GROUND ZERO ANALYSIS, INC.

1714 Main Street
Escalon, California 95320-1927
Telephone: (209) 838-9888
Facsimile: (209) 838-9883

FILE

PHASE III RCRA FACILITY INVESTIGATION STATUS REPORT

Prepared for

FORMER PURE-ETCH, CO. FACILITY
1031 INDUSTRIAL WAY
SALINAS, CALIFORNIA 93906

Prepared by

ORIGINAL SIGNED BY

John P. Lane
CA Registered Geologist No. 6795

REGISTERED GEOLOGIST
JOHN P. LANE
No. 6795
STATE OF CALIFORNIA

March 29, 2004

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

PHASE III RCRA FACILITY INVESTIGATION STATUS REPORT
Former Pure-Etch, Co. Facility
1031 Industrial Way
Salinas, California 93901

EXECUTIVE SUMMARY

This report is submitted to summarize investigations conducted to date related to a former Underground Storage Tank ("UST") used for storage of gasoline at the former Pure-Etch, Co. ("Pure-Etch") site located at 1031 Industrial Way, Salinas, California (the Site). The purpose of the investigation was to further define the nature and extent of contamination, to install permanent soil-vapor sampling points in order to investigate the concentration of petroleum hydrocarbons in soil gas beneath the Site, and to evaluate the feasibility of certain potential corrective measures.

The Site occupies approximately 1.25 acres in an industrial area of Salinas at the southeast corner of Industrial Way and Vertin Avenue. Surrounding property use is primarily industrial, with some commercial use. The nearest surface water body is Alisal Slough, located more than 2000 feet southwest of the Site. Drinking water wells in the Salinas area generally draw water from below 180 feet.

Pure-Etch obtained the Site from Georgia Pacific Corporation in 1993 and conducted operations until it was closed in 1998. Pure-Etch did not operate any underground storage tanks. Prior to Pure-Etch's purchase of the Site, previous owners had legally closed a 1000-gallon UST in place in 1985 by filling it with concrete. The tank had reportedly not been in use for 10 to 25 years prior to its closure in 1985. The entire Site is now paved. Twenty-five sites within ¼ mile of the Site were listed in a recent VISTA Report as having USTs. Five of these identified sites, as well as 13 others within ½ mile of the Site, are listed as having leaking underground storage tanks ("LUSTs"). Investigations of LUSTs are ongoing at two sites located approximately 1,000 feet southeast and 1/3 mile southeast, respectively from the Site.

Previous subsurface investigations at the Site in 1997, 2000, and 2002 determined that soil and

groundwater beneath the UST has been impacted by a release of petroleum hydrocarbons.

Soil contamination at the Site is generally limited to a relatively small area in the vicinity of the UST and lies primarily within the upper clay/silt unit and the upper sand unit to a depth of approximately 40-45 feet below ground surface (bgs). The middle clay unit appears to retard downward vertical migration of contaminants in soil. Thus, soil contamination found below approximately 45 feet bgs in Site borings may be due to fluctuations of the water table, which is contaminated.

Groundwater beneath the site has been impacted by a historical release of gasoline. Well MW1 contained more than one foot of free-phase gasoline in the well casing on June 18, 2002. Ground Zero initiated bi-weekly free product monitoring and removal on October 24, 2003. No measurable free product was present in well MW1 between January 6, 2003 and July 17, 2003. Less than one inch of free product was measured in the well between August 19, 2003 and October 14, 2003. No free product has been measured in well MW1 since October 14, 2003.

The lateral extent of shallow groundwater contamination beneath the site has been defined through the installation and sampling of six additional groundwater monitoring wells.

Based upon investigations conducted to date, Ground Zero recommends completing the scheduled soil vapor extraction pilot test to evaluate the feasibility of soil vapor extraction as a remedial action to reduce vadose zone soil contamination, completing the scheduled soil vapor sampling from the annular vapor probes to investigate the concentration of petroleum hydrocarbons in soil gas beneath the Site, continuing quarterly groundwater monitoring and sampling activities, and monitoring groundwater for specific indicator parameters to determine if intrinsic bioremediation is occurring.

REVISED PHASE II RCRA FACILITY INVESTIGATION REPORT
Former Pure-Etch, Co. Facility
1031 Industrial Way
Salinas, California 93901

1.0 INTRODUCTION

The purpose of the investigation was as follows:

1. To obtain sufficient additional contaminant concentration data in groundwater to estimate the lateral extent of documented dissolved gasoline constituents in shallow groundwater beneath the site;
2. To determine if previously documented free-phase gasoline has migrated downgradient of well MW1;
3. To obtain sufficient additional contaminant concentration data in soil gas and physical characteristics of soil beneath the site to evaluate contaminant migration pathways and the concentration of petroleum hydrocarbons in soil gas beneath the Site;
4. To obtain sufficient information on physical characteristics of soil and groundwater beneath the site in order to evaluate potential remediation measures.

This report summarizes the field, analytical, and assessment activities conducted to date in carrying out the investigation.

2.0 SITE BACKGROUND AND PHYSICAL SETTING

2.1 Property Use

The Site is located at 1031 Industrial Way, Salinas, California. The Site occupies approximately 1.25 acres in an industrial area of Salinas at the southeast corner of Industrial Way and Vertin Avenue. Surrounding property use is commercial and industrial. The nearest surface water body is Alisal Slough, located more than 2000 feet southwest of the Site. The Site location is shown on Figure 1.

The Site is currently occupied by Trécé Inc., which manufactures insect monitoring products. It was previously operated as an etchant recycling facility from approximately 1994 to 1998. The Site is entirely covered with relatively impermeable materials, which include concrete slab structures over approximately 80% of the Site and asphalt or concrete over the remaining 20%. A rail spur enters the southwest portion of the Site from the west.

Pure-Etch obtained the property from Georgia Pacific Corporation in 1993 and conducted operations until 1998. Pure-Etch did not operate any underground storage tanks. Prior to Pure-Etch's purchase of the Site, previous owners had legally closed a 1000-gallon underground storage tank (UST) in place in 1985 by filling it with concrete. The tank had reportedly not been in use for 10 to 25 years prior to its closure in 1985. The entire Site is now paved. A site plan is presented on Figure 2.

In 1997 the State of California Department of Toxic Substance Control (DTSC) and the Monterey County Department of Environmental Health (MCDEH) requested that Pure-Etch undertake an investigation to determine if any fuel had leaked from the tank.

2.2 Physical Setting

The Site is located in the Salinas Valley, in the central portion of the Coast Ranges physiographic province of California. The Valley is defined by the Gabilan Range to the east and the Santa Lucia Range to the west. The Salinas Valley is underlain by the Salinas Ground Water Basin, created by regional downwarping and localized reverse and strike slip faulting along the eastern range front of the Santa Lucia Range. This basin is post-Miocene synclinal graben-trough with a repository of thick mid-late Cenozoic sediments up to 8,000 feet thick (Bowen, 1965).

Two distinct layers of fine grained and coarse grained sediments were encountered during exploratory drilling at the site in 1997. A fine grained layer of silt and/or clay is present at the ground surface (an elevation of about 60 feet), and the base of this layer appears to be located at an elevation of about 45 feet, making the unit approximately 15 feet thick. A course-grained layer of sand with silt interbeds extends from about 15 feet below ground surface (bgs) to 40 feet bgs. The 1997 borings were terminated in the sand layer at 40 bgs.

The Salinas Valley Ground Water Basin contains a series of productive aquifers, which are mined intensively to supply water for agricultural, domestic, and industrial purposes. The shallowest aquifer underlying Salinas is the unconfined "A-aquifer," composed of interbedded and interfingering sands, gravels, silts, and clays. This aquifer is underlain by a relatively continuous impermeable blue clay layer at approximately 180 feet (California Department of Water Resources, 1973). The clay layer separates the A-aquifer and the deeper "180 foot aquifer."

Since perched groundwater is present in the A-aquifer, depth to first groundwater is variable across the City of Salinas. Regional groundwater flow direction across the Salinas area is generally west-northwest towards the Pacific Ocean (Yates, 1988). The A-aquifer has been encountered at the Granite Construction Company site (1161 Abbott Street) in a sand aquifer at a depth of 80 to 100 feet bgs. The Granite Construction Company has monitoring wells less than 1,500 feet southwest of the Pure-Etch property (ASE Environmental, December 15, 1993 Remedial Action Plan). According to Mr. John Goni of the RWQCB, the groundwater flow direction at the Granite Construction site has varied considerably and it has been difficult to determine a predominant local groundwater flow direction.

A nearby water supply well is located at the Shippers Development Company site at 634 South Sanborn Road less than 1,000 feet north of the Pure-Etch site. The upper perforations of the water supply well reportedly begin at 235 feet bgs.

VISTA Information Solutions, Inc. conducted a search of regulatory documentation designed to identify sites within one mile of the Site on March 9, 2000. The search identified 25 sites within ¼ mile of the Site as having USTs. Five of these identified sites, as well as 13 others within ½ mile of the Site, are listed as having had leaking USTs (LUSTs). At least two of the LUST sites are located within 1/8 mile of the Site. A copy of the VISTA report was presented in the April 12, 2000 *Workplan for Investigation of Soil and Groundwater Contamination from Former Gasoline Storage UST at 1031 Industrial Street, Salinas, California*, submitted by Lee & Pierce Inc.

A further review of documents at the MCDEH was conducted on sites identified in the VISTA report. Significant findings include the presence of free-phase petroleum product at the Granite Construction site (1161 Abbott Street) approximately 1,000 feet southeast of the Site, and an on-going investigation for gasoline constituents in groundwater at the Mitchell Silliman site, located approximately 1/3 mile southeast of the Site._Figure 3 presents an aerial photograph showing these properties in relation to the Site.

2.3 Contamination Investigation, Regulatory Enforcement and Interim Actions

Investigations related to contamination from the UST began at the property in 1997.

2.3.1 Underground Storage Tank Investigations

One underground storage tank (UST) was formerly operated on the Site. The steel UST was used for storage of gasoline fuel. Previous owners of the property closed the tank in place in 1985 by filling it with concrete. The tank was reportedly not used for 10 to 25 years prior to being closed.

2.3.2 Initial Subsurface Investigation

Soil and groundwater investigation was initiated in 1997 at the request of DTSC and MCDEH as a precursor to plant closure. Three borings were advanced in the vicinity of the closed UST. Two of the borings located within 10 feet of the UST, BH-1 and BH-2, exhibited elevated levels of gasoline constituents. The locations of soil borings BH-1 through BH-3 are shown on Figure 4. Soil sample analytical results are summarized in Table 1.

Soil vapor samples were collected from each boring at a depth of approximately 15 feet bgs. Each of the three samples contained gasoline constituents, with the sample collected from BH-1 recording the highest level at 18,000 mg/L total petroleum hydrocarbons as gasoline (TPHg). Soil vapor sample analytical results are summarized in Table 2.

Groundwater was not encountered during the 1997 investigation. The drilling was terminated at approximately 40 feet bgs.

2.3.3 Regulatory Enforcement

A Corrective Action Consent Agreement (Consent Agreement) between Pure-Etch and the DTSC was signed on February 14, 2000.

2.3.4 Phase II RCRA Facility Investigation

The initial investigation identified soil contamination at the Site in the vicinity of the closed-in-place UST. Additional investigation was necessary in order to determine the lateral and vertical extent of impact to soil and to determine if there has been an impact to groundwater. Additional soil borings were advanced in July and August 2000 at the request of DTSC and MCDEH, and groundwater monitoring wells MW1 through MW5 were installed in June 2002.

Three borings located within 20 feet of the UST (BH-6, BH-8, BH-10) exhibited elevated levels of gasoline constituents in the vadose zone and at the capillary fringe, three borings located east (BH-5) and south (BH-4 and BH-7) of the former UST exhibited elevated levels of gasoline constituents primarily at the capillary fringe, and one boring north of the UST (BH-9) exhibited no evidence of gasoline contamination. Soil sample analytical results for the second phase of investigation are summarized in Table 3.

Soil vapor samples collected from the boring located nearest the UST from a permeable sand zone at a depth of approximately 16 feet bgs contained concentrations of gasoline constituents five orders of magnitude greater than those detected in the vapor sample collected from the silt/clay unit at 7 feet bgs. These results suggest that the upper clay/silt unit is an effective barrier to upward migration of hydrocarbon vapors to the atmosphere. Soil vapor analytical results for boring BH-6 are summarized in Table 4.

Discrete groundwater samples collected from borings BH-4 through BH-9 indicated that the highest concentrations of dissolved gasoline constituents were present in areas south and east of the former UST. Analytical results of the groundwater samples collected from borings BH-4 through BH-9 are summarized in Table 5.

At the direction of DTSC, five groundwater monitoring wells (MW1 through MW5) were installed at the Site in June 2002 to characterize hydrology and water quality of shallow groundwater beneath the site. The investigation confirmed that soil contamination at the Site is generally limited to a relatively small area in the vicinity of the UST and lies primarily within the upper clay/silt unit and the upper sand unit to a depth of approximately 40-45 feet bgs. Analytical results of soil samples collected in June 2002 are summarized in Tables 6 and 7.

Based upon initial groundwater monitoring data, shallow groundwater beneath the site flows generally in a southeasterly direction. Free petroleum product measuring 1.42 feet thick was present in well MW1, located south of the UST, and elevated dissolved gasoline constituents were present in well MW4, located southeast of the UST.

Figure 4 presents the locations of soil borings and monitoring wells drilled at the site. Detailed summaries of the Phase II facility investigation are contained in separate reports entitled *Phase II RCRA Facility Investigation, Former Pure Etch Facility, 1031 Industrial Way, Salinas, CA 93906, February 16, 2001,* which was prepared by Ground Zero and Lee & Pierce, Inc. and in *Revised Phase II RCRA Facility Investigation Report, Former Pure-Etch Facility, 1031 Industrial Way, Salinas, CA 93906, July 19, 2002,* which was prepared by Ground Zero.

2.3.5 Interim Remedial Actions

Well MW1 contained more than one foot of free-phase gasoline in the well casing on June 18, 2002. Ground Zero initiated bi-weekly free product monitoring and removal on October 24, 2003. The frequency was later reduced to monthly due to the absence of free product. Field technicians hand bailed free product from well MW1 on nine occasions between October 24, 2002 and October 14, 2003. No measurable free product was present in well MW1 between January 6, 2003 and July 17, 2003. Less than one inch of free product was measured in the well between August 19, 2003 and October 14, 2003. No free product has been measured in well MW1 since October 14, 2003. A total of approximately 2.15 gallons of product/water mixture has been removed from the well. Table 8 summarizes free product monitoring and removal at the site.

3.0 PHASE III RCRA FACILITY INVESTIGATION

3.1 Purpose

The initial and Phase II facility investigations identified soil and groundwater contamination at the Site in the vicinity of the closed-in-place UST, identified free-phase gasoline on the water table in the vicinity of well MW1, and determined that dissolved groundwater contamination had migrated some distance downgradient of the UST. Additional investigation was necessary in order to estimate the lateral extent of documented dissolved gasoline constituents in shallow groundwater beneath the site, to determine if previously documented free-phase gasoline had migrated downgradient of well MW1, to obtain sufficient additional contaminant concentration data in soil gas and physical characteristics of soil beneath the site to evaluate contaminant migration pathways, and to obtain sufficient information on physical characteristics of soil and groundwater beneath the site to evaluate potential remediation measures.

3.2 Resources

All field work was initiated under the direct supervision of John Lane, CA Registered Geologist

6795.

Sean Garvey, a Ground Zero geologist, provided on-site supervision of drilling and directed soil sampling and well installation activities between December 15 and December 19, 2003.

Mr. David Payne, a Lee & Pierce field technician, provided on-site supervision of the re-drilling and installation of vapor extraction test well VEW1. Mr. Payne also conducted periodic monitoring and removal of free-phase gasoline in well MW1.

Mr. Anthony Scoma, a Ground Zero field technician, sampled wells MW1 through MW5 between September 19 and 20, 2003, developed newly installed wells and re-developed existing site wells between December 29 and 31, 2003, and sampled all site wells again between January 28 and 30, 2004. Mr. Scoma also conducted periodic monitoring and removal of free-phase gasoline in well MW1.

West Hazmat Drilling Corp., a California State licensed drilling company (C57 819548), performed drilling, soil coring, and well installation activities. Cascade Drilling, Inc., a California State licensed drilling company (C57 717510), completed the installation of vapor extraction test well VEW1.

Mid Coast Engineers surveyed the new well casing elevations on January 9, 2004.

McCampbell Analytical, a State certified hazardous waste testing laboratory (ELAP #1644), conducted analyses on submitted soil samples, and Argon Analytical Services, Inc., a State certified hazardous waste testing laboratory (ELAP #2359), conducted analyses on submitted groundwater samples. Cooper Testing Labs conducted physical analyses on selected soil samples.

Ground Zero is currently coordinating the soil vapor extraction pilot test, to be conducted by

Deltech Geotechnical Support on March 21, 2004, and the in-situ soil gas investigation, to be conducted by TEG, a State certified mobile hazardous waste testing laboratory, on March 29, 2004.

3.3 Investigative Procedures

On December 15, 2003, Sean Garvey arrived at the Site to initiate the subsurface investigation. Anticipated well locations were verified in the field and a site safety meeting was conducted prior to initiating field work. Monitoring well locations are presented on Figure 4.

3.3.1 Subsurface Soil Borings and Soil Sampling

Seven soil borings were drilled at the site for the purpose of installing additional groundwater monitoring wells to further investigate the nature and extent of dissolved and phase-separated petroleum hydrocarbon contamination previously detected at the site. In addition, multi-zone vapor probes were installed within the annulus of selected newly installed wells to evaluate the potential risk to on-site and off-site workers.

The borings were sampled at 5-foot intervals for soil characterization and subjective evaluation of contamination. Soil samples were classified in accordance with ASTM Designation D2488-90, which is equivalent to the Unified Soil Classification System. A portion of each sample was placed in a zip-lock plastic bag for a period of time for eventual screening by a field volatile organic analyzer (PID). The field observations were noted on the boring log. Selected soil samples were submitted to McCampbell Analytical to further characterize adsorbed contamination in the vadose zone. Selected samples were also submitted to Cooper Testing Labs to conduct companion soil matrix sampling at the location of the vapor probes. Copies of drilling permits and boring logs/well construction details are including in Appendix A.

3.3.2 Installation of Groundwater Monitoring Wells

Groundwater monitoring wells were completed at depths of approximately 70 feet bgs (MW7), 72 feet bgs (MW6, MW8, MW9, MW10), and 80 feet bgs (MW11). The wells were constructed of 2-inch diameter, Schedule 40 PVC casing and 0.010-inch slotted screen, except for wells MW6 and MW7, which were constructed of 4-inch diameter casing and well screen. The lower 20 feet of each well was screened, with filter pack consisting of #2/12 pre-washed silica sand from the bottom of the wells to approximately two feet above the top of the screens. The filter pack was placed through the augers using a tremie and the augers were retracted in stages as the filter pack was placed. A surge-block was utilized during placement of the sand to minimize settling of the filter pack after well construction. Except for those wells that were completed with vapor probes, the remaining annulus of each well was completed with two feet of hydrated bentonite pellets overlain by neat cement grout to the surface. The bentonite pellets and neat cement grout was placed using a tremie.

Surface completion consisted of a flush mount, water tight, traffic rated well box and a locking well cap, except for well MW10, which was completed with a low well monument because it was located in an area where standing water tends to accumulate during the wet season. Table 9 presents the construction details of site wells. Copies of boring logs/well construction details for wells installed during the Phase III investigation are including in Appendix A.

3.3.3 Installation of Soil Vapor Probes

Soil vapor probes were installed at multiple depths in wells MW6, MW9, and MW11 to investigate the concentration of petroleum hydrocarbons in soil gas beneath the Site near the UST, beneath the building, and at the downgradient property boundary.

Two probes were installed in the well annulus at each location (MW6, MW9, MW11). One probe was installed within the zone of highest documented soil contamination (approximately 25 feet bgs within the upper sand unit) and one probe was installed within the upper clay unit (approximately 5 feet bgs) to sample near surface soil vapor concentrations.

The probes were constructed of ¼-inchdiameter tubing fitted with a stainless steel vapor probe and screen manufactured by AMS Inc. The filter pack around each probe screen was extended approximately one foot above and one foot below each probe-tip, for a total filter pack of approximately 2 feet in thickness. The annulus between each filter pack interval was sealed with hydrated bentonite pellets. The bentonite was allowed to hydrate for approximately one-half to one hour before placing additional filter pack or cementing materials. Table 9 summarizes the construction details of the new wells. Copies of boring logs/well construction details are including in Appendix A.

3.3.4 Installation of Soil Vapor Extraction Test Well

Well VW1 was constructed as near as possible to the closed-in-place UST. The well was constructed of 4-inch diameter PVC casing with 0.10-inch slotted screen. The filter pack consists of pea gravel. The well is screened from approximately 16 feet bgs to 36 feet bgs, with gravel pack from approximately 14 feet bgs to 36 feet bgs. A 3-foot layer of hydrated bentonite pellets was placed above the gravel pack, and the remaining annular space was completed with neat cement after allowing the bentonite pellets to hydrate for approximately 30 minutes. A traffic-rated well box and locking cap was used to secure the well head. Table 9 summarizes the construction details of the new wells. Copies of boring logs/well construction details are including in Appendix A.

3.3.5 Development and Surveying of Newly Installed Groundwater Monitoring Wells

The elevations of the casing collars of the wells were surveyed by Mid Coast Engineers to an accuracy of 0.01 feet on January 9, 2004. Mid Coast Engineers surveyed the latitude and longitude of the site wells relative to the North American Datum (NAD83). Wellhead elevations were surveyed using control points AIR and WORK as shown on the map entitled *Record of Survey, Salinas GPS Control Network, City of Salinas, Monterey County, California,* filed in Volume 17 of Surveys, Page 46, Monterey County Records. Well survey information is included in Appendix B.

A Ground Zero field technician measured static depth to water and subsequently developed the wells between December 28 and December 30, 2003 pursuant to the Phase III RCRA Investigation Workplan and section 2.3 of the Groundwater Sampling and Analysis Plan, which was previously approved by DTSC. The field technician also redeveloped wells MW1 through MW5 during that period. Copies of well development logs are included in Appendix C.

3.3.6 Purging and Sampling of Site Groundwater Monitoring Wells

A Ground Zero field technician measured static depth to water and subsequently purged and sampled site wells between September 19 and September 20, 2003 (MW1 through MW5) and again between January 28 and January 30, 2004 (MW1 through MW11) pursuant to the Phase III RCRA Investigation Workplan and section 2.3 of the Groundwater Sampling and Analysis Plan, which was previously approved by DTSC. Copies of the well purge logs are included in Appendix C.

3.4 Rationale for Sampling

The rationale for sampling and the type and number of samples for each location are discussed below. A summary of samples and analyses during the Phase III investigation is presented on Table 10.

MW6: Located approximately 10 feet east of the UST, well MW6 was installed as a multi-purpose well, with 4-inch diameter PVC casing, and two vapor probes installed in the annulus. The monitoring well was utilized to evaluate the extent of free-phase gasoline in the vicinity of the UST and for aquifer testing. The vapor probes, installed at depths of approximately 5 feet bgs and 25 feet bgs, will be used to monitor soil vapor concentrations near the source and to measure vacuum response during the soil vapor extraction test. Since this well is located near the UST, soil samples collected at 5-foot intervals were submitted to a State-certified laboratory for analysis. In addition to chemical analyses, soil samples collected at approximately 5 feet bgs and 25 feet bgs were analyzed for density, soil moisture, effective permeability, porosity, and grain size distribution, as recommended in the January 28, 2003 "Advisory – Active Soil Gas Investigations" jointly developed by DTSC and the California Regional Water Quality Control Board – Los Angeles Region (LARWQCB). This location was not tested for organic carbon content of the soil since it is located in an impacted area.

MW7: Located approximately 50 feet southeast (downgradient) of well MW1, well MW7 was installed to evaluate the extent of free-phase and/or dissolved gasoline downgradient of well MW1. Soil samples collected at 5-foot intervals within the screened interval of this well were submitted to McCampbell for analysis.

MW8, MW9, MW10: Wells MW8, MW9, and MW10 were installed near the southern boundary of the property to evaluate the downgradient extent of documented groundwater contamination. In addition, well MW9, located at the southeastern corner of the property, was equipped with soil vapor probes at depths of 5 feet bgs and 25 feet bgs to monitor soil vapor concentrations at the downgradient property boundary. Soil samples collected at 5-foot intervals within the screened interval of these perimeter wells were submitted to McCampbell for analysis. In addition to chemical analyses, soil samples collected at approximately 5 feet bgs and 25 feet bgs from well MW9 were analyzed for density, organic carbon content of the soil, soil moisture, effective permeability, porosity, and grain size distribution.

MW11: Well MW11 was installed east of the UST to investigate the lateral extent of groundwater contamination in that direction. Well MW11 was installed as a multi-purpose well, with 2-inch diameter PVC casing and two vapor probes in the annulus. The vapor probes, installed at depths of approximately 5 feet bgs and 25 feet bgs, will be used to monitor soil vapor concentrations in the vadose zone beneath the building. Soil samples collected at 5-foot intervals within the screened interval of this perimeter well were submitted to McCampbell for analysis. In addition to chemical analyses, soil samples collected at approximately 5 feet bgs and 25 feet bgs were analyzed for density, organic content of the soil, soil moisture, effective permeability, porosity, and grain size distribution.

VEW1: Located approximately 5-10 feet south of the UST, well VEW1 was installed as a vapor extraction test well. The well will be utilized as the test well in the soil vapor extraction test. Since this well is located near the UST, soil samples collected at 5-foot intervals were submitted to McCampbell for analysis.

3.5 Sample Collection Procedures

3.5.1 Soil Samples

Soil samples were collected at 5-foot intervals during drilling. The soil in each boring was classified according to ASTM Designation D2488-90, which is equivalent to the Unified Soil Classification System. Soil sample collection procedures and sample handling was conducted in accordance with the Sampling and Analysis Plan and Field Procedures, which was approved by DTSC in a previous workplan.

Soil sample selection for chemical analysis was based upon requirements imposed by DTSC in a letter dated February 27, 2002. Samples were collected into 2-inch diameter brass rings, then extracted pursuant to EPA Method 5035 using the Easydraw Syringe® and the Powerstop Handle® developed for the method by U.S. Analytical Laboratory. For EPA Method 5035 low-level protocol, the syringe was inserted into the appropriate 5-gram position pursuant to manufacturer's specifications, the sampler was then pushed into the core sample until the soil column inside the syringe forced the plunger to the stopping point. The syringe was then removed from the handle device, and the sample was ejected into a pre-tared vial preserved with acidified water. For EPA Method 5035 high-level protocol, a similar procedure was used to inject 15 grams of soil into a pre-tared vial containing 15 mL ethylene glycol preservative. The sample containers were immediately capped and put into an ice chest cooled to approximately 4° Celsius for transport to McCampbell under chain of custody protocol.

In addition to chemical analyses, soil samples that correspond to the depths of the vapor probes in wells MW6, MW9, and MW11 were submitted for soil matrix parameters as described in Section 3.4 of this report.

3.5.2 Soil Vapor Samples

Soil vapor sampling of the annular vapor probes installed in wells MW6, MW9, and MW11 is scheduled to be conducted March 29, 2004 by TEG Inc. The samples will be collected by TEG's certified mobile laboratory into pre-cleaned glass syringes, glass bulbs, or Summa canisters pursuant to the procedures recommended in the "Interim Guidance for Active Soil Gas Investigation" (LARWQCB, 1997) and the "Advisory – Active Soil Gas Investigations" (DTSC and LAWRQCB, 2003).

Sample collection will be conducted by laboratory personnel under the supervision of the field and registered geologist following the protocol outlined in the guidance documents, including conducting leak tests, purge volume tests, initial calibration, daily mid-point calibration, field blank analysis, and sample analyses.

3.5.3 Groundwater Samples

Prior to arriving at the sampling site, all sampling equipment was washed with Alconox detergent, then rinsed once with tap water and once with deionized water.

Immediately prior to sampling a groundwater monitoring well, the depth to water (DTW) in the well was recorded. No free-phase gasoline was noted on top of the groundwater in any site well.

Each well was purged until indicator parameters stabilized. This entailed the removal of at least three well casing volumes, unless the wells went dry. The indicator parameter measurements were taken at a frequency of approximately once every 0.5 well casing volumes. Ground Zero utilized the Waterra Inertial Pump system in site wells as described in the Groundwater Sampling and

Analysis Plan.

A Ground Zero technician collected groundwater samples from the wells after the groundwater elevations had recovered to approximately 80% or more of their pre-purged levels. Groundwater samples were collected into appropriate containers supplied by the laboratory. The samples were placed in an ice chest refrigerated to a temperature of 4°C. The samples were submitted under chain of custody protocol to Argon for analysis. Field purge logs are included in Appendix C.

3.6 Sample Analysis

The sample analytical methods utilized during the investigation are shown on Table 10.

Based upon available information regarding past chemical use on the site, soil samples were analyzed for the following:

1. TPHg by EPA Method 8015.
2. BTEX by EPA Method 8021B.
3. Volatile organic compounds (VOCs) including oxygenates and breakdown products (MTBE, TAME, TBA, DIPE, ETBE) and lead scavengers and breakdown products (chlorobenzene, dichlorobenzene, 1,2-DCA, EDB) using EPA Method 5035/8260B.

Groundwater samples were analyzed for the following:

1. TPHg using EPA Method 8015B.
2. BTEX using EPA Method 8021B.
3. Oxygenates and breakdown products (MTBE, TAME, TBA, DIPE, ETBE) using EPA Method 8260B.
4. Lead scavengers and breakdown products (chlorobenzene, dichlorobenzene, 1,2-DCA, EDB) using EPA Method 8260.

3.7 Containment and Disposal of Contaminated Materials

Soil generated during drilling was placed into a roll-off container and later transported off-site by Clearwater Environmental to a Class II Forward landfill for disposal.

All withdrawn groundwater was stored on-site in properly labeled DOT approved containers and remains on site pending disposal. Drummed water was labeled with the source of the water to help ensure appropriate disposal based on contamination levels.

3.8 Quality Assurance/Quality Control (QA/QC) Procedures

QA/QC procedures were employed in both the field and the laboratory.

3.8.1 Field QA/QC Procedures

Field QA/QC procedures performed at the site consisted of the following:

- Chain of custody forms were used for sample submittal to the laboratory;
- Daily information regarding soil sample collection was recorded on daily field sheets. Sample types, soil descriptions, sample identification numbers, and sample times were collected and recorded on field data sheets and/or field drilling logs.
- Field QA/QC samples were collected and submitted for analysis along with the discrete samples.

3.9 Departures from Workplan

Key decisions made during the course of the investigation that resulted in departures from the approved workplan related to the length of screen to install in the monitoring wells, the depth of completion for well MW11, modifying the location of vapor extraction well VW1, resolving issues related to incorrect materials brought to the site by West Hazmat Drilling Corp. for completing well VW1, collecting a groundwater sample from well MW6 with less than 80% recovery, and the failure to collect a field duplicate groundwater sample.

Based upon known fluctuations in groundwater elevations at a nearby site exceeding 15 feet in a single year, previously installed wells MW1 through MW5 were equipped with a 25-foot screened interval. However, based upon a review of measured water levels in well MW1 between June 12, 2002 and January 28, 2004, which varied from approximately 55.6 to 58.5 feet below the top of the casing (btoc), site wells MW6 through MW11 were installed with the customary 20-foot screened interval, rather than the 25-foot screened interval used in wells MW1 through MW5.

Well MW11 was installed to a depth of approximately 80 feet bgs, instead of 70 feet bgs, which was specified in the workplan. The deeper completion depth was selected in the field because groundwater was not initially encountered in the borehole at that location until approximately 70 feet bgs. The groundwater level eventually stabilized at approximately 59 feet bgs after the well was completed.

Well VW1 was installed approximately 12 feet south of the closed-in-place UST, rather than northwest of the UST as proposed in the workplan due to access issues. Prior to beginning any drilling, the supervising Ground Zero field geologist reviewed well materials with West Hazmat Drilling Corp. to confirm that the proper materials were brought to the site. It was determined that West Hazmat brought incorrect materials for completing well VW1. Ground Zero directed West Hazmat to order the appropriate materials (0.100-inch slotted screen and pea gravel filter pack) and drilling of well VW1 was postponed until later in the week. After the re-ordered materials arrived late on Friday, December 19, 2003, West Hazmat proceeded to drill the pilot borehole for well VW1 and collected soil samples from the borehole. However, during the installation of the well, the supervising Ground Zero field geologist noted that West Hazmat was preparing to utilize decorative rock for the filter pack, rather than pea gravel as specified in the workplan. No pea gravel could be located on short notice and West Hazmat was directed to remove the casing and grout up the pilot hole. After coordinating with Monterey County Environmental Health, Cascade Drilling, Inc. was brought in to drill and install well VW1 on

January 23, 2004.

Well MW6 was pumped dry during well development in December 2003 as well as during purging and sampling in January 2004. After the well was pumped dry in January 2004, the groundwater level recovered only about 3 feet in more than three hours. Due to time restraints, the well was sample with less than 80% recovery.

Due to an oversight by the field technician, no field duplicate groundwater sample was collected in January 2004.

4.0 SUBSURFACE CONDITIONS ENCOUNTERED

4.1 Physical Conditions

Soil stratigraphy encountered during drilling was consistent with previous investigations and can generally be divided into the following laterally continuous units:

Upper clay/silt unit: this unit extends from the ground surface to approximately 14-16 feet bgs and consists primarily of lean to fat clay with silt (with no coarse material). According to the results of physical testing conducted by Cooper Testing Laboratory, the upper clay unit has an average permeability of 9.E-08 cm/sec, an average moisture content of 30%, and an average organic content of 2.5%. A copy of the results report from Cooper Testing Laboratory is included in Appendix D.

Upper sand unit: this unit consists of well to poorly graded sand extending from approximately 14-16 feet bgs to 36-44 feet bgs. According to the results of physical testing conducted by Cooper Testing Laboratory, the upper sand unit has an average permeability of 4.E-03 cm/sec, an average moisture content of 5.3%, and an average organic content of 0.5%.

Middle clay unit: consists primarily of lean to fat clay with some silt and extends from approximately 36-44 feet bgs to approximately 55 feet bgs.

Lower silt unit: consists of silt with less than 5% sand and generally extends from approximately 55 feet bgs to approximately 61-64 feet bgs. This unit appears to be thinner in boring BH-6 compared to other site borings. Poorly graded sand was encountered in the upper portion of this unit from approximately 55-58/59 feet in borings BH-6 and BH-10. This sand unit does not appear to be laterally significant. Wells MW8 through MW11 in the southern and eastern portions of the site did not contain this lower silt unit. Wells MW8, MW9, and MW11 instead transitioned from clay or silty clay directly to a well graded sand approximately 2-5 feet thick at approximately 61-64 feet bgs. This sand unit was also encountered in wells MW5 and MW7. No sand or silt was encountered in this unit in well MW10.

Lower clay unit: consists of lean to fat clay and extends from approximately 61-64 feet bgs to the bottom of each well (70-80 feet bgs). Site stratigraphy is graphically represented in cross section on Figures 5 and 6.

Petroleum hydrocarbon odors within the vadose zone were noted in wells VW1 and MW6. Slight gasoline odors were noted at the capillary fringe during the drilling of well MW7. No odors were noted during drilling of wells MW8 through MW11. The highest PID readings within the vadose zone were measured in cored soil samples from the upper sand unit, although the highest PID readings from well MW7, located downgradient of the UST, were recorded in soil samples collected below 50 feet bgs. The distribution of PID readings in this and previous investigations indicates that the middle clay unit has acted to retard to vertical migration of gasoline constituents released from the UST, although soil contamination beneath the middle clay unit tends to increase again as you approach the water table. The distribution of contamination in the vadose zone suggests that soil contamination below the depth of approximately 45 feet bgs is largely due to the gasoline constituents in groundwater, which fluctuates in elevation over time.

The static depth to groundwater beneath the site ranged from 57.71 to 59.73 feet btoc in

September 2003, from 58.16 to 62.48 btoc in December 2003, and from 57.95 to 62.40 feet btoc in January 2004. Free petroleum product was measured in well MW1, ranging from 0.08 to 0.02 feet thick, between August 19, 2003 and October 14, 2003. No free-phase petroleum product was detected in well MW1 on November 5, 2003, December 9, 2003, December 30, 2003, or January 28, 2003. No floating product has ever been encountered in any other site well.

The shallow groundwater gradient beneath the site in the vicinity of the UST was calculated at between 0.0099 ft/ft and 0.012 ft/ft (~50-60 ft/mile) in southeasterly direction between September 2003 and January 2004. Based upon groundwater elevations measured in December 2003 and January 2004, there appears to be a mounding effect beneath the southern portion of the site near well MW10. Groundwater elevations are summarized in Table 11. Potentiometric surface maps generated using the September 2003, December 2003, and January 2004 well monitoring data are depicted on Figures 7, 8, and 9, respectively.

4.2 Analytical Results

4.2.1 Soil Analytical Results

Elevated levels of TPHg and BTEX were detected in soil samples collected from well VW1 beginning at approximately 15 feet bgs to at least 36 feet, which was the total depth of the well.

Relatively low to moderate levels of gasoline constituents were detected in soil samples collected from well MW6 between the depths of approximately 15 feet bgs to 65 feet bgs. The highest PID readings were recorded in the upper portion of the upper sand unit at approximately 15-20 feet bgs, but the highest concentrations of contaminants detected through laboratory analyses were within the lower clay unit at approximately 55 feet bgs, which is essentially the capillary fringe zone.

Gasoline constituents were detected in soil samples collected from well MW7 at 55 and 60 feet bgs, which is within the capillary fringe zone. No contaminants were detected from the samples collected at 65 and 70 feet bgs.

No gasoline constituents were detected in soil samples collected from wells MW8, MW9, MW10, or MW11 from the capillary fringe or the saturated zone, although 1,1-dichloroethene (1,1-DCE) was detected in the samples collected from MW10 at 50 and 55 feet bgs.

Soil analytical results for samples collected in December 2003 are summarized in Tables 12 and 13. Laboratory reports and chain of custody documentation are included in Appendix E.

4.2.2 Groundwater Analytical Results

Groundwater samples were collected from wells MW1 through MW5 in September 2003. Groundwater samples were collected from wells MW1 through MW11 in January 2004.

The sample collected from MW1 in September 2003 contained TPHg, benzene, toluene, ethylbenzene, xylenes, and EDB at concentrations of 57,000 parts per billion (ppb), 6,000 ppb, 7,000 ppb, 500 ppb, 1,700 ppb, and 44 ppb, respectively. The sample collected from MW1 in January 2004 contained TPHg, benzene, toluene, ethylbenzene, xylenes, and 1,2-DCA at concentrations of 67,000 ppb, 6,000 ppb, 12,000 ppb, 1,000 ppb, 4,400 ppb, and 140 ppb, respectively.

The sample collected from MW2 in September 2003 contained TPHg, ethylbenzene, and EDB at concentrations of 130 ppb, 0.8 ppb, and 4.9 ppb, respectively. The sample collected from MW2 in January 2004 contained TPHg and ethylbenzene at concentrations of 330 ppb and 3.6 ppb, respectively.

The sample collected from MW3 in September 2003 contained only EDB at 7.9 ppb. The sample collected from MW3 in January 2004 contained only 1,2-DCA at 6.2 ppb.

The sample collected from MW4 in September 2003 contained TPHg, benzene, toluene, ethylbenzene, and xylenes at concentrations of 1,500 ppb, 48 ppb, 87 ppb, 35 ppb, and 54 ppb, respectively. The sample collected from MW4 in January 2004 contained TPHg, benzene, toluene, ethylbenzene, and xylenes at concentrations of 1,200 ppb, 65 ppb, 110 ppb, 28 ppb, and 57 ppb, respectively.

The sample collected from MW5 in September 2003 contained benzene and 1,2-DCA at concentrations of 14 ppb and 21 ppb, respectively. The sample collected from MW5 in January 2004 contained benzene and 1,2-DCA at concentrations of 2.0 ppb and 11 ppb, respectively.

The sample collected from well MW6 in January 2004 contained TPHg, benzene, toluene, ethylbenzene, xylenes, and EDB at concentrations of 28,000 ppb, 1,700 ppb, 4,400 ppb, 230 ppb, 1,800 ppb, and 5.7 ppb, respectively.

The sample collected from well MW7 in January 2004 contained TPHg, benzene, toluene, ethylbenzene, xylenes, and 1,2-DCA at concentrations of 260 ppb, 6.9 ppb, 3.2 ppb, 1.4 ppb, 3.7 ppb, and 13 ppb, respectively.

No gasoline constituents were detected in the groundwater sample collected from well MW8 in January 2004.

No gasoline constituents were detected in the groundwater sample collected from well MW9 in January 2004.

No gasoline constituents were detected in the groundwater sample collected from well MW10 in January 2004.

The sample collected from MW11 in January 2004 contained only 1,2-DCA at 4.8 ppb.

Analytical results of the groundwater samples collected from site wells are summarized in Table 14.

Laboratory reports and chain of custody documentation are included in Appendix F. Figures 10 and 11 present the estimated distribution of dissolved gasoline constituents (as benzene) beneath the site based on the groundwater samples collected from site wells in September 2003 and January 2004, respectively.

5.0 CONCLUSIONS

Soil contamination at the Site is generally limited to a relatively small area in the vicinity of the UST and lies primarily within the upper clay/silt unit and the upper sand unit to a depth of approximately 40-45 feet bgs. The middle clay unit appears to retard downward vertical migration of contaminants in soil. Thus, soil contamination found below approximately 45 feet bgs in Site borings is most likely due to fluctuations of the water table, which is contaminated.

Groundwater beneath the site has been impacted by a historical release of gasoline. The lateral extent of groundwater contamination has essentially been completely defined, with non-detect results in downgradient wells MW8, MW9, and MW10.

Implementation of interim groundwater remediation, in the form of free product monitoring and removal has apparently resulted in eliminating free-phase gasoline floating on the water table downgradient of the closed-in-place UST.

6.0 WORKPLAN TASKS NOT YET COMPLETED

6.1 Soil Vapor Extraction Pilot Test

Deltech Geotechnical Support Services is scheduled to conduct the soil vapor extraction pilot test, pursuant to the approved workplan, on March 21, 2004.

6.2 Soil Vapor Sampling

TEG Inc. is scheduled to conduct the soil vapor sampling of the annular vapor probes with an on-site mobile laboratory, pursuant to the approved workplan, on March 29, 2004.

6.3 Aquifer Testing

As previously noted in this report, shallow groundwater beneath the site in the vicinity of the closed-in-place UST occurs in fine-grained soil. No sand was encountered in borings MW1 and MW6 below a depth of approximately 38 feet bgs. Both wells were dewatered at pumping rates less than 0.5 gallons per minute during development and sampling. It is clear that groundwater extraction is not a technically feasible remediation alternative to reduce dissolved contaminants in the perched aquifer near the closed-in-place UST.

7.0 RECOMMENDATIONS

Based upon investigations conducted to date, Ground Zero makes the following recommendations:

1. Complete the scheduled soil vapor extraction pilot test and evaluate the feasibility of soil vapor extraction as a remedial action to reduce vadose zone soil contamination.
2. Complete the scheduled soil vapor sampling from the annular vapor probes in order to investigate the concentration of soil gas beneath the Site.
3. Continue quarterly groundwater monitoring and sampling activities.
4. Since groundwater extraction does not appear to be a feasible remediation alternative, monitor groundwater for specific indicator parameters to determine if intrinsic bioremediation is occurring. Sampling and analyses of indicator parameters would be performed in accordance with *Protocol for Monitoring Intrinsic Bioremediation in Groundwater* compiled by Chevron Research and Technology Company (Chevron), March 1995. The sampling could be conducted concurrently with quarterly sampling activities.

8.0 REFERENCES

CapRock, 02/97: *Workplan, Underground Storage Tank Investigation,* prepared for Pure-Etch Company, 1031 Industrial Way, Salinas, California 93901, February 1997.

CapRock, 04/97: *Underground Storage Tank Site Investigation Report,* prepared for Pure-Etch Company, 1031 Industrial Way, Salinas, California 93901, April 1997.

CRWQCB, 01/94: *Interim Guidance for Soil Gas Investigation*, California Regional Water Quality Control Board, Los Angeles Region, February 25, 1997

DTSC, 01/94: *Preliminary Endangerment Assessment Guidance Manual*, Cal EPA, Department of Toxic Substances Control, January 1994

DTSC, 01/00: *Corrective Action Consent Agreement for the Pure-Etch Company*, Cal EPA, Department of Toxic Substances Control correspondence, January 31, 2000

DTSC, 01/03: *Advisory – Active Soil Gas Investigations*, Cal EPA, Department of Toxic Substances Control and California Regional Water Quality Control Board, Los Angeles Region, January 28, 2003

GSI, 1998: *Guidance Manual for RBCA Tool Kit for Chemical Releases*, Groundwater Services, Inc. (GSI), 1998

GZA, 02/01: *Phase II RCRA Facility Investigation, Former Pure-Etch Facility, 1031 Industrial Way, Salinas, CA 93906, February 16, 2001,* prepared by Ground Zero Analysis, Inc. (GZA) with Lee & Pierce, Inc. (L&P)

GZA, 01/02: *Revised Addendum to Workplan for Investigation of Soil and Groundwater Contamination from Former Gasoline Storage UST, 1031 Industrial Way, Salinas, CA 93906,* prepared by Ground Zero Analysis, Inc., January 30, 2002

GZA, 07/02: *Revised Phase II RCRA Facility Investigation Report, 1031 Industrial Way, Salinas, CA 93906,* prepared by Ground Zero Analysis, Inc., July 17, 2002

GZA, 05/03: *Groundwater Sampling and Analysis Plan, UST Contamination Investigation, Former Pure-Etch Company Site, 1031 Industrial Way, Salinas, CA 93906,* prepared by Ground Zero Analysis, Inc., May 15, 2003

GZA, 05/03: *Phase III RCRA Facility Investigation Workplan, Former Pure-Etch, Co. Facility, 1031 Industrial Way, Salinas, CA 93906,* prepared by Ground Zero Analysis, Inc., May 15, 2003

GZA, 05/03: *Site Safety and Health Plan, Pure-Etch, Company, 1031 Industrial Street, Salinas, California,* prepared by Ground Zero Analysis, Inc., May 2003

EPA, 11/86: *Test Methods for Evaluating Solid Waste*, SW-846, US EPA, November 1986

EPA, 04/88: *Superfund Exposure Assessment Manual*, PB89-135859, US EPA, April, 1988

EPA, 10/88: *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, OSWER Directive 9355.3-01, EPA/540/6-89/004, US EPA, October 1988

EPA, 03/89: *Risk Assessment Guidance for Superfund*, 540-1-89-001, US EPA, March, 1989

L&P, 04/00: *Workplan for Investigation of Soil and Groundwater Contamination from Former Gasoline Storage UST, 1031 Industrial Street, Salinas, CA 93906, April 12, 2000*