90	ND	14.9	ND	7.40
Spr-04	1,700	9.6	ND	12.8	ND	7.31

7-MW-5 (A)	As	Ni	Se
Jan-02*	16.5	ND	6.32
Fall-02	8.03	ND	ND
Win-03	ND	ND	ND
Spr-03	2.9	5.4	ND
Sum-03	ND	5.2	ND
Fall-03	4.1	5.7	ND
Win-04	3.1	ND	ND
Spr-04	5.44	ND	ND

5-MW-8 (S)	As	Cr(VI)	Ni	Se
Jan-02*	5.95	10	ND	9.95
Fall-02	ND	3.79	ND	ND
Spr-03	2.8	5.57	ND	1.10
Spr-04	5.21	5.35	ND	ND

5-MW-20 (S)	TCE	cis-1,2-DCE	As	Ni	Se
May-02*	350	14	ND	45.9	ND
Fall-02	230	13	6.32	31.8	ND
Win-03	290	15	ND	45.1	ND
Spr-03	342	22.4	4.1	44.3	ND
Sum-03	400	21.6	ND	35.5	ND
Fall-03	340	19.7	1.6	167	1.10
Win-04	401	19.9	ND	143	2.20
Spr-04	410	17	ND	190	ND

5-MW-17 (S)	TCE	cis-1,2-DCE	As	Ni	Se
Jan-02*	6.5	ND	27.4	ND	32.7
Fall-02	8.0	ND	ND	ND	ND
Win-03	8.5	ND	ND	ND	10.9
Spr-03	7.19	ND	ND	ND	1.50
Sum-03	7.43	0.17	ND	ND	ND
Fall-03	5.65	ND	ND	ND	ND
Win-04	5.36	ND	ND	ND	ND
Spr-04	4.1	ND	ND	18	ND

6-MW-1 (P)	TCE	As	Ni	Se
Jan-02	1.8	21.2	80.5	37.6
Fall-02	DRY	DRY	DRY	DRY
Win-03	4.0	5.64	45.8	63.7
Spr-03	9.96	2.5	48.7	27.2
Sum-03	1.53	ND	11.9	19.5
Fall-03	2.94	ND	8.4	19.4
Win-04	14.8	ND	57.6	32.0
Spr-04	19	ND	87.7	44.6

5-MW-12 (S)	As	Ni	Se
Jan-02*	12.4	ND	30.5
Fall-02	ND	320	ND
Spr-03	2.3	120	1.30
Spr-04	ND	44.3	ND

5-MW-15 (S)	TCE	cis-1,2-DCE	As	Ni	Se
Jan-02*	4,400	6.0	ND	ND	63.1
Fall-02	NA	NA	19.3[b]	ND	11.6
Win-03	61	3,200	26.9	ND	ND
Spr-03	95.9	3,300	30.1	ND	ND
Sum-03	182	2,690	20.6	ND	ND
Fall-03	223	3,170	34.6	ND	ND
Win-04	808	2,880	26.6	ND	ND
Spr-04	1,300	2,400	27.3	ND	ND

5-MW-4T (S)	As	Ni	Se
Jan-02*	17.3	ND	119
Fall-02	6.97	20.7	87.4
Win-03	ND	19.2	92.9
Spr-03	3.9	19.6	87.6
Sum-03	ND	20.2	90.3
Fall-03	4.5	15.4	83.5

5-MW-16 (S)	As	Ni	Se
Jan-02*	ND	ND	ND
Fall-02	ND	ND	ND
Spr-03	2.3	ND	1.20
Spr-04	ND	12.8	ND

5-MW-22 (I)	As	Ni	Se
May-02*	ND	ND	ND
Fall-02	7.26	ND	ND
Win-03	ND	86.3	10.1
Spr-03	3.9	240	ND
Sum-03	ND	139	6.30
Fall-03	14.6	85.8	ND
Win-04	4.6	288	ND
Spr-04	4.81	368	ND

5-MW-4C (S)	As	Ni	Se
Jan-02*	NA	NA	NA
Fall-02	9.16	22.4	92.0
Win-03	ND	24.3	96.1
Spr-03	3.7	18.5	87.2
Sum-03	ND	20.6	101
Fall-03	4.4	17.9	88.6

5-MW-14 (D)	TCE	As	Ni	Se
Jan-02*	ND	ND	ND	116
Fall-02	ND	ND	ND	ND
Win-03	ND	ND	ND	10.7
Spr-03	ND	2.3	ND	ND
Sum-03	0.2	ND	ND	ND
Fall-03	ND	2.9	ND	ND
Win-04	ND	2.3	ND	ND
Spr-04	ND	4.83	ND	ND

5-MW-4B (S)	As	Ni	Se
Jan-02*	NA	NA	NA
May-02	ND	ND	90.9
Fall-02	6.74	23.5	87.1
Win-03	ND	27.9	94.3
Spr-03	3.3	19.0	87.3
Sum-03	ND	21.3	94
Fall-03	4.1	15.6	87.6

7-MW-6 (A)	As	Ni	Se
Jan-02*	47.5	ND	28.4
Fall-02	11.5	ND	ND
Spr-03	1.8	6.9	ND
Spr-04	ND	12	ND

5-MW-21 (I)	TCE	Ni	Se
May-02*	1.1	ND	ND
Fall-02	4.9	ND	ND
Win-03	0.80	ND	ND
Spr-03	0.50[a]	ND	ND
Sum-03	NA	ND	ND
Fall-03	ND	ND	ND
Win-04	ND	ND	ND
Spr-04	ND	ND	ND

5-MW-1 (A)	As	Ni	Se
Jan-02*	40.7	25.9	26.7
Fall-02	9.03	ND	ND
Win-03	ND	22.7	13.5
Spr-03	1.9	20.0	ND
Sum-03	ND	22.0	ND
Fall-03	1.2	15.3	ND
Win-04	ND	44.0	1.30
Spr-04	ND	92.2	ND

5-MW-3 (P)	TCE	As	Ni	Se
Jan-02*	ND	29.3	ND	19.5
Fall-02	5.1	9.55	14.6	ND
Win-03	0.66	ND	19.4	ND
Spr-03	0.32	ND	14.8	ND
Sum-03	1.06[a]	ND	18.1	ND
Fall-03	0.92	ND	10.4	ND
Win-04	0.89	ND	8.2	ND
Spr-04	0.71	ND	10	ND

5-MW-2 (A)	TCE	As	Ni	Se
Jan-02	ND	23.7	1,690	27.4
Fall-02	ND	7.99	2,520	10.2
Win-03	ND	ND	2,980	18.6
Spr-03	3.23	1.1	2,010	ND
Sum-03	2.8	ND	2,690	ND
Fall-03	ND	ND	2,390	ND
Win-04	ND	ND	2,530	1.20
Spr-04	ND	ND	2,550	ND

5-MW-7B (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Jan-02*	5,100	1.2	10.2	16	ND	31
Fall-02	3,900	ND	5.04	16.5	14.8	14.6
Win-03	3,900	2.0	ND	11.9	16.2	17.4
Spr-03	4,320	2.12	ND	11.2	22.9	13.8
Sum-03	3,540	3.32	ND	12.1	20.7	12.4
Fall-03	3,440	2.61	1.1	10.9	18.5	11.6
Win-04	3,460	3.12	ND	10.9	18.2	11.5
Spr-04	3,700	3.2	ND	9.28	21.4	13.3

5-MW-7T (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Jan-02*	3,100	0.75	11.1	18	ND	26.5
Fall-02	4,100	ND	ND	10.1	14.5	12.0
Win-03	4,100	ND	ND	10.9	15.4	18.2
Spr-03	4,620	2.45	ND	11.3	19.7	13.0
Sum-03	3,350	2.69	ND	10.9	17.3	8.20
Fall-03	3,420	2.66	ND	11.4	13.3	11.1
Win-04	3,650	3.22	ND	10.7	16.1	11.9
Spr-04	3,900	3	ND	9.91	15.6	13.2

LEGEND

- 425 — CONTOUR LINE, 25-FOOT INTERVALS (FEET ABOVE MSL, NAVD 1988)
- FENCE
- PAVED ROAD OR STREET
- DIRT ROAD
- DIRT TRAIL
- BUILDING
- CONCRETE OR PAVED AREAS
- UNLINED DRAINAGE ROUTE AND FLOW DIRECTION
- SITE BOUNDARY
- 5-MW-4 — GROUNDWATER MONITORING WELL
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT
- * — INSTALLED MICROPURGE PUMP
- ** — MONITORING WELL WITH INSUFFICIENT WATER FOR SAMPLING DURING TIME PERIOD REPRESENTED ON THIS FIGURE.
- DRY — WELL WAS DRY OR HAD INSUFFICIENT WATER FOR SAMPLING.
- a — RESULT WAS QUALIFIED FOR BLANK CONTAMINATION (B-QUALIFIED) AND IS SUSPECTED TO BE A FALSE POSITIVE.
- b — PROFESSIONAL JUDGMENT DETERMINED THAT THE DATA SHOULD BE REJECTED.

CONTOURS REPRESENT ESTIMATED EXTENT OF TCE CONCENTRATIONS IN GROUNDWATER IN µg/L (DASHED WHERE INFERRED).

- 5 — Estimated extent of 5 µg/L TCE
- 100 — Estimated extent of 100 µg/L TCE
- 1000 — Estimated extent of 1000 µg/L TCE

(A) SCREENED IN THE ALLUVIAL GROUNDWATER ZONE
(P) SCREENED IN THE PERCHED GROUNDWATER ZONE
(S) SCREENED IN THE SHALLOW GROUNDWATER ZONE
(I) SCREENED IN THE INTERMEDIATE GROUNDWATER ZONE
(D) SCREENED IN THE DEEP GROUNDWATER ZONE

NOTE(S): CONTOUR LINES INFERRED FROM HISTORIC CONCENTRATIONS. MONITORING WELLS 5-MW-3, 5-MW-13, 5-MW-14, AND 5-MW-21 NOT USED TO DEVELOP CONTOURS DUE TO SCREEN INTERVAL BEING IN A DIFFERENT AQUIFER. RESULTS FOR ALL COMPOUNDS ARE IN µg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. BTVs ARE AS FOLLOWS:
As – 7 µg/L
Ni – 490 µg/L
Se – 3 µg/L

N

0 550' 1100' 1650'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 5 CLUSTER
HISTORICAL ANALYTICAL RESULTS FOR BGMP KEY CONTAMINANTS OF CONCERN
JANUARY 2002 THROUGH SPRING 2004

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	12/5/05	RANDALL	TAB32 TAB35	5215	3A

5-MW-23 (I)	TCE	As	Ni	Se
Sum-04	ND	5.13	146	ND
Fall-04	ND	5.63	243	ND
Spr-05	ND	ND	246	ND
Sum-05	0.21	NA	NA	NA
Fall-05	ND	NA	NA	NA

5-MW-10 (S)	As	Cr(VI)	Ni	Se
Spr-05	ND	13.4	ND	ND

5-MW-18 (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Sum-04	5,000	590	ND	ND	ND	ND
Fall-04	3,600	510	ND	NA	ND	ND
Win-05	4,700	510	NA	NA	NA	NA
Spr-05	5,500	550	ND	ND	24	ND
Sum-05	5,300	460	NA	NA	NA	NA
Fall-05	5,400	510	NA	NA	NA	NA

5-MW-11 (S)	TCE	As	Ni	Se
Sum-04	20	ND	ND	ND
Fall-04	18	ND	ND	ND
Win-05	19	NA	NA	NA
Spr-05	23	ND	ND	ND
Sum-05	20	NA	NA	NA
Fall-05	21	NA	NA	NA

7-MW-3 (A)	Ni	Se
Spr-05	ND	ND

7-MW-4 (A)	As	Ni	Se
Spr-05	ND	ND	ND

7-MW-5 (A)	As	Ni	Se
Sum-04	6.14	ND	ND
Fall-04	ND	ND	ND
Spr-05	ND	ND	ND

5-MW-20 (S)	TCE	cis-1,2-DCE	As	Ni	Se
Sum-04	520	18	ND	225	ND
Fall-04	530	20	ND	343	ND
Win-05	650	20	NA	NA	NA
Spr-05	670	22	ND	384	ND
Sum-05	700	20	NA	NA	NA
Fall-05	670	19	NA	NA	NA

6-MW-1 (P)	TCE	As	Ni	Se
Sum-04	5.5	ND	57	20.3
Fall-04	7.8	ND	43.8	28.4
Win-05	0.56	NA	NA	NA
Spr-05	0.45	5.99	40[a]	26.4
Sum-05	7.7	NA	NA	NA
Fall-05	7.4	NA	NA	NA

5-MW-15 (S)	TCE	cis-1,2-DCE	As	Ni	Se
Sum-04	2,200	2,700	28.9	ND	ND
Fall-04	1,500	1,700	26.2	ND	ND
Win-05	2,400	2,100	NA	NA	NA
Spr-05	2,100	2,400	24.1	ND	ND
Sum-05	1,900	2,000	NA	NA	NA
Fall-05	2,200	2,500	NA	NA	NA

5-MW-22 (I)	As	Ni	Se
Sum-04	10.2	196	ND
Fall-04	8.85	116	ND
Spr-05	ND	538	ND

5-MW-14 (D)	TCE	As	Ni	Se
Sum-04	ND	4.45	ND	ND
Fall-04	0.42	ND	ND	ND
Spr-05	ND	ND	ND	ND

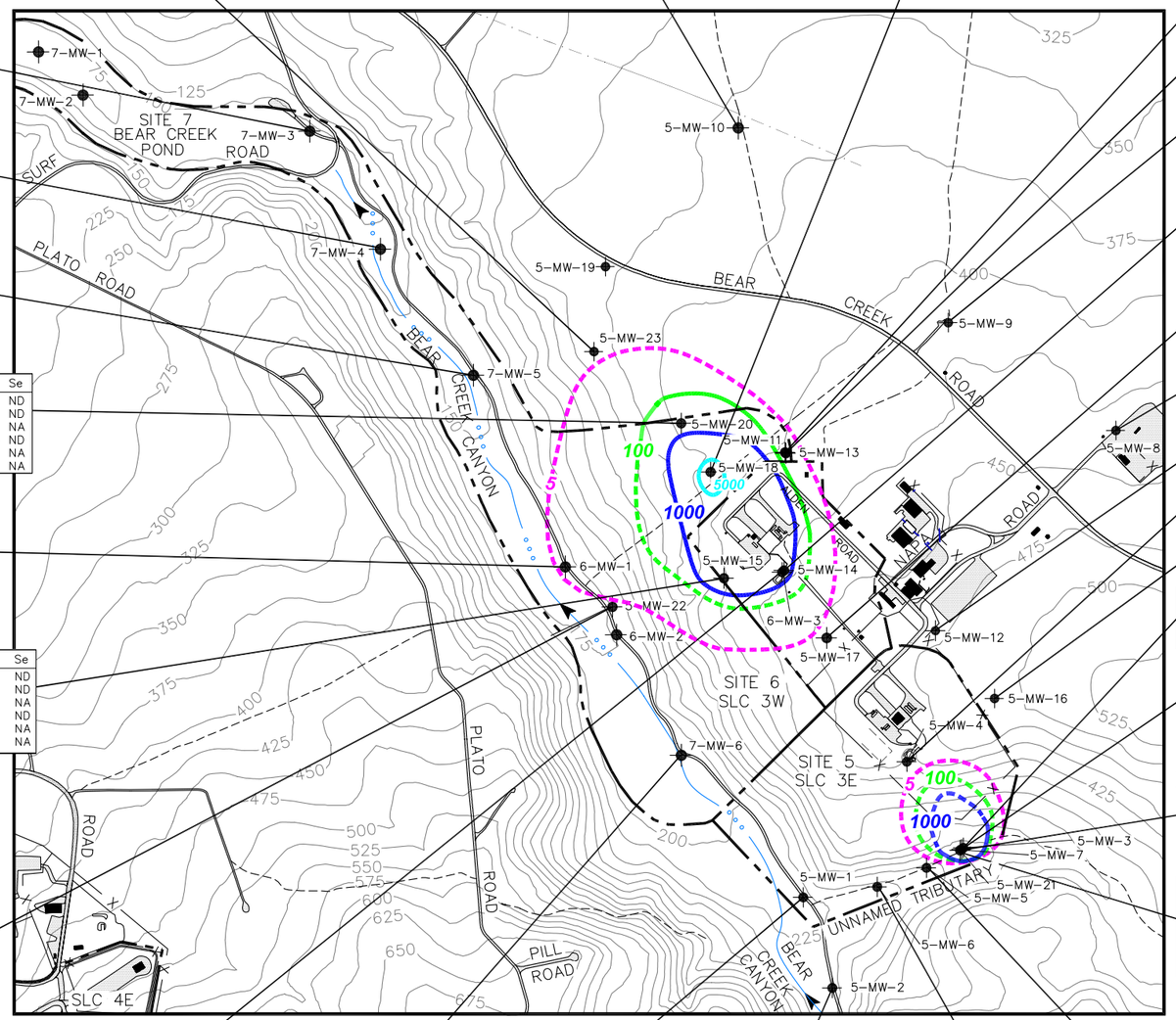
7-MW-6 (A)	As	Ni	Se
Spr-05	ND	ND	ND

5-MW-1 (A)	As	Ni	Se
Sum-04	ND	44.4	ND
Fall-04	ND	28.2	ND
Spr-05	ND	ND	ND

5-MW-2 (A)	TCE	As	Ni	Se
Sum-04	ND	ND	2,770	ND
Fall-04	5.9	ND	3,000	ND
Spr-05	ND	8.49	744	ND

5-MW-6 (P)	TCE
Sum-04	DRY
Fall-04	DRY
Win-05	1.9
Spr-05	0.27
Sum-05	0.27
Fall-05	DRY

5-MW-5 (P)	All Key VOCs
Sum-04	DRY
Fall-04	DRY
Win-05	ND
Spr-05	ND
Sum-05	DRY
Fall-05	DRY



5-MW-13 (D)	As	Ni	Se
Sum-04	ND	ND	ND
Fall-04	ND	ND	ND
Spr-05	ND	ND	ND

5-MW-9 (S)	As	Cr(VI)	Ni	Se
Spr-05	ND	3.94	ND	ND

6-MW-3 (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Sum-04	2,100	12	5.68	12.2	ND	6.32
Fall-04	2,400	12	ND	12.8	ND	9.39
Win-05	2,700	14	NA	11.4	NA	NA
Spr-05	2,200	12	ND	12.4	ND	7.89
Sum-05	1.800	8.2	NA	13.5	NA	NA
Fall-05	1,800	10	NA	13.6	NA	NA

5-MW-17 (S)	TCE	cis-1,2-DCE	As	Ni	Se
Sum-04	4.2	ND	ND	36.2	ND
Fall-04	4.2	ND	ND	29.6	ND
Win-05	3.5	ND	NA	NA	NA
Spr-05	3.4	ND	ND	72	ND
Sum-05	3	0.21	NA	NA	NA
Fall-05	2.7	ND	NA	NA	NA

5-MW-8 (S)	As	Cr(VI)	Ni	Se
Spr-05	ND	9.88	ND	ND

5-MW-12 (S)	As	Ni	Se
Spr-05	ND	36.7	ND

5-MW-4C (S)	As	Ni	Se
Spr-05	5.76	16.6	82.7

5-MW-16 (S)	As	Ni	Se
Spr-05	ND	13.2	ND

5-MW-3 (P)	TCE	As	Ni	Se
Sum-04	1.3	ND	11.2	ND
Fall-04	0.75	ND	ND	ND
Spr-05	ND	ND	ND	ND

5-MW-21 (I)	TCE	Ni	Se
Sum-04	ND	ND	ND
Fall-04	0.42	ND	ND
Win-05	0.22	NA	NA
Spr-05	ND	ND	ND
Sum-05	ND	NA	NA
Fall-05	ND	NA	NA

5-MW-7T (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Sum-04	4,200	3.3	ND	8.88	16.7	9.16
Fall-04	4,800	3.7	ND	8.14	17.5	16
Win-05	4,300	4.9	NA	8.21	NA	NA
Spr-05	4,000	5.5	ND	9.26	19.7	9.94
Sum-05	3,100	4.8	NA	9.91	NA	NA
Fall-05	3,900	5	NA	10.3	NA	NA

5-MW-7B (S)	TCE	cis-1,2-DCE	As	Cr (VI)	Ni	Se
Sum-04	4,500	3.3	ND	7.45	13.6	16
Fall-04	4,700	3.9	ND	7.7	19.1	17
Win-05	4,800	4.5	NA	7.84	NA	NA
Spr-05	4,400	5	ND	8.48	15.5	11.2
Sum-05	3,700	5.1	NA	9.28	NA	NA
Fall-05	3,600	5.1	NA	9.09	NA	NA

LEGEND

- 425 — CONTOUR LINE, 25-FOOT INTERVALS (FEET ABOVE MSL, NAVD 1988)
- x — FENCE
- PAVED ROAD OR STREET
- DIRT ROAD
- DIRT TRAIL
- BUILDING
- CONCRETE OR PAVED AREAS
- UNLINED DRAINAGE ROUTE AND FLOW DIRECTION
- SITE BOUNDARY
- 5-MW-4 — GROUNDWATER MONITORING WELL
- NA — NOT ANALYZED
- ND — NOT DETECTED; RESULT IS LESS THAN THE METHOD DETECTION LIMIT
- DRY — WELL WAS DRY OR HAD INSUFFICIENT WATER FOR SAMPLING.
- a — RESULT WAS QUALIFIED FOR BLANK CONTAMINATION (B QUALIFIED) AND IS SUSPECTED TO BE FALSE POSITIVE.

CONTOURS REPRESENT ESTIMATED EXTENT OF TCE CONCENTRATIONS IN GROUNDWATER IN µg/L (DASHED WHERE INFERRED).

- 5 — Estimated extent of 5 µg/L TCE
- 100 — Estimated extent of 100 µg/L TCE
- 1000 — Estimated extent of 1000 µg/L TCE
- 5000 — Estimated extent of 5000 µg/L TCE

(A) SCREENED IN THE ALLUVIAL GROUNDWATER ZONE
(P) SCREENED IN THE PERCHED GROUNDWATER ZONE
(S) SCREENED IN THE SHALLOW GROUNDWATER ZONE
(I) SCREENED IN THE INTERMEDIATE GROUNDWATER ZONE
(D) SCREENED IN THE DEEP GROUNDWATER ZONE

NOTE(S): CONTOUR LINES INFERRED FROM HISTORIC CONCENTRATIONS. MONITORING WELLS 5-MW-3, 5-MW-13, 5-MW-14, AND 5-MW-21 NOT USED TO DEVELOP CONTOURS DUE TO SCREEN INTERVAL BEING IN A DIFFERENT AQUIFER. RESULTS FOR ALL COMPOUNDS ARE IN µg/L. METALS RESULTS ARE FOR FILTERED GROUNDWATER. B-QUALIFIED DATA NOT SHOWN. BTVs ARE AS FOLLOWS:
As – 7 µg/L
Ni – 490 µg/L
Se – 3 µg/L

N

0 550' 1100' 1650'
SCALE

UNITED STATES AIR FORCE
VANDENBERG AIR FORCE BASE

SITE 5 CLUSTER
HISTORICAL ANALYTICAL RESULTS FOR
BGMP KEY CONTAMINANTS OF CONCERN
SUMMER 2004 THROUGH FALL 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	1/18/06	PRICHARD	TAB32 TAB35	5412	3B

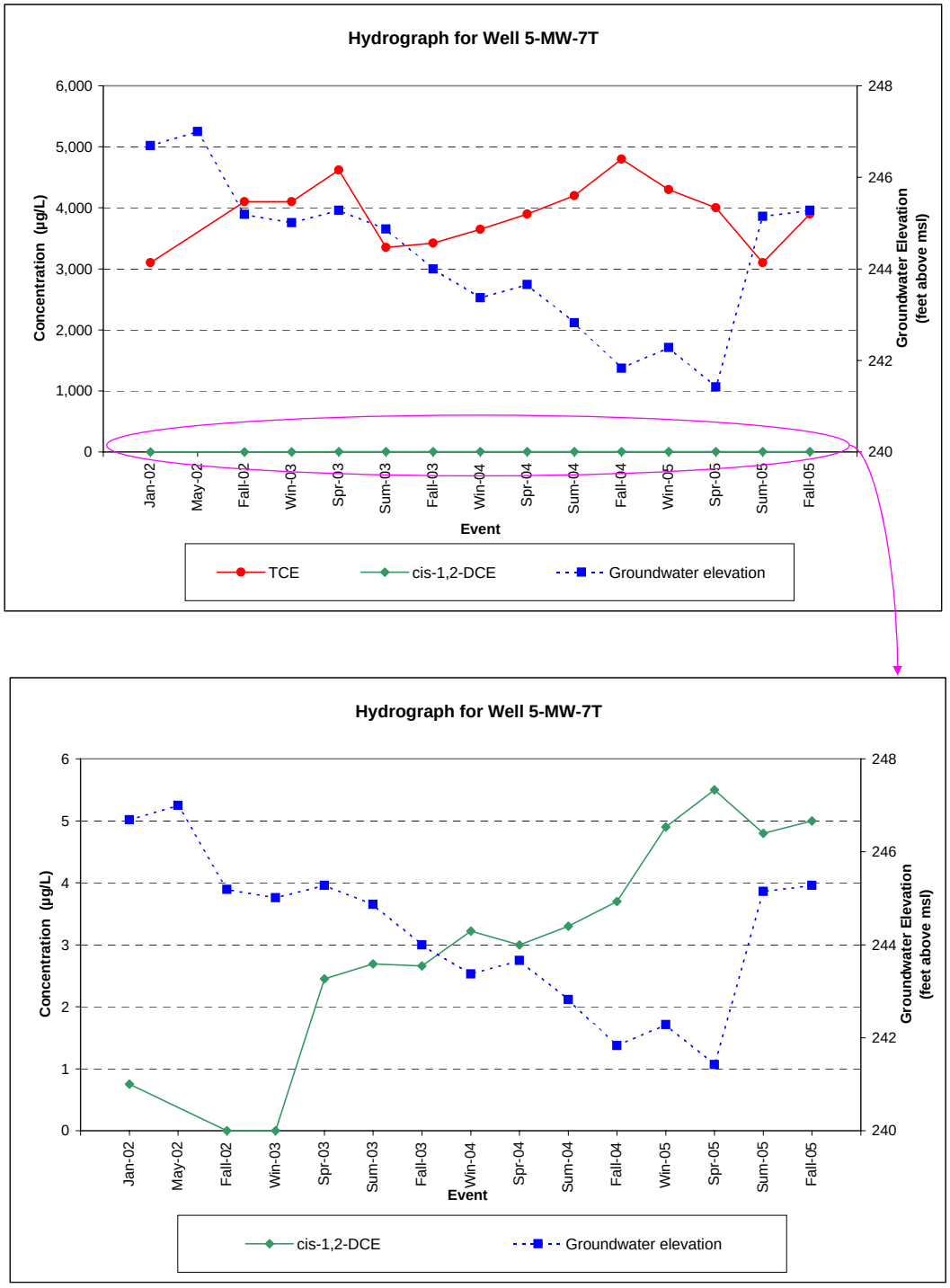


Figure 4. Groundwater Elevations and Concentrations of TCE and *cis*-1,2-DCE at Site 5 Cluster

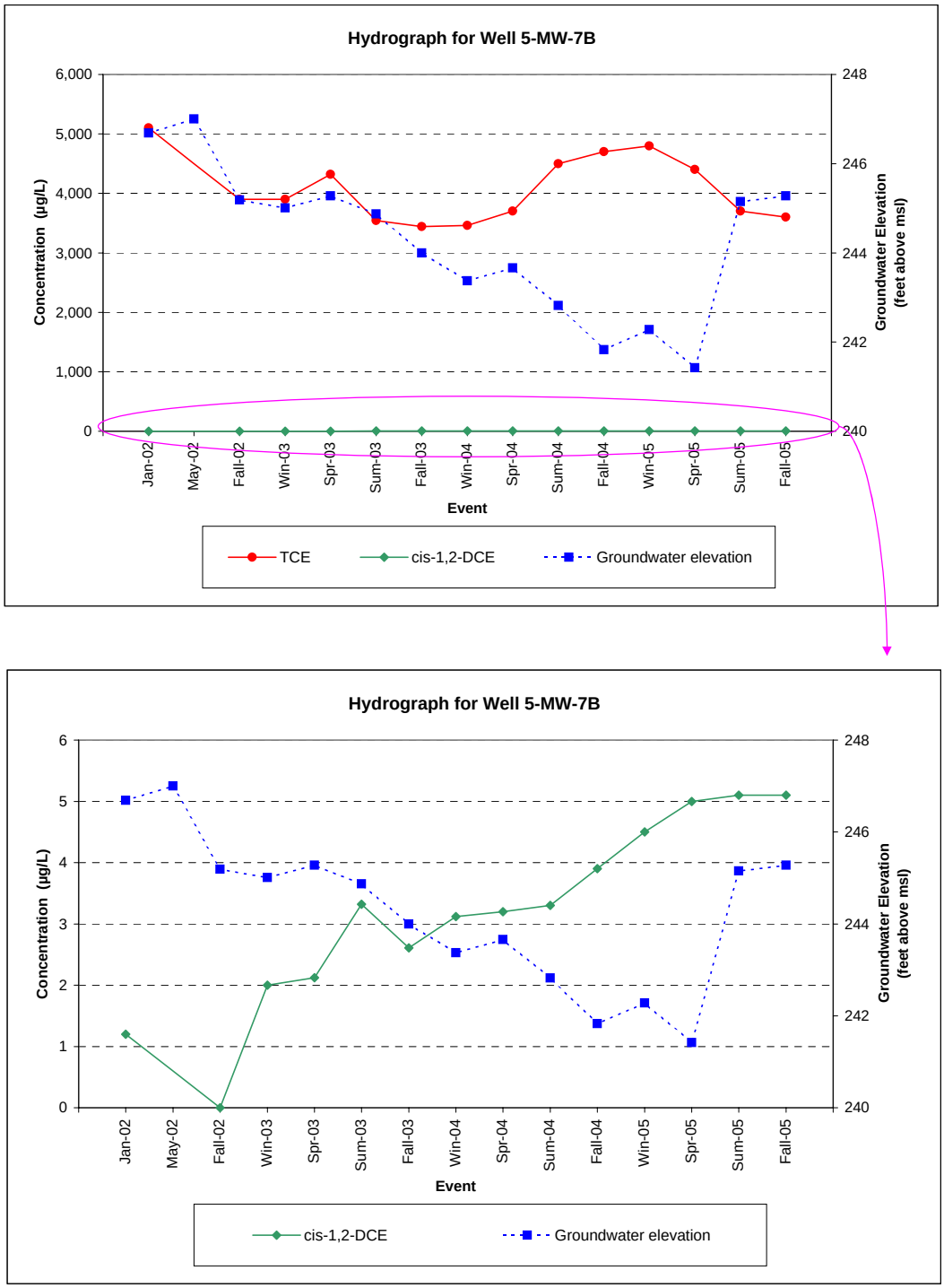
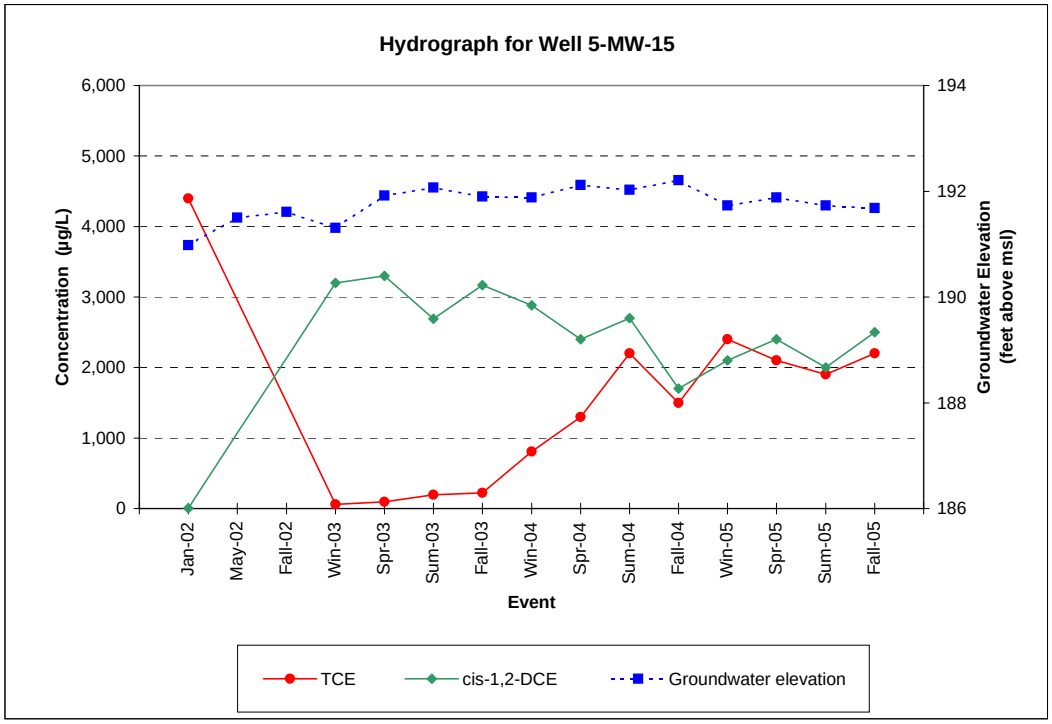


Figure 4 (cont.). Groundwater Elevations and Concentrations of TCE and *cis*-1,2-DCE at Site 5 Cluster



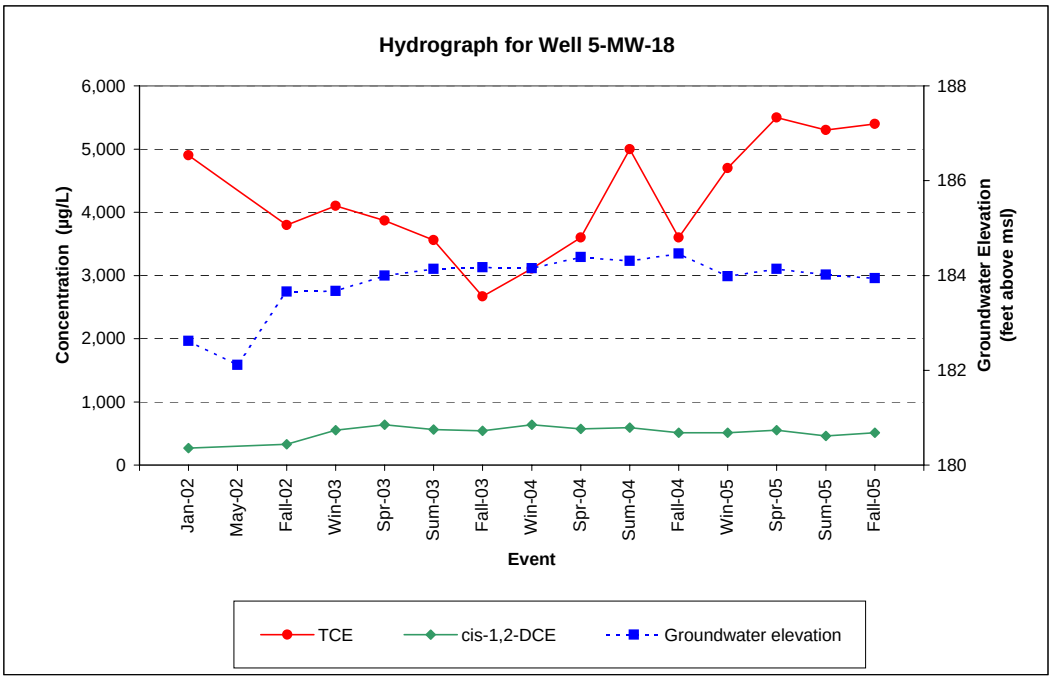
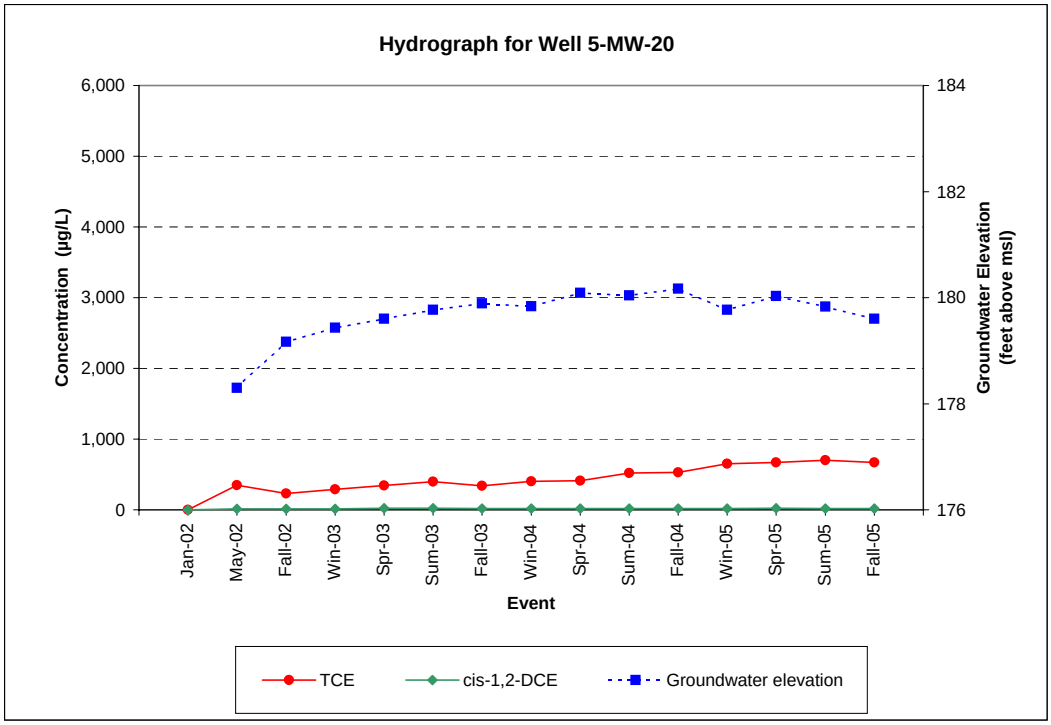


Figure 4 (cont.). Groundwater Elevations and Concentrations of TCE and *cis*-1,2-DCE at Site 5 Cluster



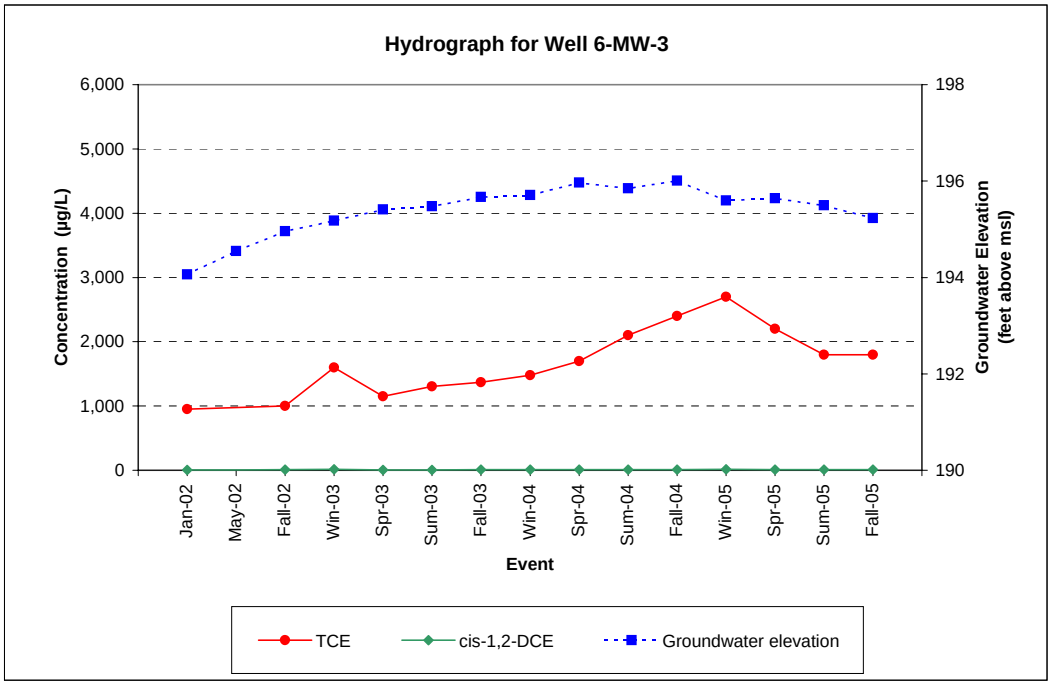


Figure 4 (cont.). Groundwater Elevations and Concentrations of TCE and *cis*-1,2-DCE at Site 5 Cluster

Table 1
Groundwater Elevations
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

Monitoring Well	Top of Casing Elevation (feet above msl)	Date Measured	Groundwater Depth (feet below TOC)	Groundwater Elevation (feet above msl)			
				Fall 2005	Summer 2005	Spring 2005	Winter 2005
		Fall 2005	Fall 2005				
5-MW-1	215.60	29-Nov-05	22.73	192.87	194.14	199.57	203.88
5-MW-2	245.48	29-Nov-05	32.36	213.12	213.34	215.23	224.85
5-MW-3	294.96	29-Nov-05	15.56	279.40	280.86	282.95	283.38
5-MW-4	443.52	29-Nov-05	234.57	208.95	208.92	208.69	208.41
5-MW-5	270.11	17-Nov-05	DRY	DRY	DRY	251.52	252.18
5-MW-6	245.84	17-Nov-05	DRY	DRY	225.26	230.76	227.24
5-MW-7	295.49	16-Nov-05	50.21	245.28	245.15	241.42	242.28
5-MW-8	443.35	29-Nov-05	309.18	134.17	134.12	134.00	NM
5-MW-9	419.45	29-Nov-05	265.06	154.39	154.35	154.34	NM
5-MW-10	359.82	29-Nov-05	207.75	152.07	152.09	152.02	NM
5-MW-11	405.25	15-Nov-05	218.24	187.01	187.03	187.25	187.14
5-MW-12	473.42	29-Nov-05	277.09	196.33	196.41	196.33	NM
5-MW-13	405.28	29-Nov-05	220.00	185.28	185.49	185.63	185.58
5-MW-14	416.93	29-Nov-05	224.62	192.31	192.54	192.67	192.64
5-MW-15	402.03	15-Nov-05	210.35	191.68	191.73	191.88	191.73
5-MW-16	509.24	29-Nov-05	314.24	195.00	194.87	194.64	NM
5-MW-17	462.68	15-Nov-05	261.23	201.45	201.48	201.53	201.28
5-MW-18	387.89	15-Nov-05	203.95	183.94	184.02	184.14	183.98
5-MW-19	350.16	29-Nov-05	184.99	165.17	165.34	165.37	NM
5-MW-20	384.32	16-Nov-05	204.72	179.60	179.83	180.03	179.77
5-MW-21	293.67	16-Nov-05	59.32	234.35	234.62	234.26	233.42
5-MW-22	174.69	29-Nov-05	9.97	164.72	164.73	165.32	165.93
5-MW-23	345.44	15-Nov-05	178.08	167.36	167.41	167.61	167.36
6-MW-1	165.71	17-Nov-05	7.76	157.95	157.92	158.10	158.52
6-MW-2	183.82	29-Nov-05	NM[1]	NM[1]	DRY	167.47	NM
6-MW-3	416.90	16-Nov-05	221.67	195.23	195.50	195.64	195.60
7-MW-1	54.44	29-Nov-05	NM[2]	NM[2]	NM[2]	NM[2]	NM
7-MW-2	78.02	29-Nov-05	15.68	62.34	62.52	NM[2]	NM
7-MW-3	88.20	29-Nov-05	9.30	78.90	78.60	79.16	NM
7-MW-4	102.80	29-Nov-05	NM[3]	NM[3]	NM[3]	NM[3]	NM[3]
7-MW-5	150.05	29-Nov-05	18.02	132.03	132.12	132.28	132.37
7-MW-6	189.43	29-Nov-05	3.38	186.05	186.11	186.17	NM

Definition(s):

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

Note(s):

1 - Roots were encountered in the well and no water level measurement was taken.
2 - Well is located in Bear Creek Pond and was submerged during sampling round.
3 - Artesian flow observed in well.

Table 2
Water Quality Parameters
Fall 2005
EPA Methods E300.0, E310.1, E353.3, E376.2, E415.1, and RSK175
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

Sampling Location			**6-MW-1**	**5-MW-4**	**5-MW-7**	**5-MW-7**	**5-MW-11**	**5-MW-15**	**5-MW-17**	**5-MW-18**	**5-MW-18**
Sample ID			**V6MW1**	**V5MW4C**	**V5MW7T**	**V5MW7B**	**V5MW11**	**V5MW15**	**V5MW17**	**V5MW18**	**V99W583 (D)**
Collection Date			**17-Nov-05**	**29-Nov-05**	**16-Nov-05**	**16-Nov-05**	**15-Nov-05**	**15-Nov-05**	**15-Nov-05**	**15-Nov-05**	**15-Nov-05**
Groundwater Zone			**Perched**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**
Laboratory Parameters (mg/L)	**MDL[2]**	**PQL[2]**									
Chloride	0.10	0.2	NA	NA	NA	NA	NA	127 g	NA	193 g	190 g
Sulfate	0.09	1.0	NA	NA	NA	NA	NA	52.5 g	NA	58.4 g	58.3 g
Alkalinity, total (as $CaCO_3$)	2.5	5.0	NA	NA	NA	NA	NA	194 g	NA	151 g	151 g
Nitrogen as nitrate + nitrite	0.02	0.1	NA	NA	NA	NA	NA	0.02 U g	NA	0.759 g	0.616 g
Total sulfide	0.1	1.0	NA	NA	NA	NA	NA	0.1 U g	NA	0.1 U g	0.1 U g
Total organic carbon	1.0	5.0	NA	NA	NA	NA	NA	2.09 J q	NA	1.08 J q	1.05 J q
Laboratory Parameters (µg/L)											
Ethane	0.8	2.0	NA	NA	NA	NA	NA	0.6 U g	NA	0.6 U g	0.6 U g
Ethene	0.9	2.0	NA	NA	NA	NA	NA	0.6 U g	NA	0.6 U g	0.6 U g
Methane	0.6	2.0	NA	NA	NA	NA	NA	270 g	NA	84 g	85 g
Field Parameters[1]:											
Temperature (°Celsius)	N/A	N/A	16.86	16.00	19.27	16.24	18.66	19.51	22.18	18.86	18.86
Conductivity (µmhos/cm)	N/A	N/A	462	777	681	636	658	741	609	941	941
pH	N/A	N/A	7.25	6.11	7.00	7.11	6.47	7.13	7.34	7.57	7.57
Turbidity (NTUs)	N/A	N/A	>200	42.6	4.28	2.85	0.69	1.39	5.56	1.15	1.15
Dissolved oxygen (mg/L)	N/A	N/A	4.65	7.74	0.51	0.65	7.86	1.48	3.04	1.92	1.92
Oxidation/reduction potential (mV)	N/A	N/A	193.0	-15.8	-132.7	-105.3	237.6	-18.3	132.3	31.0	31.0
Fe II (mg/L)	N/A	N/A	NM	NM	NM	NM	NM	3.0	NM	0.0	0.0

Sampling Location	**5-MW-20**	**6-MW-3**	**5-MW-21**	**5-MW-23**
Sample ID	**V5MW20**	**V6MW3**	**V5MW21M**	**V5MW23**
Collection Date	**16-Nov-05**	**16-Nov-05**	**16-Nov-05**	**15-Nov-05**
Groundwater Zone	**Shallow**	**Shallow**	**Intermediate**	**Intermediate**
Field Parameters[1]:				
Temperature (°Celsius)	16.54	17.09	17.64	17.26
Conductivity (µmhos/cm)	987	442	951	819
pH	8.91	6.48	8.44	7.80
Turbidity (NTUs)	1.61	0.71	10.0	4.60

Table 2
Water Quality Parameters
Fall 2005
EPA Methods E300.0, E310.1, E353.3, E376.2, E415.1, and RSK175
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
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.

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):

$CaCO_3$	-	calcium carbonate
(D)	-	duplicate sample
Fe II	-	ferrous iron
MDL	-	method detection limit
µg/L	-	micrograms per liter
µmhos/cm	-	micromhos per centimeter
mg/L	-	milligrams per liter
mV	-	millivolts
N/A	-	not applicable
NA	-	not analyzed
NM	-	not measured
NTU	-	nephelometric turbidity unit
PQL	-	practical quantitation limit
QAPP	-	Quality Assurance Project Plan

Note(s):

Fe II units of mg/L are equivalent to parts per million measured in the field.

1	-	All field parameters were measured immediately prior to sampling.
2	-	Values from QAPP Addendum (Tetra Tech 2004).

Table 3
Hexavalent Chromium in Groundwater
Fall 2005
EPA Method E218.6 (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

Sample Location	Sample ID	Collection Date	Groundwater Zone		Hexavalent Chromium	
				MDL[1]	0.1	
				PQL[1]	0.2	
5-MW-7	V5MW7T	16-Nov-05	Shallow		10.3	g
5-MW-7	V5MW7B	16-Nov-05	Shallow		9.09	g
6-MW-3	V6MW3	16-Nov-05	Shallow		13.6	g

Data Validity Comment(s):

g - The data met prescribed criteria as detailed in the QAPP.

Definition(s):

B - bottom of screened interval
MDL - method detection limit
µg/L - micrograms per liter
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
T - top of screened interval

Note(s):

1 - Values from QAPP Addendum (Tetra Tech 2004).

Table 4
VOCs in Groundwater
Fall 2005
EPA Method SW8260B (µg/L)
IRP Site 5 (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

Sample Location				**6-MW-1**	**5-MW-4**	**5-MW-7T**	**5-MW-7B**	**5-MW-11**	**5-MW-15**	**5-MW-17**
Sample ID				**V6MW1**	**V5MW4C**	**V5MW7T**	**V5MW7B**	**V5MW11**	**V5MW15**	**V5MW17**
Collection Date				**17-Nov-05**	**29-Nov-05**	**16-Nov-05**	**16-Nov-15**	**15-Nov-05**	**15-Nov-05**	**15-Nov-05**
Groundwater Zone				**Perched**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Shallow**
	MDL[1]	**PQL[1]**	**Primary MCL**							
1,1,2-TCA	0.28	1.0	5	0.2 U g	0.2 U g	0.2 J q	0.26 J q	0.2 U g	0.63 J q	0.2 U g
1,1-DCE	0.32	1.0	6	0.2 U g	0.2 U g	0.23 J q	0.24 J q	0.2 U g	2.6 g	0.2 U g
Chloroform	0.12	0.3	100 [2]	0.2 U g	0.2 U g	1.2 g	1.2 g	0.2 U g	1 g	0.2 U g
cis-1,2-DCE	0.21	1.0	6	0.2 U g	0.2 U g	5 g	5.1 g	0.2 U g	**2,500** g	0.2 U g
PCE	0.15	1.0	5	0.2 U g	0.2 U g	0.2 U g	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	3.6 g	0.2 U g
TCE	0.18	1.0	5	**7.4** g	0.2 U g	**3,900** g	**3,600** g	**21** g	**2,200** g	2.7 g
Vinyl chloride	0.36	1.0	0.5	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.2 U g	0.31 J q	0.2 U g
All other target analytes	N/A	N/A	N/A	ND	ND	ND	ND	ND	ND	ND

Sample Location				**5-MW-18**	**5-MW-18**	**5-MW-20**	**6-MW-3**	**5-MW-21**	**5-MW-23**
Sample ID				**V5MW18**	**V99W583 (D)**	**V5MW20**	**V6MW3**	**V5MW21M**	**V5MW23**
Collection Date				**15-Nov-05**	**15-Nov-05**	**16-Nov-05**	**16-Nov-05**	**16-Nov-05**	**15-Nov-05**
Groundwater Zone				**Shallow**	**Shallow**	**Shallow**	**Shallow**	**Intermediate**	**Intermediate**
	MDL[1]	**PQL[1]**	**Primary MCL**						
1,1,2-TCA	0.28	1.0	5	0.79 J q	0.83 J q	0.2 U g	0.2 U g	0.2 U g	0.2 U g
1,1-DCE	0.32	1.0	6	1.4 g	1.5 g	1.3 g	0.23 J q	0.2 U g	0.2 U g
Chloroform	0.12	0.3	100 [2]	12 g	11 g	0.66 g	0.91 g	0.2 U g	0.2 U g
cis-1,2-DCE	0.21	1.0	6	**510** g	**470** g	**19** g	**10** g	0.2 U g	0.2 U g
PCE	0.15	1.0	5	1.2 g	1.3 g	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	2.9 J f	2.1 J f	0.4 J q	0.2 U g	0.2 U g	0.2 U g
TCE	0.18	1.0	5	**5,400** g	**5,000** g	**670** g	**1,800** g	0.2 U g	0.2 U g
Vinyl chloride	0.36	1.0	0.5	0.2 U g	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	ND

Table 4
VOCs in Groundwater
Fall 2005
EPA Method SW8260B (µg/L)
IRP Site 5 (SLC 3E, SLC 3W, and Bear Creek Pond)
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.

Data Validity Comment(s):

f - The duplicate/replicate sample's relative percent difference was outside the control limit.
g - The data met prescribed criteria as detailed in the QAPP.
q - The analyte detection was below the PQL.

Definition(s):

B - bottom of screened interval
(D) - duplicate sample
DCE - dichloroethene
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
PCE - tetrachloroethane
PQL - practical quantitation limit
QAPP - Quality Assurance Project Plan
T - top of screened interval
TCA - trichloroethane
TCE - trichloroethene

Note(s):

Bold type indicates results that were above the MCL.
1 - Values from QAPP Addendum (Tetra Tech 2004).
2 - For total trihalomethanes (sum of bromoform, bromodichloromethane, chloroform, and dibromochloromethane).

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	TCE [a]														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	ND	NA	ND	ND	ND	0.59[b]	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-2	ND	NA	ND	ND	3.23	2.8	ND	ND	ND	ND	**5.9**	NA	ND	NA	NA
7-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-4	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-5	ND	NA	ND	ND	ND	0.55[b]	ND	ND	ND	ND	ND	NA	ND	NA	NA
7-MW-6	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perched Zone															
5-MW-3	ND	NA	**5.1**	0.66	0.32	1.06[b]	0.92	0.89	0.71	1.3	0.75	NA	ND	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	ND	ND	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	1.9	0.27	0.27	DRY
6-MW-1	1.8	NA	DRY	4.0	**9.96**	1.53	2.94	**14.8**	**19**	**5.5**	**7.8**	0.56	0.45	**7.7**	**7.4**
Shallow Zone															
5-MW-4T	ND	NA	ND	ND	ND	ND	0.91	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND
5-MW-4B	NA	ND	ND	ND	ND	0.12	ND	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	**3,100**	NA	**4,100**	**4,100**	**4,620**	**3,349**	**3,420**	**3,650**	**3,900**	**4,200**	**4,800**	**4,300**	**4,000**	**3,100**	**3,900**
5-MW-7B	**5,100**	NA	**3,900**	**3,900**	**4,320**	**3,543**	**3,440**	**3,460**	**3,700**	**4,500**	**4,700**	**4,800**	**4,400**	**3,700**	**3,600**
5-MW-8	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-11	**25**	NA	**18**	**17**	**17.8**	**17.29**	**15.5**	**15.2**	**19**	**20**	**18**	**19**	**23**	**20**	**21**
5-MW-12	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-15	**4,400**	NA	NA	**61**	**95.9**	**193.7**	**223**	**808**	**1,300**	**2,200**	**1,500**	**2,400**	**2,100**	**1,900**	**2,200**
5-MW-16	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-17	**6.5**	NA	**8.0**	**8.5**	**7.19**	**7.43**	**5.65**	**5.36**	4.1	4.2	4.2	3.5	3.4	3	2.7
5-MW-18	**4,900**	NA	**3,800**	**4,100**	**3,870**	**3,557**	**2,670**	**3,110**	**3,600**	**5,000**	**3,600**	**4,700**	**5,500**	**5,300**	**5,400**
5-MW-20	NA	**350**	**230**	**290**	**342**	**400**	**340**	**401**	**410**	**520**	**530**	**650**	**670**	**700**	**670**
6-MW-3	**950**	NA	**1,000**	**1,600**	**1,150**	**1,304**	**1,370**	**1,480**	**1,700**	**2,100**	**2,400**	**2,700**	**2,200**	**1,800**	**1,800**
Intermediate Zone															
5-MW-21	NA	1.1	4.9	0.80	ND	0.5[b]	ND	ND	ND	ND	0.42	0.22	ND	ND	ND
5-MW-22	NA	ND	ND	ND	ND	0.31[b]	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-23	NA	ND	ND	ND	ND	0.13[b]	ND	ND	ND	ND	ND	ND	ND	0.21	ND
Deep Zone															
5-MW-13	ND	NA	ND	ND	ND	0.12	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-14	ND	NA	ND	ND	ND	0.2	ND	ND	ND	ND	0.42	NA	ND	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	cis-1,2-DCE [c]														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	ND	NA	ND	ND	ND	0.16	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-2	ND	NA	ND	ND	ND	0.14	ND	ND	ND	ND	0.53	NA	ND	NA	NA
7-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-4	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-5	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
7-MW-6	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perched Zone															
5-MW-3	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	ND	ND	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	ND	ND	ND	DRY
6-MW-1	ND	NA	DRY	0.93	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Shallow Zone															
5-MW-4T	ND	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	ND	ND	ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND
5-MW-4B	NA	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	0.75	NA	ND	ND	2.45	2.69	2.66	3.22	3	3.3	3.7	4.9	5.5	4.8	5
5-MW-7B	1.2	NA	ND	2.0	2.12	3.32	2.61	3.12	3.2	3.3	3.9	4.5	5	5.1	5.1
5-MW-8	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-11	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5-MW-12	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-15	6.0	NA	NA	**3,200**	**3,300**	**2,693**	**3,170**	**2,880**	**2,400**	**2,700**	**1,700**	**2,100**	**2,400**	**2,000**	**2,500**
5-MW-16	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-17	ND	NA	ND	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	0.21	ND
5-MW-18	**270**	NA	**330**	**550**	**638**	**561.9**	**544**	**636**	**570**	**590**	**510**	**510**	**550**	**460**	**510**
5-MW-20	NA	**14**	**13**	**15**	**22.4**	**21.64**	**19.7**	**19.9**	**17**	**18**	**20**	**20**	**22**	**20**	**19**
6-MW-3	4.1	NA	**9.1**	**16**	**7.16**	**7.21**	**10.6**	**9.02**	**9.6**	**12**	**12**	**14**	**12**	**8.2**	**10**
Intermediate Zone															
5-MW-21	NA	ND	ND	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND
5-MW-22	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-23	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Deep Zone															
5-MW-13	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-14	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	Hexavalent Chromium														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perched Zone															
5-MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	NA	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	NA	NA	DRY
6-MW-1	ND	NA	DRY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Shallow Zone															
5-MW-4T	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	18	NA	10.1	10.9	11.3	10.9	11.4	10.7	9.91	8.88	8.14	8.21	9.26	9.91	10.3
5-MW-7B	16	NA	16.5	10.9	11.2	12.1	10.9	10.9	9.28	7.45	7.7	7.84	8.48	9.28	9.09
5-MW-8	10	NA	3.79	NA	5.57	NA	NA	NA	5.35	NA	NA	NA	9.88	NA	NA
5-MW-9	NA	NA	3.27	NA	3.49	NA	NA	NA	3.53	NA	NA	NA	3.94	NA	NA
5-MW-10	18	NA	11.1	NA	12.6	NA	NA	NA	13.5	NA	NA	NA	13.4	NA	NA
5-MW-11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-15	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-16	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-17	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-18	13	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA
5-MW-20	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6-MW-3	14	NA	15.3	13.9	14.2	14.4	14.3	14.9	12.8	12.2	12.8	11.4	12.4	13.5	13.6
Intermediate Zone															
5-MW-21	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-22	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-23	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Deep Zone															
5-MW-13	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-14	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	Dissolved Arsenic[d]														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	40.7	NA	9.03	ND	1.9	ND	1.2	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-2	23.7	NA	7.99	ND	1.1	ND	ND	ND	ND	ND	ND	NA	8.49	NA	NA
7-MW-1	NA	NA	14.1	NA	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	10.4	NA	6.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
7-MW-4	28.7	NA	7.71	NA	1.7	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
7-MW-5	16.5	NA	8.03	ND	2.9	ND	4.1	3.1	5.44	6.14	ND	NA	ND	NA	NA
7-MW-6	47.5	NA	11.5	NA	1.8	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
Perched Zone															
5-MW-3	29.3	NA	9.55	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	NA	DRY
6-MW-1	21.2	NA	DRY	5.64	2.5	ND	ND	ND	ND	ND	ND	NA	5.99	NA	NA
Shallow Zone															
5-MW-4T	17.3	NA	6.97	ND	3.9	ND	4.5	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	9.16	ND	3.7	ND	4.4	NA	NA	NA	NA	NA	5.76	NA	NA
5-MW-4B	NA	ND	6.74	ND	3.3	ND	4.1	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	11.1	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-7B	10.2	NA	5.04	ND	ND	ND	1.1	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-8	5.95	NA	ND	NA	2.8	NA	NA	NA	5.21	NA	NA	NA	ND	NA	NA
5-MW-9	7.85	NA	ND	NA	2.4	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-10	7.48	NA	ND	NA	1.3	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-11	13.2	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-12	12.4	NA	ND	NA	2.3	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-15	ND	NA	19.3	26.9	30.1	20.6	34.6	26.6	27.3	28.9	26.2	NA	24.1	NA	NA
5-MW-16	ND	NA	ND	NA	2.3	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-17	27.4	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-18	ND	NA	7.37	ND	3.1	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-20	NA	ND	6.32	ND	4.1	ND	1.6	ND	ND	ND	ND	NA	ND	NA	NA
6-MW-3	11.8	NA	5.19	ND	1.1	ND	1.4	ND	ND	5.68	ND	NA	ND	NA	NA
Intermediate Zone															
5-MW-21	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-22	NA	ND	7.26	ND	3.9	ND	14.6	4.6	4.81	10.2	8.85	NA	ND	NA	NA
5-MW-23	NA	ND	12.1	8.54	9.4	ND	7.5	6.2	7.86	5.13	5.63	NA	ND	NA	NA
Deep Zone															
5-MW-13	ND	NA	ND	ND	1.7	ND	1.6	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-14	ND	NA	ND	ND	2.3	ND	2.9	2.3	4.83	4.45	ND	NA	ND	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	Dissolved Nickel[e]														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	25.9	NA	ND	22.7	20.0	22.0	15.3	44.0	92.2	44.4	28.2	NA	ND	NA	NA
5-MW-2	**1,690**	NA	**2,520**	**2,980**	**2,010**	**2,690**	**2,390**	**2,530**	**2,550**	**2,770**	**3,000**	NA	**744**	NA	NA
7-MW-1	NA	NA	ND	NA	NA	10.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	ND	NA	ND	NA	NA	6.9	NA	NA	NA	NA	NA	NA	ND	NA	NA
7-MW-4	ND	NA	ND	NA	NA	5.8	NA	NA	ND	NA	NA	NA	ND	NA	NA
7-MW-5	ND	NA	ND	ND	5.4	5.2	5.7	ND	ND	ND	ND	NA	ND	NA	NA
7-MW-6	ND	NA	ND	NA	NA	6.9	NA	NA	12	NA	NA	NA	ND	NA	NA
Perched Zone															
5-MW-3	ND	NA	14.6	19.4	14.8	18.1	10.4	8.2	10	11.2	ND	NA	ND	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	NA	DRY
6-MW-1	80.5	NA	DRY	45.8	48.7	11.9	8.4	57.6	87.7	57	43.8	NA	40[b]	NA	NA
Shallow Zone															
5-MW-4T	NA	NA	20.7	19.2	19.6	20.2	15.4	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	22.4	24.3	18.5	20.6	17.9	NA	NA	NA	NA	NA	16.6	NA	NA
5-MW-4B	NA	ND	23.5	27.9	19	21.3	15.6	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	ND	NA	14.5	15.4	19.7	17.3	13.3	16.1	15.6	16.7	17.5	NA	19.7	NA	NA
5-MW-7B	ND	NA	14.8	16.2	22.9	20.7	18.5	18.2	21.4	13.6	19.1	NA	15.5	NA	NA
5-MW-8	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-9	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-10	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-11	ND	NA	ND	ND	11.1	7	10.1	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-12	ND	NA	**320**	NA	**120**	NA	NA	NA	44.3	NA	NA	NA	36.7	NA	NA
5-MW-15	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-16	ND	NA	ND	NA	ND	NA	NA	NA	12.8	NA	NA	NA	13.2	NA	NA
5-MW-17	ND	NA	ND	ND	ND	ND	ND	ND	18	36.2	29.6	NA	72	NA	NA
5-MW-18	ND	NA	ND	ND	ND	7.3	ND	ND	ND	ND	ND	NA	24	NA	NA
5-MW-20	NA	45.9	31.8	45.1	44.3	35.5	**167**	**143**	**190**	**225**	**343**	NA	**384**	NA	NA
6-MW-3	ND	NA	ND	ND	5.4	6.8	ND	ND	ND	ND	ND	NA	ND	NA	NA
Intermediate Zone															
5-MW-21	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-22	NA	ND	ND	86.3	**240**	**139**	85.8	**288**	**368**	**196**	**116**	NA	**538**	NA	NA
5-MW-23	NA	ND	ND	12.1	89.3	72.6	**131**	**101**	81.2	**146**	**243**	NA	**246**	NA	NA
Deep Zone															
5-MW-13	ND	NA	ND	ND	ND	5.1	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-14	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

	Dissolved Selenium[g]														
Sample Location	**Jan-02**	**May-02**	**Fall-02**	**Win-03**	**Spr-03**	**Sum-03**	**Fall-03**	**Win-04**	**Spr-04**	**Sum-04**	**Fall-04**	**Win-05**	**Spr-05**	**Sum-05**	**Fall-05**
Alluvial Zone															
5-MW-1	26.7	NA	ND	13.5	ND	ND	ND	1.30	ND	ND	ND	NA	ND	NA	NA
5-MW-2	27.4	NA	10.2	18.6	ND	ND	ND	1.20	ND	ND	ND	NA	ND	NA	NA
7-MW-1	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-2	NA	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-MW-3	ND	NA	9.29	NA	ND	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA
7-MW-4	58.4	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
7-MW-5	6.32	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
7-MW-6	28.4	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
Perched Zone															
5-MW-3	19.5	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-5	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	DRY	DRY
5-MW-6	NA	NA	DRY	NA	DRY	DRY	DRY	DRY	DRY	DRY	DRY	NA	ND	NA	DRY
6-MW-1	37.6	NA	DRY	63.7	27.2	19.5	19.4	32.0	44.6	20.3	28.4	NA	26.4	NA	NA
Shallow Zone															
5-MW-4T	NA	NA	87.4	92.9	87.6	90.3	83.5	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-4C	NA	NA	92.0	96.1	87.2	101	88.6	NA	NA	NA	NA	NA	82.7	NA	NA
5-MW-4B	NA	90.9	87.1	94.3	87.3	94.0	87.6	NA	NA	NA	NA	NA	NA	NA	NA
5-MW-7T	26.5	NA	12.0	18.2	13.0	8.20	11.1	11.9	13.2	9.16	16	NA	9.94	NA	NA
5-MW-7B	31	NA	14.6	17.4	13.8	12.4	11.6	11.5	13.3	16	17	NA	11.2	NA	NA
5-MW-8	9.95	NA	ND	NA	1.10	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-9	16.2	NA	ND	NA	1.20	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-10	26.5	NA	ND	NA	2.50	NA	NA	NA	5.49	NA	NA	NA	ND	NA	NA
5-MW-11	22.3	NA	ND	ND	ND	ND	1.10	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-12	30.5	NA	ND	NA	1.30	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-15	63.1	NA	11.6	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-16	ND	NA	ND	NA	1.20	NA	NA	NA	ND	NA	NA	NA	ND	NA	NA
5-MW-17	32.7	NA	ND	10.9	1.50	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-18	25	NA	ND	7.78	ND	ND	ND	1.20	ND	ND	ND	NA	ND	NA	NA
5-MW-20	NA	ND	ND	ND	ND	ND	1.10	2.20	ND	ND	ND	NA	ND	NA	NA
6-MW-3	16.9	NA	8.96	13.2	8.60	ND	4.50	7.40	7.31	6.32	9.39	NA	7.89	NA	NA
Intermediate Zone															
5-MW-21	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-22	NA	ND	ND	10.1	ND	6.30	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
Deep Zone															
5-MW-13	112	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA
5-MW-14	116	NA	ND	10.7	ND	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA

Table 5
Summary of BGMP Key Contaminants of Concern (µg/L)
IRP Site 5 Cluster (SLC 3E, SLC 3W, and Bear Creek Pond)
Vandenberg AFB, California

Definition(s):

BTV	- background threshold value
DCE	- dichloroethene
DRY	- Well was dry or had insufficient water for sampling.
MCL	- maximum contaminant level
µg/L	- micrograms per liter
NA	- not analyzed
ND	- Not detected; result is less than the method detection limit.
TCE	- trichloroethene

Note(s):

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

a	- The MCL for TCE is 5 µg/L.
b	- 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.
c	- The MCL for *cis*-1,2-DCE is 6 µg/L.
d	- The BTV and MCL for arsenic are 7 and 10 µg/L, respectively.
e	- The BTV and MCL for nickel are 490 and 100 µg/L, respectively.
f	- Professional judgement determined that the data should be rejected.
g	- The BTV and MCL for selenium are 3 and 50 µg/L, respectively.

APPENDIX A PURGE RECORDS

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Telefax (805) 681-3108

GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/29/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. VSTB1153 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-4C PID READING IN CASING (ppm) (initial) 0.0 (vented to) 0.0

SAMPLE I.D. VSMW4C DUPLICATE I.D. / COLLECTION TIME — PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 234.57 TOTAL WELL DEPTH (ft btoc) 271.1

WATER COLUMN (feet) 36.5 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 2.86 5 V (L) 14.3

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)
0905	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
0941	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.36
0946		235.53	15.70	775	6.03	71.8	7.33	-23.9	Cloudy	1.80	0.63	
0951		235.62	15.73	774	6.06	59.0	7.28	-20.7	Cloudy	3.60	1.26	
0956		235.78	15.77	774	6.09	54.3	7.66	-17.2	Cloudy	5.40	1.89	
1001		235.85	15.80	774	6.11	54.1	7.61	-16.6	Cloudy	7.20	2.52	
1006		235.90	15.79	773	6.12	52.2	7.64	-20.7	Cloudy	9.00	3.15	
1011		236.00	15.92	776	6.12	45.8	7.76	-15.7	Cloudy	10.80	3.78	
1016		236.00	15.93	775	6.12	46.5	7.76	-16.7	Cloudy	12.60	4.41	
1021	End Purge	236.03	16.00	777	6.11	42.6	7.74	-15.8	Cloudy	14.40	5.03	
1025	Sample											
1050	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 236.05 FILTER LOT # —

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

Comments: ① Upon arrival at well, 10' of tubing is cut so that pump is approximately 264.1 ft from bottom of well.
② Hole in cap should be drilled larger for W.L.M. probe to fit in.

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.

Form number Tt-O-049 (9/05)

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TETRA TECH, INC.
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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/17/05 SITE NUMBER 5C PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. — SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION 5-MW-5 PID READING IN CASING (ppm) (initial) ND (vented to) —

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

STATIC WATER LEVEL (ft btoc) 23.02 TOTAL WELL DEPTH (ft btoc) 23.3

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

WELL VOLUME (V) (gals) — 3 V (gals) — BAILER BOX # —

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)
930	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
—	Begin Purge	—	—	—	—	—	—	—	—	—	—	—	—
insufficient water for purging + sampling - no sample collected													
935	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: — FILTER LOT # —

Comments: —

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.

Form number Tt-O-050 (9/05)

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 11/17/05 SITE NUMBER 5C PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME B6MP TRIP BLANK I.D. — SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION 5-MW-6 PID READING IN CASING (ppm) (initial) ND (vented to) —

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

STATIC WATER LEVEL (ft btoc) 26.01 TOTAL WELL DEPTH (ft btoc) 26.6

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

WELL VOLUME (V) (gals) — 3 V (gals) — BAILER BOX # —

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)
940	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
—	Begin Purge	—	—	—	—	—	—	—	—	—	—	—	—
insufficient water for purging & sampling - no sample collected													
945	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: — FILTER LOT # —

Comments: —

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.

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/16/05 SITE NUMBER 5C

PROGRAM NAME BGMP TRIP BLANK I.D. VST31135

MONITORING WELL IDENTIFICATION 5-MW-7T

SAMPLE I.D. VSMW7T DUPLICATE I.D. / COLLECTION TIME —/—

STATIC WATER LEVEL (ft btoc) 55.04 TOTAL WELL DEPTH (ft btoc) 82.7

WATER COLUMN (feet) 27.7 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 6.15 5 V (L) 5.75

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) —

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)
—	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1335	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.15
1340		55.03	19.53	688	7.08	4.74	0.67	-114.1	clear	0.75	0.65	↓
1345		55.04	19.26	681	7.08	4.38	0.56	-122.7	clear	1.50	1.30	
1350		55.04	19.27	681	7.00	4.28	0.51	-132.7	clear	2.25	1.95	
1351	End Purge											
1400	Sample											
1410	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 55.04 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 11/16/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. V5TB1135 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-7B PID READING IN CASING (ppm) (initial) ND (vented to) —

SAMPLE I.D. V5MW7B DUPLICATE I.D. / COLLECTION TIME —/— PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 50.21 TOTAL WELL DEPTH (ft btoc) 82.7

WATER COLUMN (feet) 32.5 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 1.15 5 V (L) 5.75

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)
1200	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1209	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.27
1213		52.73	16.32	636	7.03	13.8	3.47	-95.0	clear	1.08	0.93	
1217		53.31	16.28	634	7.05	10.1	2.96	-101.7	clear	2.16	1.88	
1221		53.79	16.24	634	6.42	10.1	2.22	-163.4	clear	3.24	2.82	
1225		54.06	16.19	634	6.55	4.49	1.02	-154.4	clear	4.32	3.72	
1229		54.34	16.27	636	6.89	4.04	0.83	-133.2	clear	5.40	4.56	
1234		54.69	16.24	636	7.11	2.85	0.65	-105.3	clear	6.75	5.86	
1235	End Purge											
1240	Sample											
—												
—	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 54.69 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL FIELD DATA LOG SHEET - PURGING

DATE 11/15/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. 1131 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION ~~R-15~~ 5-MW-11 PID READING IN CASING (ppm) (initial) ND (vented to) ND

SAMPLE I.D. V5MWH DUPLICATE I.D. / COLLECTION TIME — / — PID READING IN BREATHING ZONE (ppm) ~~(initial)~~ ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 218.24 TOTAL WELL DEPTH (ft btoc) 238.7

WATER COLUMN (feet) 20.4 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 2.64 5 V (L) (J) ~~7.92~~ 132 Jongsok Cai

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)
1348	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1356	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.24
1402		218.51	18.45	676	7.15	0.72	8.03	125.3	clear	1.44	0.55	↓
1408		218.54	18.47	661	6.46	0.87	7.78	187.9	clear	2.88	1.10	
1414		218.54	18.53	656	6.45	0.86	7.87	214.6	clear	4.32	1.66	
1420		218.56	18.66	658	6.47	0.69	7.86	237.6	clear	5.76	2.18	↓
1421	End Purge											
1425	Sample											
1437	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 218.56 FILTER LOT # —

Comments: —

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.

Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/15/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. 1131 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-15 PID READING IN CASING (ppm) (initial) ND (vented to) ND

SAMPLE I.D. U5MW15 DUPLICATE I.D. / COLLECTION TIME -/- PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 210.35 TOTAL WELL DEPTH (ft btoc) 255.1

WATER COLUMN (feet) 44.8 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 2.61 5 V (L) ~~7.83~~ 13.05

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)
1132	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1142	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.12
1148		210.89	20.08	740	736	2.56	6.19	142.6	clear	0.72	0.28	
1154		211.08	19.78	739	7.25	2.28	4.18	141.7	clear	1.44	0.45	
1200		211.27	19.66	741	7.16	1.79	2.62	115.8	clear	2.16	0.83	
1206		211.44	19.62	742	7.12	1.85	1.91	42.5	clear	2.88	1.10	
1212		211.55	19.51	741	7.13	1.39	1.48	-18.3	clear	3.60	1.34	
1213	End Purge											
1215	Sample											
1228	Vacated well	—	—	—	—	—	—	—	—	—	—	—

Fe+2 (ppm) 3.0 Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 211.60 FILTER LOT # —

Comments: —

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.

Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/15/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. 1131 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-17 PID READING IN CASING (ppm) (initial) ND (vented to) ND

SAMPLE I.D. V5MW17 DUPLICATE I.D. / COLLECTION TIME -/- PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 261.23 TOTAL WELL DEPTH (ft btoc) 327.1

WATER COLUMN (feet) 65.9 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 3.19 5 V (L) ~~19.97~~ 15.95

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)
0957	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1016	Begin Purge	—	—	—	—	—	—	—	—	—	—	0-10
1026		261.86	21.65	618	7.35	2.43	6.88	69.0	clear	1.0	0.31	
1036		262.05	22.06	618	7.34	2.46	5.84	108.9	clear	2.0	0.62	
1046		262.22	22.15	617	7.35	4.71	4.13	124.6	clear	3.0	0.93	
1056		262.45	22.15	612	7.31	5.06	3.71	132.6	clear	4.0	1.26	
1106		262.64	22.15	609	7.34	5.56	3.04	132.3	clear	5.0	1.58	
1107	End Purge											
1110	Sample											
1115	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 262.78 FILTER LOT # —

Comments: Turbidity stable @ ~9ppm.

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.

Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/15/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. 1131 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-18 PID READING IN CASING (ppm) (initial) ND (vented to) ND

SAMPLE I.D. V5MW18 DUPLICATE I.D. / COLLECTION TIME V99W583/1700 PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) ND

STATIC WATER LEVEL (ft btoc) 203.95 TOTAL WELL DEPTH (ft btoc) 252.2

WATER COLUMN (feet) 48.3 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 2.70 5 V (L) ~~8.10~~ 13.5 Jogsokari

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)
1241	Arrived at well											
1252	Begin Purge											0.14
1258		204.46	18.90	944	7.55	0.81	8.17	7.8	clear	0.84	0.31	
1304		204.67	18.76	943	7.51	0.59	6.55	40.4	clear	1.68	0.62	
1310		204.94	18.73	940	7.56	0.66	3.41	40.0	clear	2.52	0.93	
1316		205.16	18.86	941	7.57	1.15	1.92	36.0	clear	3.36	1.24	
1317	End Purge											
1320	Sample											
1342	Vacated well											

Fe+2 (ppm) 0.0 Taken immediately before sampling.

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 205.24 FILTER LOT # —

Comments: —

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.

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Form number Tt-O-049 (9/05)

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GROUNDWATER MONITORING WELL
FIELD DATA LOG SHEET - PURGING

DATE 11/16/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. VS TB1135 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-20 PID READING IN CASING (ppm) (initial) ND (vented to) —

SAMPLE I.D. VSMW20 DUPLICATE I.D. / COLLECTION TIME —/— PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 204.72 TOTAL WELL DEPTH (ft btoc) 242.5

WATER COLUMN (feet) 37.8 TUBING DIAMETER (in) 1/4 SAMPLER'S SIGNATURE [signature]

PUMP & TUBING (V) (L) 1.32 5 V (L) 6.6

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)
0915	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
0933	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.12
0938		205.28	16.13	981	8.57	2.63	4.17	-113.6	clear	0.6	0.45	↓
0943		205.42	16.21	981	8.71	2.43	3.10	-127.6	clear	1.2	0.91	
0948		205.60	16.31	983	8.94	1.17	2.65	-124.7	clear	1.8	1.36	
0953		205.78	16.28	982	8.98	1.00	2.50	-123.7	clear	2.4	1.81	
0958		205.91	16.54	987	8.91	1.61	2.44	-173.3	clear	3.0	2.27	
0959	End Purge	—										
1005	Sample	—										
1020	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 205.91 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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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 11/16/05 SITE NUMBER 5C

PROGRAM NAME BG MP TRIP BLANK I.D. VSTB1135

MONITORING WELL IDENTIFICATION 5-MW-21

SAMPLE I.D. VSMW21M DUPLICATE I.D. / COLLECTION TIME —/—

STATIC WATER LEVEL (ft btoc) 59.32 TOTAL WELL DEPTH (ft btoc) 133.1

WATER COLUMN (feet) 73.8 TUBING DIAMETER (in) 1/4

PUMP & TUBING (V) (L) 0.74 5 V (L) 3.7

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) —

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)
1100	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1121	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.15
1124		59.91	16.96	934	8.25	30.3	0.76	-161.3	clear	0.45	0.61	
1127		60.06	16.98	936	8.28	37.1	0.47	-166.4	clear	0.90	1.21	
1130		60.18	17.03	937	8.30	34.2	0.41	-169.9	clear	1.35	1.82	
1133		60.30	17.05	938	8.33	22.4	0.37	-174.5	clear	1.80	2.43	
1136		60.40	17.11	939	8.33	15.5	0.34	-174.8	clear	2.25	3.04	
1139		60.50	17.25	941	8.29	11.5	0.33	-175.7	clear	2.70	3.64	
1142		60.60	17.40	945	7.96	10.7	0.26	-220.1	clear	3.15	4.25	
1145		60.71	17.55	949	8.40	10.4	0.28	-175.8	clear	3.60	4.86	
1148		60.80	17.64	951	8.44	10.0	0.28	-165.3	clear	4.05	5.47	
1149	End Purge											
1155	Sample											
1200	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 60.80 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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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 11/15/05 SITE NUMBER 5C PURGING DEVICE MICROPURGE DEDICATED PUMP

PROGRAM NAME BGMP TRIP BLANK I.D. VSTB1131 SAMPLING DEVICE MICROPURGE DEDICATED PUMP

MONITORING WELL IDENTIFICATION 5-MW-23 PID READING IN CASING (ppm) (initial) 4.2 (vented to) 0.0

SAMPLE I.D. V5MW23 DUPLICATE I.D. / COLLECTION TIME -/- PID READING IN BREATHING ZONE (ppm) (initial) 0.0 (vented to) 0.0

STATIC WATER LEVEL (ft btoc) 178.08 TOTAL WELL DEPTH (ft btoc) 242.6

WATER COLUMN (feet) 64.5 TUBING DIAMETER (in) 3/8 SAMPLER'S SIGNATURE

PUMP & TUBING (V) (L) 2.61 5 V (L) 7.83

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)
1300	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1319	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.16
1329		178.72	18.79	852	7.55	2.14	8.49	-96.1	clear	1.6	0.61	0.16
1334		178.95	18.27	837	7.55	5.09	5.01	-102.7	clear	2.4	0.92	0.16
1339		179.15	17.86	830	7.67	11.9	2.97	-111.8	clear	3.2	1.23	0.16
1344		179.32	17.83	828	7.73	6.4	2.39	-122.8	clear	4.0	1.53	0.16
1349		179.48	17.67	824	7.77	8.11	2.08	-127.2	clear	4.8	1.84	0.16
1354		179.60	17.13	819	7.80	6.43	1.61	-128.3	clear	5.6	2.15	0.16
1359		179.73	17.26	819	7.80	4.60	1.48	-129.3	clear	6.4	2.45	0.16
1405	Sample	—										
1415	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 179.86 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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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 11/17/05 SITE NUMBER 5C PURGING DEVICE 2" SUBMERSIBLE GRUNDFOS PUMP

PROGRAM NAME B6MP TRIP BLANK I.D. VSTB1138 SAMPLING DEVICE DISPOSABLE TEFLON BAILER

MONITORING WELL IDENTIFICATION 6-MW-1 PID READING IN CASING (ppm) (initial) 0.2 (vented to) ND

SAMPLE I.D. V6MW1 DUPLICATE I.D. / COLLECTION TIME — PID READING IN BREATHING ZONE (ppm) (initial) ND (vented to) —

STATIC WATER LEVEL (ft btoc) 7.76 TOTAL WELL DEPTH (ft btoc) 16.6

WATER COLUMN (feet) 8.84 CASING DIAMETER (in) 4 SAMPLER'S SIGNATURE

WELL VOLUME (V) (gals) 5.75 3 V (gals) 17.24 BAILER BOX # 196

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)
950	Arrived at well	—	—	—	—	—	—	—	—	—	—	—	—
958	Begin Purge	—	13	—	—	—	—	—	—	—	—	—	1.0
1003	—	9.33	13	17.56	444	6.21	+200	2.27	198.2	Brown	5	0.87	1.0
1008	—	9.43	13	17.79	459	6.26	189	1.37	108.9	Brown	10	1.74	1.0
1013	—	9.45	13	17.82	460	6.26	155	1.08	117.6	Brown	15	2.61	1.0
1018	—	9.47	13	17.81	458	6.33	159	1.01	122.1	Brown	20	3.48	1.0
1023	—	9.48	13	17.82	457	6.30	150+	0.97	129.6	Brown	25	4.35	1.0
1028	End Purge	9.49	13	17.88	456	6.30	150+	0.98	133.1	Brown	30	5.22	1.0
1030	SAMPLE	8.89	—	16.86	462	7.25	207	4.65	193.0	Brown	—	—	—
1040	Vacated well	—	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 8.89 FILTER LOT # —

Comments:

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.

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 11/16/05 SITE NUMBER 5C

PROGRAM NAME BGMP TRIP BLANK I.D. VSTB1135

MONITORING WELL IDENTIFICATION 6-MW-3

SAMPLE I.D. V6MW3 DUPLICATE I.D. / COLLECTION TIME -/-

STATIC WATER LEVEL (ft btoc) 221.67 TOTAL WELL DEPTH (ft btoc) 244.8

WATER COLUMN (feet) 23.1 TUBING DIAMETER (in) 3/8

PUMP & TUBING (V) (L) 2.69 5 V (L) 13.45

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) —

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)
1425	Arrived at well	—	—	—	—	—	—	—	—	—	—	—
1446	Begin Purge	—	—	—	—	—	—	—	—	—	—	0.25
1450		221.98	17.20	444	6.50	1.93	4.78	-66.7	Clear	1.0	0.37	↓
1454		221.87	17.18	443	6.41	1.02	4.72	-67.2	Clear	2.0	0.73	
1458		221.99	17.12	443	6.47	0.87	4.93	-64.2	Clear	3.0	1.11	
1502		222.05	17.09	442	6.48	0.71	5.17	-62.9	Clear	4.0	1.48	
1503	End Purge											
1505	Sample											
	Vacated well	—	—	—	—	—	—	—	—	—	—	—

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

WATER LEVEL (ft btoc) AT TIME OF SAMPLING: 222.06 FILTER LOT # —

Comments:

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.

Form number Tt-O-049 (9/05)

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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

A2/rw08-17

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

05K138

CHAIN OF CUSTODY RECORD

SITE 5C DATE 11/15/05 PAGE 1 OF 1

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
1.	V5TB1131	11/15/05	0815	X																	W	G	2		
2.	V5MW17	↓	1110	X																	↓	G	3		
3.	V5MW11		1425	X																		G	3		
4.	V99W583		1700	X								X	X	X	X							G	9		
5.	V5MW15		1215	X								X	X	X	X							G	9		
6.	V5MW18		1320	X								X	X	X	X							G	9		
7.	V5MW23		1405	X																		G	3		

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

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

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
Dave Fenity	Dave Fenity	TETRA TECH, INC.	11/16/05	1005	38
RECEIVED BY: GEORGE Cim	SIGNATURE:	COMPANY: EMAX	DATE: 11/16/05	TIME: 10:10	METHOD OF SHIPMENT: Courier
RELINQUISHED BY: GEORGE Cim	SIGNATURE:	COMPANY: EMAX	DATE: 11/16/05	TIME: 12:15	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: SITNIKOV	SIGNATURE:	COMPANY: EMAX	DATE: 11.16.05.	TIME: 12:15	

T = 3.6°C

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

05K145

CHAIN OF CUSTODY RECORD

SITE 5C DATE 11/16/05 PAGE 1 OF 1

e2

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

TURN-AROUND TIME: Standard

OBSERVATIONS/COMMENTS: Hexachrome 24-Hour Hold Time

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	U5MW7B	11/16/05	1240								X						W	P	1	
2	U5MW7T	11/16/05	1400								X						W	P	1	
3	U6MW3	11/16/05	1505								X						W	P	1	

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

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

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

T = 3.4 °C

TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:
P. Leonard		TETRA TECH, INC.	11/16/05	1535
RECEIVED BY: Matt Peterson				
RELINQUISHED BY:				
RECEIVED BY: JON LUNA		EMAX	11/17/05	0930

TOTAL NUMBER OF CONTAINERS: 3

METHOD OF SHIPMENT: Fed Ex

SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS: 24 Hour Hold Time

1001

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

05K15T

CHAIN OF CUSTODY RECORD

SITE 5C DATE 11/16/05 PAGE 1 OF 1

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
1.	V5MW7B	11/16/05	1240	X													W	G	3		
2.	V5TB1135	11/16/05	0810	X													W	G	2		
3.	V5MW7T	↓	1400	X													W	G	3		
4.	V6MW3	↓	1505	X													W	G	3		
5.	V5MW20	↓	1005	X													W	G	3		
6.	V5MW21M	↓	1155	X													W	G	9		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.
T=3.0°C
TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:	TOTAL NUMBER OF CONTAINERS
Brian Dow		TETRA TECH, INC.	11/17/05	1040	23
RECEIVED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	METHOD OF SHIPMENT
GEORGE LIM		EMAX	11/17/05	10:40	Courier
RELINQUISHED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
GEORGE LIM		EMAX	11/17/05	13:15	
RECEIVED BY:	SIGNATURE:	COMPANY:	DATE:	TIME:	
SITNIKOV		EMAX	11.17.05.	13:15	

1001

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

VW09-16

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

05K169

CHAIN OF CUSTODY RECORD

SITE 5c DATE 11/17/05 PAGE 1 OF 1

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
1	V6MW1	11/17/05	1030	X													W	G	3		
2	V5TB1138	11/17/05	0810	X													W	G	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
Matt Hovlahan	Matt Hovlahan	TETRA TECH, INC.	11/18/05	1015	5 OF 5
RECEIVED BY: GEORGE LIM	SIGNATURE:	COMPANY: EMAX	DATE: 11/18/05	TIME: 10:20	METHOD OF SHIPMENT
RELINQUISHED BY: GEORGE LIM	SIGNATURE:	COMPANY: EMAX	DATE: 11/18/05	TIME: 13:15	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: Jon Luna	SIGNATURE:	COMPANY: emax	DATE: 11/18/05	TIME: 1315	

T = 3.7°C

1001

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

VW01-36

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

05K212

CHAIN OF CUSTODY RECORD

SITE SC DATE 11/29/05 PAGE 1 OF 1

CLIENT: Vandenberg, AFB
PROJECT NAME: BGMP
PROJECT MANAGER: Kevin McNamara
TC#: T99105-06
SAMPLERS (Signatures)
X Matthew M. Hahn
X Dave Tenly

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
1	VSTB1153	11/29/05	0805	X													W	G	2		
2	VSMW4C	11/29/05	1025	X													W	G	3		

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

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

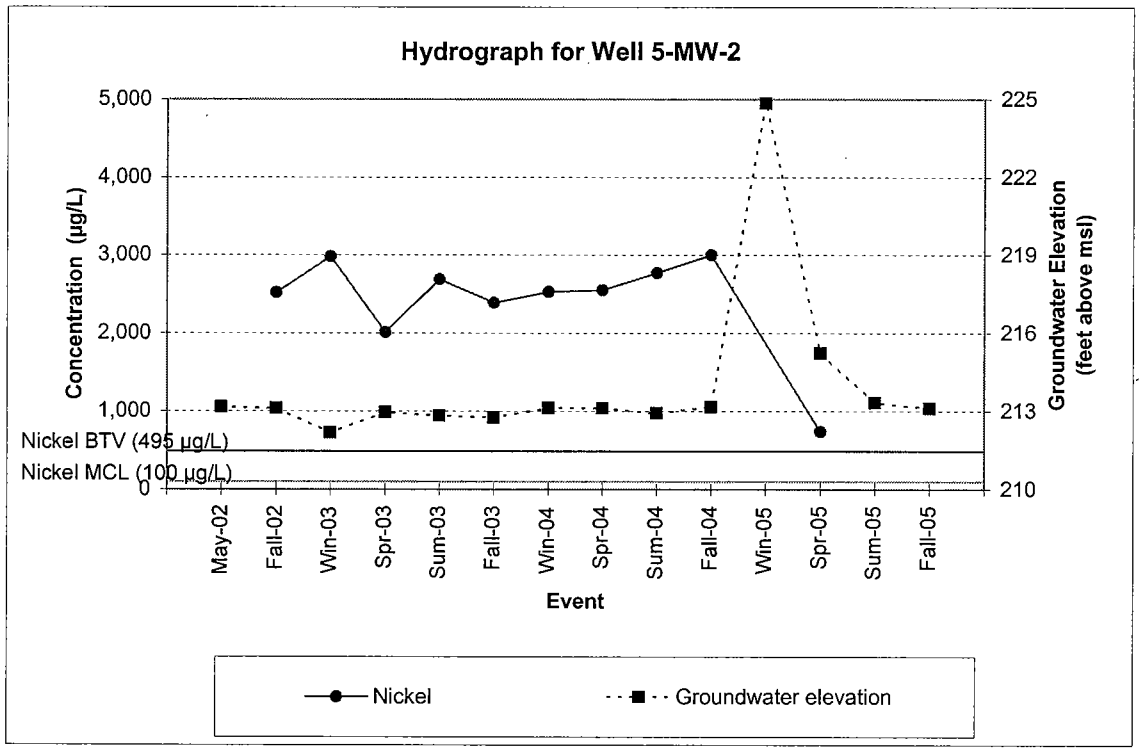
PRESERVATIVES: All samples are preserved at 4° C. Water samples are preserved as indicated on the sample labels.

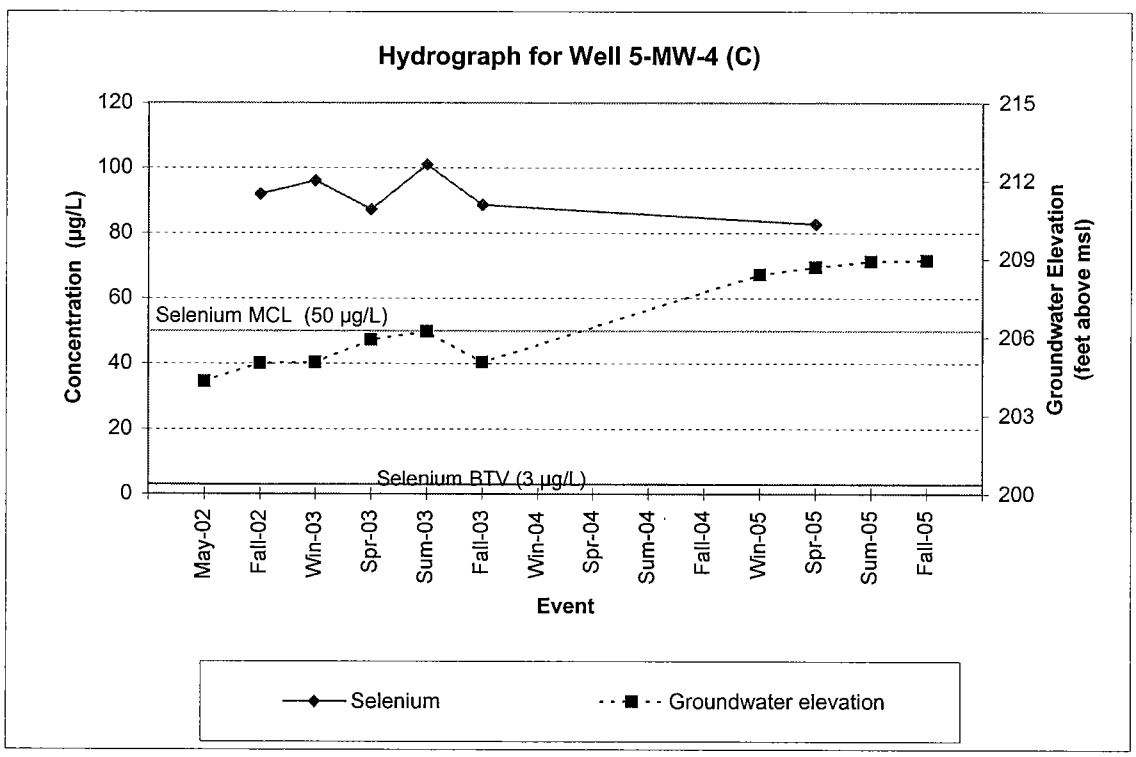
TEMPERATURE BLANK EACH COOLER: YES NO

RELINQUISHED BY:	SIGNATURE:		DATE:	TIME:	TOTAL NUMBER OF CONTAINERS
Joachim Eberharter		TETRA TECH, INC.	11/30/05	1015	5
RECEIVED BY: GEORGE LIM	SIGNATURE:	COMPANY: EMAX	DATE: 11/30/05	TIME: 10:05	METHOD OF SHIPMENT
RELINQUISHED BY: GEORGE LIM	SIGNATURE:	COMPANY: EMAX	DATE: 11/30/05	TIME: 12:15	SPECIAL SHIPMENT/HANDLING/STORAGE REQUIREMENTS:
RECEIVED BY: INDRA PATEL	SIGNATURE:	COMPANY: EMAX	DATE: 11/30/05	TIME: 12:15	

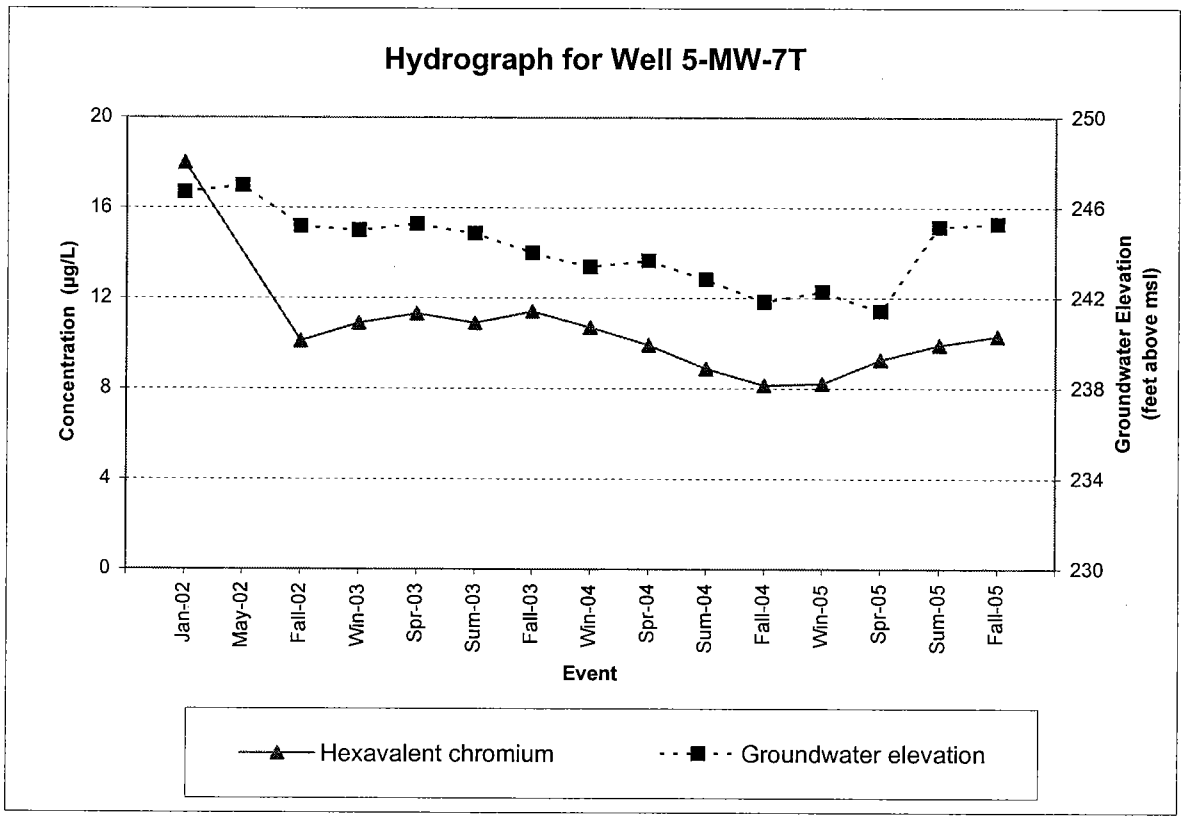
1001

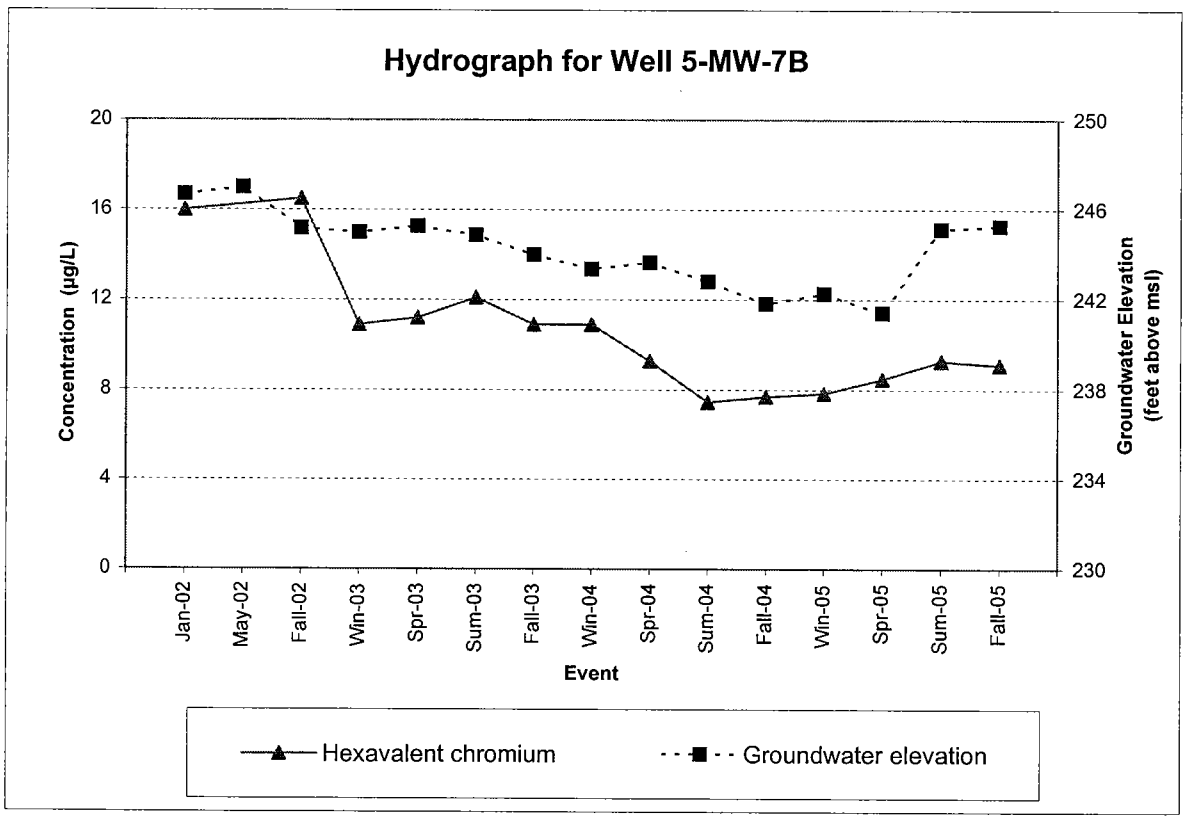
APPENDIX C HYDROGRAPHS



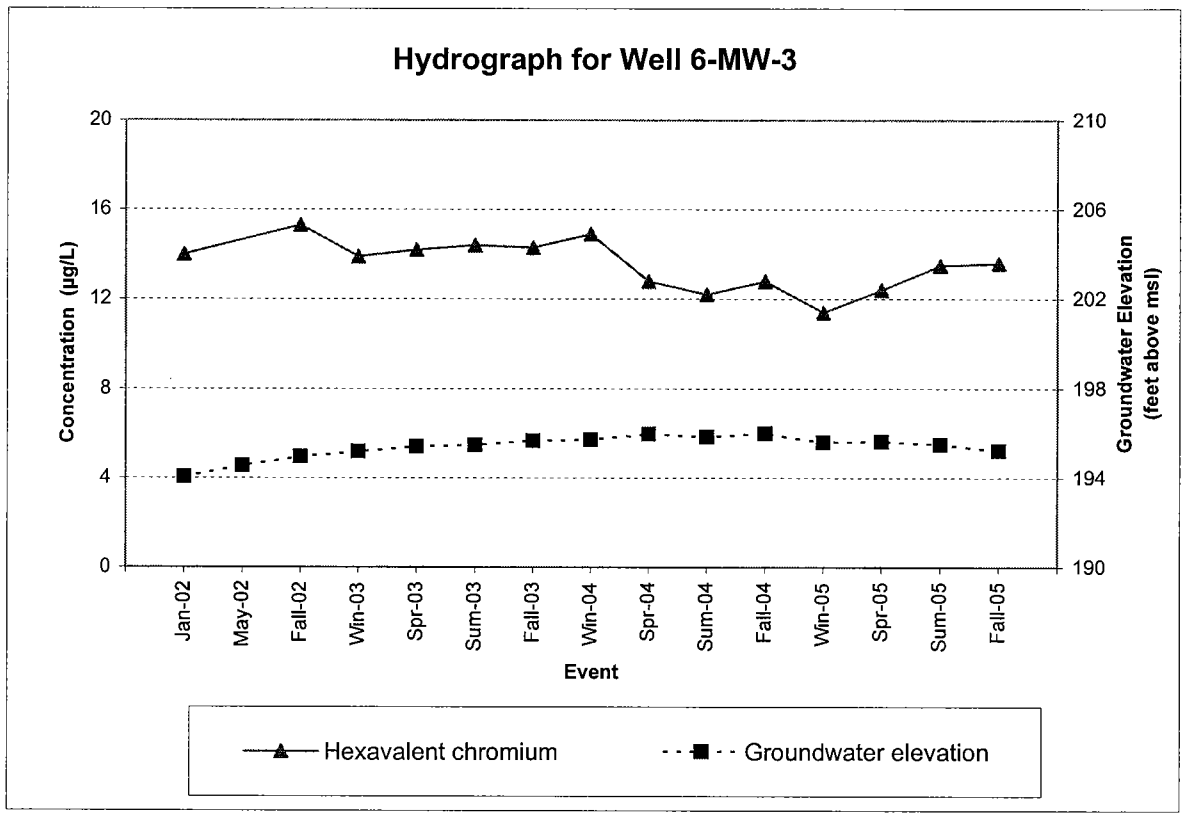


Appendix C. Groundwater Elevations and Concentrations of Metals at Site 5 Cluster.





Appendix C. Groundwater Elevations and Concentrations of Hexavalent chromium at Site 5 Cluster.



Appendix C. Groundwater Elevations and Concentrations of Hexavalent chromium at Site 5 Cluster.