

***REVISED DRAFT***  
**REMEDIAL INVESTIGATION WORK PLAN**  
**WYLE LABORATORIES, INC.**  
**1841 HILLSIDE AVENUE**  
**NORCO, CALIFORNIA**

**Volume I of II**

*Submitted to*

California Environmental Protection Agency  
Department of Toxic Substances Control  
Cypress, California

*On behalf of*

Wyle Laboratories, Inc.  
Norco, California

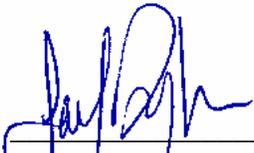
*Prepared by*

ENVIRON International Corporation  
Irvine, California

November 24, 2004

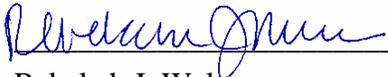
*Prepared by:*

ENVIRON International Corporation  
2010 Main Street, Suite 900  
Irvine, California 92614  
Tel: (949) 261-5151  
Fax: (949) 261-6202



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Safaa Dergham  
Associate



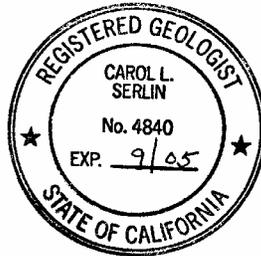
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Rebekah J. Wale  
Manager



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Carol L. Serlin, R.G.  
Principal



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## 1.0 INTRODUCTION

### 1.1 Objectives of Remedial Investigation

On behalf of Wyle Laboratories (Wyle) and Arrow Electronics, Inc., the respondents named in the State of California Department of Toxic Substances Control (DTSC) Consent Order, Docket number HAS-CO 03/04 – 042 (the Order), which became effective October 3, 2003, ENVIRON International Corporation (ENVIRON) has prepared this work plan to perform a remedial investigation at the Wyle site located at 1841 Hillside Avenue, Norco, California (the Site; Figure 1).

Various subsurface investigations have been conducted at the Site since 1991. Ground water investigations were initiated in 1999. Wyle and Arrow Electronics also have conducted response actions to address known areas of impacted soil. Ground water remediation currently is underway at the Site. However, certain data gaps remain, and in its letter dated October 15, 2003, DTSC required a remedial investigation at the Site. The first step in conducting the remedial investigation is the preparation of this work plan.

This remedial investigation work plan (the RI work plan) was prepared based on: (i) existing historical soil and ground water data for the Site; (ii) a review of the Consent Order and DTSC files for the Site; (iii) DTSC's letter dated October 15, 2003 identifying potential data and information gaps, (iv) recent interviews with long time Wyle employees; (v) a series of detailed site inspections conducted on December 8 and 9, December 11 and 12, and December 17 and 18, 2003; (vi) a review of regulatory agency files pertaining to the Site obtained from Environmental Data Resources, Inc. (EDR) of Southport, Connecticut; and (vii) a series of site visits conducted with DTSC personnel on August 12 and 13, and September 2 and 7, 2004, and a follow-on meeting with DTSC held on September 24, 2004.

The objective of this RI work plan is to provide a detailed plan for the further assessment and characterization of chemicals in soil gas, soil, surface water, and ground water at the Site, and for further evaluation of geology and hydrogeology at the Site. The further assessment and characterization activities will be prioritized according to the plan provided in the *General Strategy and Priorities for Investigation/Mitigation Memorandum* submitted by ENVIRON to the DTSC on November 2, 2004. In addition, if data collected during execution of the scope of work described in this work plan indicate that further assessment is required, such assessment will be agreed upon with DTSC, and will be conducted as part of the implementation of this work plan. The findings of the

RI investigation will be used to assess potential health risks, if any, posed by the Site, whether additional subsurface investigation is needed to define the areal and/or vertical extent of contamination at the Site, and to determine if additional remedial action is necessary.

## **1.2 Regulatory Agency Oversight**

Various regulatory agencies have provided oversight for environmental investigations conducted at the Site since the mid 1990s, when surface soil discoloration was observed during performance of a Phase I Environmental Site Assessment (ESA). The County of Riverside Department of Environmental Health (the County) was the lead agency for the soil investigation and remediation that took place between 1995 and 1997 (discussed in Section 2.5.2.6 Area F). In January 1998, the County issued a letter indicating no further action was required for the soil contamination that was discovered during the 1995 investigations. In addition, in 1998, the County provided oversight of an underground storage tank (UST) removal from the motor pool area (Area M); the County issued a closure letter for the former UST in June 1998.

In June 2001, personnel from multiple agencies, including the Regional Water Quality Control Board (RWQCB) – Santa Ana Region, DTSC, the County, and the South Coast Air Quality Management District (SCAQMD), conducted an inspection of the Site. The DTSC issued a Statement of Violation (SOV) based on the occurrence of lead in a soil sample obtained from the “new arena” area. Immediately upon receipt of the SOV, Wyle investigated and remediated the “new arena” and an area where similar testing had been conducted, known as the J14 area. DTSC conducted its own confirmation sampling of the areas in April 2002, and subsequently issued a letter stating that chemicals indicative of hazardous waste constituents were not detected. DTSC did not require additional action in these two areas.

The RWQCB has provided oversight of ground water monitoring at Wyle since early 1999, after the first wells were installed at the Site. Based on the results of ground water monitoring completed through early 2003, the RWQCB requested work plans to address volatile organic compounds (VOCs) in ground water at the Site, and to perform an evaluation of off-site downgradient ground water quality. On behalf of Wyle, ENVIRON submitted these work plans to the RWQCB in early June of 2003, as described in later sections of this work plan (ENVIRON, 2003a, 2003b). After submittal of these work plans, the RWQCB ceded active oversight of site investigation/remediation activities to the DTSC. Wyle continues to address site investigation and remedial issues on a voluntary basis, pursuant to the Order.

### **1.3 Purpose and Scope of Remedial Investigation**

As stated above, the objective of this RI work plan is to provide a plan for the further assessment and characterization of Site hydrogeology and chemicals in soil gas, soil, surface water, and ground water at the Site. This RI work plan is comprised of the following sections:

- Site background and setting, including the physical setting of the Site, the historic land use of the Site and surrounding properties, a review of regulatory agency databases, presentation of data from previous assessments, and a description of the remediation activities conducted at the Site to date;
- Initial evaluation, conceptual site model, and work plan rationale;
- RI tasks, including the proposed soil gas, soil, and grab ground water sampling, well installation, subsurface coring, the analytical program, data evaluation, and baseline human health and ecological risk assessment;
- Reporting; and
- A schedule of planned RI tasks.

In addition to this section, 1.0 Introduction, the work plan is comprised of the following sections: Section 2.0, Site Background and Setting; Section 3.0, Initial Evaluation and Conceptual Model; Section 4.0, Work Plan Rationale; Section 5.0, Remedial Investigation Tasks; Section 6.0, Schedule; Section 7.0, Project Management; and, Section 8.0, References. Tables, figures, and appendices follow the text.

## **2.0 SITE BACKGROUND AND SETTING**

### **2.1 Physical Setting**

#### **2.1.1 Physiography**

The Site is located in the northernmost portion of the Peninsular Ranges geomorphic province in the City of Norco, Riverside County, California. This portion of the geomorphic province is characterized by the flat surface of the Perris Plain, with interspersed resistant outcropping granitic knobs.

The vicinity of the Site is mapped as Mesozoic-age granite and granodiorite on the regional geologic map (Santa Ana Sheet of the Geologic Map of California, Rogers, 1965). These same rock types are mapped in the vicinity of Lake Mathews (a reservoir at the terminus of the Colorado River Aqueduct), located approximately 5 miles southeast of the Site. According to Kennedy/Jenks Consultants (Kennedy/Jenks) review of the boring logs from the Lake Mathews site (Ransom, 1933a and 1933b), most of the weathering and the fracturing in the granite and granodiorite rocks were observed primarily in the upper 50 feet of these units. The maximum depth of noticeably weathered material at Lake Mathews extended to a depth of approximately 130 feet below ground surface.

Erosional features observed at or in proximity to the Wyle site include alluvial fans generated from erosion of the adjoining natural hillsides. Two major northwest-southeast trending faults traverse the area; the San Jacinto Fault (located approximately 25 miles northeast of the Site) and the Chino Fault (located approximately 9 miles west of the Site).

#### **2.1.2 Climatology**

Meteorological information was obtained from the National Climate Data Center (NCDC) on the National Oceanic and Atmospheric Administration web page, Riverside Citrus Weather Station (approximately 10 miles east of the Site), from July 1948 to July 2003. Average daily maximum temperatures, in Fahrenheit, ranged from the mid 60°s to the low 70°s during the winter months, and from the mid 80°s to the high 90°s during summer months. Average annual precipitation was approximately 10.05 inches per year, with a maximum rainfall during this period of 17.18 inches occurring in 1995. The majority of annual precipitation

occurs from December to April, with less than 2 inches of precipitation typically occurring during the remaining summer and autumn months. Daily maximum wind speeds ranged from approximately 2.5 to 6 miles per hour were directionally variable, and showed minimal seasonal variations.

## **2.2 Historic Land Use**

The Site is divided geographically into several “areas” (Areas A through M)(see Figure 2). Each area typically consists of one or more small buildings, structures, and/or outdoor testing areas built for certain testing procedures and/or to house specific testing apparatus.

The Site was undeveloped until at least 1952. Wyle first occupied the site in approximately 1957, starting in the western portion of the site and later expanding in the eastward direction. The buildings and test areas have been used historically for testing aerospace components and systems, including pumps, valves, piping and propulsion systems; ordnance and weapons systems; performing environmental and dynamic simulation tests; and, infrequent munitions detonation and solid rocket motor firings. Several buildings not used for testing are used for administrative functions, chemical storage, vehicle maintenance, metal machining/parts fabrication, and, historically, photographic developing. Chemical use at the site has included explosives, solid rocket motor fuel, cryogenics, petroleum hydrocarbons, hypergolic fuels, and solvents; use of hypergolic fuels and chlorinated solvents was discontinued in the early 1990s. Wyle discontinued operations at the Site in 2004 and vacated the Site in October 2004.

An area-by-area summary of historic land uses has been prepared to provide a comprehensive summary of historic activities conducted at each area and/or feature. Sources for this information included historical Site investigation reports, regulatory agency records reviews, a series of in-depth interviews of Wyle employees, and detailed area-by-area inspections conducted with long-time Wyle employees knowledgeable about area-specific operations. The information provided is cross-referenced to area-specific maps and photographs (see Section 5.0 for a discussion of these attachments).

## **2.3 Surrounding Property Land Uses**

Properties adjacent to the Site include:

- To the north, residences and undeveloped, vacant land.
- To the south, residences.

- To the west, one residence, located east of Hillside Avenue, and west of Hillside Avenue, Norco High School. Sensitive receptors include: Norco High School, located at 2065 Temescal Avenue and immediately west of Hillside Avenue; Norco Intermediate School, located at 2611 Temescal Avenue and approximately 2,000 feet from the northwestern Site boundary; and, Norco Elementary School, located at 1700 Temescal Avenue and approximately 1,600 feet west of the Site boundary.
- To the east, residences and the Hidden Valley Golf Course.

## **2.4 Review of Regulatory Agency Databases**

### **2.4.1 Environmental Database Review**

As one step in assessing the potential for soil and/or ground water contamination at the Site to originate from on- and off-site sources, ENVIRON conducted a review of federal and state regulatory environmental database lists for the Site and vicinity, as provided by EDR. A copy of the EDR report, dated February 3, 2003, is appended to this work plan as Appendix A. EDR conducted an environmental regulatory database search of properties located within applicable radii of the site, as recommended by the American Standard for Testing and Materials (ASTM) standard.

Only those addresses that were listed on databases indicative of a potential environmental concern and that are located in the immediate vicinity of the Site or are located upgradient (but are not necessarily adjacent to the Site) are discussed below. These addresses were selected based on the assumption that a hazardous material released to the subsurface generally does not migrate laterally within the unsaturated soil for a significant distance, but a hazardous material can migrate in the ground water in a generally downgradient direction; however, there are limitations to this interpretation.

Appendix A includes the report provided by EDR and is the basis for most of the agency information<sup>1</sup>. The EDR report indicates there was poor or inadequate address information for several properties located in the vicinity of the Wyle site; therefore, these properties could not be mapped by EDR. Because the location of these properties with respect to the Wyle site could not be evaluated, ENVIRON is limited in its ability to express an opinion regarding the potential for impact to the Site from these properties. However, ENVIRON

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<sup>1</sup> Where indicated, ENVIRON may add information known to it from other means. Where this occurs, the source of the information is referenced.

reviewed the list of unmappable properties and could not identify any properties with the potential to adversely impact the Wyle site.

The following regulatory databases were reviewed by EDR and reported to ENVIRON:

### **Federal Superfund Sites**

Under the Comprehensive Environmental Response, Conservation and Liability Act (CERCLA) of 1980, the EPA maintains a list of Federal Superfund sites. A contaminated site is prioritized according to a quantitative hazard ranking system (HRS), which rates a site on potential risk to human health and the environment. Sites receiving the highest ranking under the HRS are included on the National Priority List (NPL). Date of Last Update: November 2003.

### **Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)**

CERCLIS is the EPA's Superfund database system that contains NPL sites and approximately 30,000 other sites that may be contaminated with hazardous substances. CERCLIS provides information on businesses and properties that are in the Federal Superfund Program. Under this program, a business or property is identified and investigated to determine if the Property should become a Superfund site. Date of Last Update: December 2003.

### **Emergency Response Notification System (ERNS)**

The ERNS database is maintained by the EPA, National Response Center of the US Coast Guard, and Department of Transportation, and includes information regarding reported releases of oil and hazardous substances. Date of Last Update: October 2003.

### **Resource Conservation and Recovery Information System (RCRIS)**

RCRIS includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Date of Last Update: January 2004.

### **Corrective Action Report (CORRACTS)**

The EPA maintains this database of RCRA facilities that are undergoing "corrective action." A "corrective action order" is issued pursuant to RCRA Section 3008(h) when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required

regardless of when the release occurred, even if it predates RCRA. Date of Last Update: December 2003.

**Facility Index System Report (FINDS)**

The FINDS database contains facility information, and ‘pointers’ to other sources that contain more detail. The FINDS database includes information from a compilation of several federal and state environmental databases. Date of Last Update: January 2004.

**Biennial Reporting System (BRS)**

The BRS database contains information on the generation and management of hazardous waste by Large Quantity Generators (LQGs) and Treatment, Storage and Disposal Facilities (TSDs). Date of Last Update: December 2003.

**Records of Decision (ROD)**

ROD documents mandate a permanent remedy at Superfund (NPL) sites containing technical and health information to aid in the cleanup. Date of Last Update: January 2004.

**Hazardous Materials Information Reporting System (HMIRS)**

HMIRS contains hazardous materials spill incidents reported to DOT. Date of Last Update: January 2004.

**Material Licensing Tracking System (MLTS)**

The MLTS is maintained by the Nuclear Regulatory Commission (NRC) and contains a list of approximately 8,100 sites that use or possess radioactive materials and are subject to NRC licensing requirements. Date of Last Update: January 2004.

**NPL Liens**

USEPA compiles a list of liens filed against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. Date of Last Update: November 2003.

**PCB Activity Data System (PADS)**

PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required to notify the EPA of such activities. Date of Last Update: November 2003.

### **RCRA Administration Action Tracking System (RAATS)**

RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. Date of Last Update: December 2003.

### **Toxic Chemical Release Inventory System (TRIS)**

TRIS identifies facilities, which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313. Date of Last Update: December 2003.

### **Toxic Substances Control Act (TSCA)**

TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory List. It includes data on the production volume of these substances by plant site. Date of Last Update: December 2003.

### **Section 7 Tracking Systems (SSTS)**

SSTS records the types and amounts of pesticides, active ingredients and devices being produced and sold or distributed on a yearly basis by pesticide producing establishments. Date of Last Update: January 2004.

### **Annual Work plan Sites (AWP)**

State of California Department of Toxic Substance Control (DTSC) identifies known hazardous substance sites targeted for cleanup. Date of Last Update: December 2003.

### **Cal-Sites Database (Cal-Sites)**

The Cal-Sites database contains potential or confirmed hazardous substance release sites. Date of Last Update: December 2003.

### **California Hazardous Material Incident Reporting System (CHMIRS)**

CHMIRS contains information on reported hazardous materials incidents (accidental releases or spills). Date of Last Update: November 2003.

### **“Cortese” Hazardous Waste & Substances Site List (CORTESE)**

The CORTESE list is a compilation of sites from the State Water Resources Board, the Integrated Waste Board, and Cal-Sites databases. Date of Last Update: October 2003.

### **Notify 65**

Notify 65 contains facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. Date of Last Update: January 2004.

**Toxic Pits Cleanup Act Sites (Toxic Pits)**

The Toxic Pits identifies sites suspected of containing hazardous substances where cleanup has not yet been completed. Date of Last Update: November 2003.

**Solid Waste Information System (SWF/LF)**

The SWF/LF records typically contain an inventory of solid waste disposal facilities or landfills. These may be active or inactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfill or disposal sites. Date of Last Update: December 2003.

**Waste Management Unit Database System (WMUDS/SWAT)**

The WMUDS/SWAT is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. The WMUDS/SWAT is composed of several other databases. Date of Last Update: December 2003.

**Leaking Underground Storage Tanks - LUST**

The LUST database contains an inventory of reported LUST incidents. Date of Last Update: January 2004.

**Active UST Facilities (CA UST)**

The CA UST list is composed of active UST facilities gathered from local agencies. Date of Last Update: January 2004.

**Voluntary Cleanup Program Properties (VCP)**

DTSC maintains a list of low threat level properties with either confirmed or unconfirmed releases and where the project proponents have requested that DTSC oversee the investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. Date of Last Update: December 2003.

**Facility Inventory Database (CA FID UST)**

The CA FID UST contains a historical listing of active and inactive underground storage tank locations from the State Water Resources Control Board. Date of Last Update: December 1998.

### **Hazardous Substances Storage Container Database (HIST UST)**

The HIST UST is a listing of historic UST sites provided by local agencies. Date of Last Update: July 2001.

### **Waste Discharge System (CA WDS)**

The CA WDS list contains sites that have been issued waste discharge permits. Date of Last Update: December 2003.

### **Hazardous Waste Information System (HAZNET)**

HAZNET contains facility and manifest data for facilities that ship hazardous wastes and submit hazardous waste manifests to DTSC. Date of Last Update: November 2003.

### **Spills, Leaks, Investigations and Cleanup Cost Recovery Listing (CA SLIC)**

CA SLIC list contains contaminated sites that impact or have the potential to impact ground water. Date of Last Update: January 2004.

The Site is listed on the following regulatory databases: ERNS, FINDS, CERCLIS, HAZNET, CHMIRS, RCRIS-LQG, CA SLIC, CA WDS, and HIST UST. Details of each listing are provided below.

#### **ERNS**

The Site appears on the ERNS database three times. The three listings relate to a release of transformer oil (containing PCBs) that occurred in March 1999. This release is discussed below (see CHMIRS database discussion).

#### **FINDS**

The FINDS listing indicates that pertinent environmental information for the Site can be found in the CERCLIS and Resource Conservation and Recovery Act Information System (RCRAINFO) databases. Details of the CERCLIS listing are provided below. ENVIRON performed a search of the RCRAINFO database available on the USEPA Facility Registry System web site. The RCRAINFO database includes facility information (location, address, contact information, etc.) and indicated that the Site was a Large Quantity Generator (see RCRIS-LQG below) and is listed on CERCLIS.

#### **CERCLIS**

The CERCLIS listing indicates that a preliminary assessment was conducted at the Site in 1988, and 'No Further Remedial Action Planned' status was granted to the Site. It should be noted that, based solely on community concerns, EPA revisited the Sites' CERCLIS listing

and conducted sampling at the Site and in the community in November 2003. Results of EPA's investigation are pending and due to be released in late spring, 2004.

### **HAZNET**

The HAZNET listing includes records of historic off-site disposal of hazardous waste associated with normal facility operation (i.e. photographic processing wastes, waste aqueous solutions, and soil generated from previous remediation activities).

### **CHMIRS**

The CHMIRS listing includes a reported release of PCB-containing transformer oil that was discovered in March 1999 while Wyle personnel were cleaning up an area of the Site that was being used to store old equipment. Based on ENVIRON's review of local agency files, this listing apparently corresponds to a leaking transformer that was discovered by Wyle in 1999 in Area J11. According to documents reviewed by ENVIRON, the impacted soil was removed by Phase One Environmental and transferred to an off-site facility for disposal.

### **RCRIS-LQG**

The Site is listed as a large quantity generator with no violations noted. Based on ENVIRON's review of Uniform Hazardous Waste Manifests (UHW) maintained by Wyle, the classification appears to result from the off-site disposal of remediation waste and oil-containing water.

### **CA SLIC**

The EDR report indicates that the Site is listed on the RWQCB Region 8 (Santa Ana Region) SLIC list, and that the status of the Site is 'additional characterization underway.' The EDR report lists 'VOCs' and 'ClO<sub>4</sub>' (perchlorate) as chemicals of concern and indicates that impacted media include soil and ground water. As stated previously, the RWQCB began oversight of all the investigations at the Site in 1999, and in 2003, ceded oversight to DTSC.

### **CA WDS**

The Site is listed as an active 'Category C' industrial facility that generates a continuous or seasonal discharge that is under Waste Discharge Requirements. No additional information is provided in the EDR report for this listing.

### **HIST UST**

One historical UST is reported in the EDR. No information is provided in the EDR report regarding the age, size, or contents of the former UST. Based on documents obtained by ENVIRON from the County, this listing corresponds to the former 4,000 gallon gasoline

UST located in the motor pool area. This UST was removed under County supervision in 1998, and a closure letter was issued.

In addition to the aforementioned listings for the Site itself, four properties located within one-eighth mile of the Site are listed on the one or more regulatory databases indicative of an environmental concern. The listings for each of the four properties are as discussed below.

### **220 Laboratories Inc., 2375 3<sup>rd</sup> Street**

The 220 Laboratories Inc. property is located to the north-northwest and within 1/8 mile of the Site, and is listed on the HAZNET, FINDS, and RCRIS-LQG databases. The FINDS listing indicates that the site is listed on RCRAINFO and TRIS databases, but no additional information is provided in the EDR report for these listings. The HAZNET listing indicates that the property has historically disposed of hazardous wastes including waste oil and mixed oil, off-specification, aged or surplus organics, and paint sludge. The RCRIS listing indicates that the property is classified as a Large Quantity Generator (RCRIS-LQG). The EDR report also includes that the amount of hazardous waste generated as reported in the 2001 Biennial Report was 62,250 pounds, and that no violations were found. Based on the information provided in the EDR report and the location of this property relative to the Site, it does not appear that this property has adversely impacted environmental conditions at the Site, although potential releases from the property could impact soil and ground water in the vicinity of the Site.

### **2421 Hillside Drive**

This property is located to the north-northwest of the Wyle site within one-eighth mile and is listed on the CHMIRS and ERNS databases. Both listings relate to an incident that occurred in September 1991. According to information provided in the EDR report obtained from the ERNS database, the incident involved a release of approximately 1,000 gallons of liquid nitrogen. The release occurred during transfer of the chemical from a truck to a tank, and resulted in an explosion. Because the only documented release is related to liquid nitrogen, it does not appear that this incident could adversely impact environmental conditions at the Wyle site.<sup>2</sup>

### **919 3<sup>rd</sup> Street, “Smith & Reynolds Storage Yard”**

This property is located to the northwest of the Wyle site within one-eighth mile, and is listed on the HIST UST database. The EDR report indicates that one tank was located at the property, but no additional information is provided. Based on the information provided in

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<sup>2</sup> This listing appears to be an error for the address listed, as the incident description matches an event that occurred during the same time frame at the Wyle Site.

the EDR report, listing on the HIST UST database alone is not indicative of an environmental concern. Therefore, it does not appear that this property could adversely impact environmental conditions at the Wyle site.

### **2065 Temescal Avenue, Norco High School**

Norco High School is located west of the Wyle site. The high school is listed on the DTSC School Property Evaluation Program, which identifies school properties being evaluated by DTSC for possible hazardous materials contamination. The EDR report indicates that a Preliminary Endangerment Assessment (PEA) was conducted under oversight of DTSC in conjunction with a proposed school addition by the Corona-Norco Unified School District (CNUSD). The EDR report indicates that the DTSC approved the final PEA, and issued a 'No Further Action' status for the property regarding the proposed addition.

Based on the information contained in the EDR report, it does not appear that any of the off-site database listings have contributed to the known soil and/or ground water contamination on the Site, although potential releases from 220 Laboratories Inc. could impact soil and/or ground water in the vicinity of the Site.

### **2.4.2 Agency File Review**

ENVIRON requested records for the Site address from the following agencies: City of Norco Building Department (Building Department), City of Norco Clerk's Office (Clerk's Office), DTSC, SCAQMD, and the County. The records were requested through Environmental Support Services (ESS) of Fullerton on April 21, 2003, and were received on May 6, 2003; therefore, the document review is current through May 2003. A summary of the records provided from each of the agencies is listed below. It is noted that this summary does not include a discussion of the numerous consultants' reports of environmental investigations that have been conducted at the Site since the early 1990s because these reports are discussed in detail in ensuing sections of this work plan.

#### **Building Department and Clerk's Office**

The Building Department records contained 45 structural, electrical, plumbing, and storm drain permits associated with the construction of various buildings at the Site; a list of the Building Department permits is included in Appendix A. The permit dates ranged from 1958 to 1970; none of the permits appear to have been issued for structures or features of potential environmental concern. In general, the permits confirm the construction dates of buildings as provided by long-time Wyle employees and described in subsequent sections of this work plan.

The Clerk's Office reported that its records contained no files for the Site address.

### **DTSC**

DTSC files contained correspondence between DTSC and other agencies, including the RWQCB and the County. Correspondence generally related to the assessment of environmental conditions at the Site based on the results of recent environmental investigations, and considerations as to which agency would assume the lead role in cleanup oversight. Documents dated after approximately 1995 are generally duplicated in the County records, and a discussion of these records is provided below. DTSC files also contained documentation of a Preliminary Assessment (PA) that was conducted in 1987 -1988 by the California Department of Health Services (DHS), and records relating to the reported release of liquid nitrogen that occurred in 1990 (see discussion in Section 2.4.1). Based on the files reviewed by ENVIRON, the DHS PA resulted in a determination by DHS that 'no further action' was necessary at the Site.

### **SCAQMD**

The SCAQMD files contained 17 permits for operation of equipment at the Site, including scrubbers, service station gasoline dispensers, internal combustion engines, and storage tanks with amines (a list of the permits is included in Appendix A). Seven of the permits, for a scrubber, a storage tank, internal combustion engines, and service station storage were active as of May 2003. Since that time, Wyle has vacated the Site, and the permits have been terminated. No violations for the Site were reported by SCAQMD.

### **Riverside County**

The County files contained numerous records pertaining to the use and storage of hazardous materials (permits, chemical disclosure forms, business plans, etc.), inspections, site maps and results of environmental investigations performed at the Site. According to the records reviewed by ENVIRON, the County acted as the lead regulatory agency for the majority of the soil remediation conducted to date at the Site. Hazardous waste generator inspection reports (dated 1988, 1993, 1995, 1997, and 2001), underground storage tank (UST) inspection reports (dated 1993, 1995, 1997, and 1998), and a letter of closure for the UST (1998) were contained in the files. The County issued several miscellaneous minor violations, which resulted from several of the inspections. The violations cited included such things as improper drum labeling, lack of signage, and an out-of-date business plan. The files also contained correspondence documenting actions taken by Wyle to comply with the violations noted during the County inspections.

ENVIRON reviewed business plans and/or chemical inventories from 1987, 1990, 1992, 1993, 1995, 1997, and 2001, as well as Tier Two Reporting Forms for 1994, 1995, and 1996, that were contained in the County files. A variety of chemicals, including PCE, TCE, other VOCs, hydrazine, petroleum hydrocarbons, acids, and compressed gases were listed on the various chemical lists. Chemicals reported on the Tier Two Reporting Forms included hydrogen, nitrogen, oxygen, carbon dioxide, helium, and hydrazine (1994 and 1995 only).

Information contained in the agency files reviewed confirms what was previously known about the Site regarding chemical and Site use history, and does not suggest areas of additional environmental concern not previously known at the Site.

## **2.5 Previous Assessment and Remediation Activities**

### **2.5.1 Introduction/Overview**

Beginning in 1994, numerous subsurface investigations and several remedial actions have been conducted at the Site. Investigative locations are depicted on Figure 2, and on additional area maps, as referenced below. The following sections of this work plan briefly describe the investigations, beginning with the earliest investigation. The results of the investigations are discussed in greater detail in Sections 2.5.2 and 2.5.3.

#### **2.5.1.1 BB&L**

In August 1994, Wyle Electronics retained Blasland, Bouck and Lee (BB&L) to perform a Phase I ESA of the Site. During its Phase I ESA, BB&L documented several recognized environmental conditions (RECs), and noted the use of chlorinated solvents and other VOCs, hydraulic oil, and hydrazine in several areas of the Site. As a follow up to BB&L's Phase I ESA report, BB&L collected 47 soil samples from locations adjacent to and in the downslope surface water runoff direction of certain Area F Buildings. The results of the initial investigation indicated that VOCs and petroleum hydrocarbons (hydraulic oil) were identified in the soil along the surface water runoff flow path from several buildings in Area F. Subsequent subsurface investigations and remediation performed by BB&L were conducted primarily in Area F, and are discussed in more detail in the following sections of this work plan.

### **2.5.1.2 Phase One**

In 1999, Phase One, Incorporated (Phase One), as part of a due diligence assignment performed at the Site, conducted a series of soil and ground water investigations that included the collection of soil samples from approximately 140 locations and installation of eight monitoring wells (MW-1 through MW-8) across the Site. Phase One tested the soil and ground water samples for a variety of compounds, including total petroleum hydrocarbons (TPH), VOCs, metals, hydrazine, and semi-volatile organic compounds (SVOCs). Sampling was conducted in potential source areas, as well as in areas of no known hazardous materials use or potential disposal at the Site. Phase One concluded from the analytical results *“there has not been a significant release of volatile organic compounds or semi-organic volatile organic compounds at most of the areas investigated.”* Ground water sampling results, from several sets of samples collected between 1999 and mid-2000, indicated the presence of VOCs, specifically, tetrachloroethene (PCE) and trichloroethene (TCE), in five of the wells installed downgradient of Area F buildings. Phase One recommended disclosing the findings to the appropriate regulatory agencies (Phase One, 1999). Phase One’s results are discussed in further detail in ensuing sections of this work plan.

### **2.5.1.3 Kennedy/Jenks**

In April 2001, at the RWQCB’s request, Kennedy/Jenks submitted a work plan for additional soil and ground water characterization. On receipt of the RWQCB’s approval of the work plan, Kennedy/Jenks advanced three soil borings (EOP-1 through EOP-3). The soil samples were analyzed for VOCs; TCE was the only VOC detected and was detected in EOP-3 (located downgradient of Building F2)(see Section 2.5.2.6). In addition, Kennedy/Jenks installed six new ground water monitoring wells (MW-1A, MW-2A, MW-9, MW-10, MW-11, and MW-13), and one replacement well, MW-5A (Well MW-5 was destroyed during residential construction activities). Further, one additional well was installed; however, the well (MW-12) was dry and could not be used to monitor ground water. As a result, this well was converted to a vapor monitoring well and assigned a new well designation, VW-12. Well VW-12 was sampled in December 2001 and April 2002 and the soil vapor samples were analyzed for VOCs using EPA Method 8260B. The only compound detected was toluene, at concentrations ranging from 1.0 µg/l to 3.1 µg/l.

All of the ground water monitoring wells (MW-1 through MW-13) were sampled quarterly between December 2001 and March 2003; analytical results of the ground water

sampling confirmed the presence of VOCs, primarily TCE, in ground water, and to a lesser extent perchlorate and NDMA.

In addition, surface water samples were collected from various locations along the ephemeral stream in March 1999, February 2001, March 2002, April 2002, February 2003, and March 2003. All surface water samples were analyzed for VOCs in accordance with EPA Method 8260. In addition, surface water samples collected in 2002 were analyzed for SVOCs, metals, TPH, and perchlorate, in accordance with EPA Methods 8270, 6010/7471/7196, 8015 Modified, and 314, respectively. Relatively low concentrations of TCE, cis-1,2-DCE, and trans-1,2-DCE were detected in surface water samples collected from adjacent to MW-5A and MW-8. No SVOCs, TPH, or perchlorate were detected in the samples. Detected metals concentrations were below federal Maximum Contaminant Levels (MCLs).

Pursuant to a request from the RWQCB, Kennedy/Jenks submitted a work plan for investigation of the 13 septic systems to the RWQCB on March 29, 2002 (Kennedy/Jenks, 2002b). On receipt of the RWQCB's approval of the work plan, Kennedy/Jenks conducted its investigation at the Site in April and May of 2002. Sludge samples were collected from the interior of each septic tank and soil samples were collected in proximity to the leach line exiting each septic tank and analyzed for VOCs using EPA Method 8260B; semi-volatiles by EPA Method 8270; Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471; TPH using EPA Method 8015M; and, chloride, nitrate, nitrite, and sulfate using EPA Method 300. In addition, the samples collected from leach field soils were analyzed for total organic carbon (TOC) using EPA Method 451.1.

VOCs were not detected in the soil samples collected from adjacent to any of the leach lines; however, VOCs were detected above the associated laboratory reporting limits in sludge samples in 6 of the 13 septic systems sampled (septic systems 3, 4, 5, 6, 9, and 11) (Kennedy/Jenks, 2002c). Kennedy/Jenks concluded that *“many of the detected compounds, including the SVOCs, most of the detected metals, and the TRPH, might be expected in septic systems as a result of normal septic system operations.”* Based on the results of this investigation, as described in the *Septic System Investigation Report*, and the ground water monitoring results at the Site, the RWQCB stated in an April 28, 2003 letter *“the septic systems do not appear to be a significant current source of water quality impact at the site”* (RWQCB, 2003).

#### **2.5.1.4 ENVIRON**

In February 2002, ENVIRON conducted soil sampling and soil remediation activities in response to the Summary of Violations (“SOV”) notice issued by the DTSC on January 14, 2002. The DTSC collected three soil samples within the current arena (Area K3) and lead was detected at elevated concentrations in one of the three samples. As a result, the SOV was issued. In response to these findings, ENVIRON collected a total of 24 soil samples; 20 soil samples in the general arena area (SB-1 through SB-20) and 4 soil samples from within the detonation test cell area (SB-21 through SB-24). All soil samples were analyzed for total lead using EPA Method 6010B. In addition, soil samples from three borings, SB-16, SB-21, and SB-21-1 at one-foot bgs were analyzed for California Title 22 metals by EPA Method 6010/7471. Results indicated the detection of elevated lead concentrations within the 10 foot by 10 foot detonation test area located within the arena. Lead concentration ranged from 11,000 mg/kg in SB-22 to 7.1 mg/kg in SB-24-1.

On February 12, 2002, using the EPA Region 9 Residential Preliminary Remediation Goal (RPRG) for lead of 400 mg/kg as a guide, ENVIRON excavated soil from the 10 foot by 10 foot detonation test area to a depth of approximately 2 feet bgs (approximately 243 cubic feet of soil). In addition, a second area measuring approximately 10 foot by 10 foot surrounding SB-6 was excavated to depth of approximately 6 inches bgs, because the soil sample SB-6 exhibited an elevated concentration (130 mg/kg) of lead compared to the other 19 general arena soil samples. Confirmation testing was conducted upon completion of the excavation. Confirmation soil sample results were below both the California- Modified RPRG for lead of 150 mg/kg and the EPA Region 9 RPRG for lead of 400 mg/kg (ENVIRON 2002).

On March 5, 2002, ENVIRON conducted soil sampling in the J14 testing arena (arena), which was constructed similarly to Area K3, because similar detonation test activities to those performed in Area K3 were performed historically in this area. This sampling was performed on a voluntary basis and not mandated by any governmental authority. ENVIRON’s field investigations addressed the 10 by 10 foot detonation test area and the surrounding arena, and focused on identifying areas, if any, that exhibited elevated lead concentrations. A total of 25 soil samples were submitted to the laboratory for California Title 22 metals analysis using EPA Method 6010B/7471. The sampling results indicated that elevated concentrations of one or more metals were detected in the detonation test area located within the arena.

As a result, on April 2, 2002, and using the RPRGs as a guide to removal criteria, ENVIRON excavated soil from within the 10 foot by 10 foot test area to a depth of approximately 4 feet bgs. A composite sample was collected from the excavated soil and analyzed for California Title 22 Metals using EPA Method 6010B/7471 to ensure appropriate characterization for off-site disposal. Confirmation testing was conducted upon completion of the excavation. Metals concentrations for all confirmation soil samples were below their respective RPRGs, with the exception of arsenic. Arsenic results were considered to be within the documented “background” range for Southern California soils (ENVIRON, 2002a).

On March 5, 2002, ENVIRON conducted soil sampling in the “Cook-Off” area of Area J (J8). The Cook-Off area consists of approximately 25 feet long by 16 feet wide, 4-inch thick concrete slab, equipped with a drainage channel and sump. Tests conducted in this area used diesel fuel. In 1999, Phase One conducted soil sampling adjacent to the sump but did not test for petroleum hydrocarbons in soil. Phase One did not detect any VOCs in soil samples at concentrations above the applicable detection limit. ENVIRON collected a total of four soil samples adjacent to the concrete slab that contains the sump (SB-22 through SB-25). Soil samples were collected from the surface, and until refusal was encountered, at depths that varied from 2 feet to 3.5 feet bgs. All soil samples were analyzed for extractable fuel hydrocarbons and volatile fuel hydrocarbons. Soil sampling results indicated the presence of heavy petroleum hydrocarbons, which ranged in concentration from 5.7 mg/kg to 2,600 mg/kg (ENVIRON, 2002b).

In July 2002, ENVIRON conducted a screening human health risk assessment (SHHRA) for VOCs and dissolved metals detected in surface water near MW-5A, located at the Site boundary; the results of the screening SHHRA indicated no significant health risk to off-site residents (ENVIRON, 2002c)<sup>3,4</sup>

In a letter dated April 28, 2003, the RWQCB requested that a work plan be submitted to address the presence of VOCs, specifically chlorinated solvents, in soil and ground water at the Site and downgradient of the Site (RWQCB, 2003). In prompt response to the RWQCB’s request, in June 2003, ENVIRON submitted a work plan to investigate soil and ground water in the vicinity and downgradient of Area F, and ground water off-site, downgradient of Well MW-5A.

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<sup>3</sup> The SHHRA was based on a child receptor assumed to be in direct contact with surface water; it is noted that surface water is present only a few months out of each year at the off-site location subject to the SHHRA.

<sup>4</sup> As part of this RI Work Plan, ENVIRON will conduct a site-wide HHRA to calculate site-specific risk-based target concentrations that will be protective of human receptors potentially exposed to Site-related chemicals.

The work plan was implemented at the Site in August and September 2003 (ENVIRON, 2003). As part of the work plan, ENVIRON advanced 25 soil borings (ESB-1 through ESB-25) and installed 12 ground water extraction wells (EX-1 through EX-12) in the immediate vicinity and downgradient of Area F buildings to further investigate and monitor the source and distribution of the VOC-impacted ground water. In addition, to address potential VOC migration off-site, ENVIRON advanced six soil borings along Hillside Avenue, downgradient of Well MW-5A, and perpendicular to the anticipated historical path of the ephemeral stream. Soil samples were analyzed for VOCs in accordance with EPA Method 8260B; for explosive residues by EPA Method 8330; for perchlorate by EPA Method 314; and for SVOCs by EPA Method 8270. With the exception of low levels of VOCs, no compounds were detected above their associated reporting limits. Ground water samples were analyzed for the same suite of compounds, excluding SVOCs but adding NDMA (EPA Method 1625C). The ground water results indicated concentrations in the same range as those previously detected on-site. Trace concentrations of TCE, cis-1,2-DCE, trans-1,2-DCE, perchlorate, and NDMA were detected in several off-site ground water samples.

On November 24, 2003, ENVIRON submitted a Draft *Removal Action Work plan* (RAW) to the DTSC. The RAW was prepared to address known VOC-impacted ground water at the Site in proximity to and downgradient of Areas F and H. The Draft RAW was approved by the DTSC on May 7, 2004 and was resubmitted as a Final RAW on May 14, 2004.

As part of the RAW implementation, ENVIRON installed five additional wells. Three of the monitoring wells (MW-1B, MW-4B, and MW-6B) were installed adjacent to existing shallow monitoring wells (MW-1, MW-4, and MW-6) to investigate the deeper part of the aquifer. In addition, ENVIRON attempted to install a deeper monitoring well (MW-8B) adjacent to Well MW-8 but refusal was encountered at a shallow depth. Wells MW-1B, MW-4B, and MW-6B were installed at depths of approximately 40 feet bgs. The remaining two monitoring wells (MW-17 and MW-18) were installed to help monitor the effectiveness of the remedial system. Three 2-PHASE™ Extraction and remediation systems were installed at the Site, and began operating in “batch” mode, under DTSC’s supervision, in April of 2004. Continuous operation of the three systems was initiated in August of 2004. The systems are being operated in accordance with the RAW and the Final System Operation, Maintenance, and Monitoring Plan (O & M Plan), dated April 21, 2004.

In addition, ENVIRON conducted quarterly ground water sampling of the monitoring wells beginning in July 2003 through October 2004; however, the October 2004 results have not yet been submitted to DTSC. The results of the ground water sampling indicated the presence of VOCs, primarily TCE, in ground water. In addition, perchlorate and NDMA were detected at low concentrations in several ground water samples.

ENVIRON collected surface water samples from the ephemeral stream adjacent to Wells MW-5A, MW-6, and/or MW-8 concurrently with quarterly ground water sampling, when water was present in the stream. Samples were selectively analyzed for general chemistry compounds in accordance with various analytical methods, metals in accordance with EPA Method 6010/7000, VOCs in accordance with EPA Method 8260B, and NDMA using EPA Method 1625C M. Detected metals concentrations were well below the respective MCLs. Certain VOCs were detected adjacent to Wells MW-5A, MW-6, and MW-8, including TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride (near Well MW-5A only). NDMA was detected in surface water samples collected adjacent to Well MW-5A.

In February through September of 2004, ENVIRON sampled shallow soil (18 locations, ESB-26 through ESB 43), soil gas (ESB-30 through ESB-43 and ESG-15 through ESG-23 ), sediment (1 location near Well MW-5A), surface water, storm water runoff (4 locations adjacent to ESB-33, ESB-34, ESB-38, and ESB-43), and ground water (3 locations, MW-14, MW-15, and MW-16) along the Site's boundaries, and performed off-site soil gas sampling on El Paso Avenue (RESG-1 through RESG-4), on Hillside Avenue (at MW-16, ESG-45 and ESG-46), at the City of Norco High School (ESG-47 through ESG-50), and on Golden West Lane (ESG-5 through ESG-14 and ESG-24, ESG-25, ESG-27 through ESG-30, ESG-32 through ESG-36, and ESG-38 through ESG-44, and ESG-51). The investigation was performed in accordance with the "Revised Work plan for Additional Investigation Along Site Boundary" dated December 31, 2003, which was conditionally approved by the DTSC on January 22, 2004.

The soil sampling results indicated that SVOCs, perchlorate, NDMA, hydrazine, and PCBs were not detected in the soil samples analyzed for these compounds. VOCs were not detected in soil samples analyzed except at locations ESB-30, ESB-34, and MW-14. TPH (diesel range hydrocarbons) was detected in soil samples collected in the North-Northwestern Section and the Western Section. These heavy end hydrocarbons were detected within a relatively narrow concentration range (6 mg/kg to 33 mg/kg), and do not appear to be related to on-site activities. Metals detected in the surface soil samples

collected in the North-Northwest and Western Sections. With the exception of arsenic, all detected metals concentrations were below the respective PRG. The detected concentrations of arsenic in soil at the Site are within published background ranges for Riverside County. In addition, DTSC has informed ENVIRON that, based on data collected locally, arsenic concentrations in the Norco area up to 12 mg/kg are considered to be representative of background concentrations; the highest concentration detected at the Site was 3.8 mg/kg.

The results for storm water runoff sampling indicated that no TPH (gasoline range) or perchlorate were detected in either of the storm water runoff samples collected; metals detected in ESB-43A included calcium, chromium, magnesium, and sodium; no storm water Benchmarks were exceeded.<sup>5</sup>

The ground water sampling results indicated that elevated concentrations of TCE were detected in ground water samples collected from both MW-14 and MW-15 (11,000 µg/l and 2,600 µg/l, respectively). In addition, TPH (gasoline range), perchlorate and NDMA were detected in both wells. TPH (diesel range) also was detected in Well MW-14. Of the metals detected in ground water for which there are regulatory action limits (MCLs) or Regulatory Action Levels (ALs), one, manganese, slightly exceeded the applicable regulatory action limit for drinking water. Hydrazine and perchlorate were not detected in off-site Well MW-16. Certain VOCs, specifically TCE, cis-1,2-DCE, and trans-1,2-DCE were detected at relatively low concentrations.

Soil gas sampling results indicate that VOCs were detected in soil gas samples collected as part of the Site Boundary Assessment. TCE was the most commonly detected compound; the highest concentrations were detected in Boring ESB-34, located adjacent to Well MW-14, in which TCE was detected in ground water at a concentration of 11,000 µg/l. The presence of TCE in the soil gas samples from Boring ESB-34 likely is the result of off gassing from the ground water.

Off-site soil gas sampling results did not indicate the presence of significant VOC concentrations on El Paso Drive (RESG-1 through RESG-4). TCE was detected in 8 of 10 soil gas sampling locations (ESG-5 through ESG-14) obtained from below Golden West Lane. Detected concentrations ranged from 0.4 µg/l to 350 µg/l in the samples collected from ESG-8 at 5 feet bgs and ESG-5 at 12 feet bgs, respectively.

Concentrations generally increased with depth, indicative of off-gassing from the ground

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<sup>5</sup> Storm water Benchmarks are listed in the Federal Register v.60 no. 189 dated Sept 29, 1995.

water table; elevated TCE concentrations have been detected in ground water samples collected from Wells MW-14 and MW-15 located near the Site's northern boundary. A *Draft Report of Additional Investigation Along Site Boundary* was submitted to DTSC on June 4, 2004.

To obtain additional information regarding the distribution of VOCs in the subsurface in proximity to and upgradient from Golden West Lane, 9 additional soil gas samples (ESG-15 through ESG-23) were collected on-site and 18 soil gas samples (ESG-24, ESG-25, ESG-27 through ESG-30, ESG-32 through ESG-36, and ESG-38 through ESG-44) were collected in proximity to selected residences on Golden West Lane in June of 2004. TCE was detected in 8 of the 9 on-site soil gas samples at concentrations ranging from 0.2 µg/l in ESG-17 to 170 µg/l in ESG-19. Off-site sampling results indicated that TCE was detected at varying depths in 15 of the 18 soil gas borings. Detected TCE concentrations ranged from 0.2 µg/l in ESG-42 to 170 µg/l in ESG-19. TCE was not detected above the laboratory reporting limits in ESG-32, ESG-33, and ESG-41.

According to a DTSC request, on July 16, 2004, ENVIRON submitted a schedule for interim remedial measures (IRM) in the Northwest Area. The first tasks conducted in association with the IRM were outlined in the *Technical Memorandum for Additional Soil Gas Survey, Vapor Probe Installation, and Indoor Air Quality Sampling* (August 20, 2004). The tasks were conducted to provide additional understanding of the vertical/lateral and temporal distribution of VOCs underlying the Northwest Area and to understand the potential for the presence of VOCs in indoor air within selected residences adjacent to the Site's northern boundary. The investigation activities were performed in accordance with the August 20, 2004 Technical Memorandum and DTSC's letter titled *DTSC Comments Technical Memorandum Additional Soil Gas for Additional Soil Gas Survey, Vapor Probe Installation, and Indoor Air Quality Sampling* (September 2004).

Based on a request from DTSC, on September 21, 2004, two additional soil gas borings (ESG-45 and ESG-46) were advanced adjacent to the 2301 and 2313 Hillside Avenue residences. In addition, on September 28, 2004, four soil gas probes (ESG-47 through ESG-50) were advanced in the middle of the Norco High School's football field. The soil gas sampling results indicated that TCE was not detected in any of the soil gas samples at concentrations above laboratory reporting limits.

On September 27 and 28, 2004, five permanent dual-nested soil vapor probes (VW-1 through VW-5) were advanced along Golden West Lane, adjacent to the residences located at 2281 and 2297 Golden West Lane. The soil borings were advanced to a

maximum depth of approximately 15 feet or to first ground water, whichever was shallower. Each vapor probe was dual nested, with probe tips installed at depths of approximately 5 and 15 feet bgs and attached to 1/8-inch Nylaflo tubing. During drilling, ground water was encountered in Borings VW-1, VW-3, and VW-4 at depths of 13.9 feet bgs, 12.7 feet bgs, and 15.4 feet bgs, respectively. Before installing the vapor wells, ground water samples were collected from Borings VW-1 and VW-3 and were analyzed for VOCs by EPA Method 8260B. The ground water sample collected from VW-3 also was analyzed for perchlorate by EPA Method 314 and for NDMA by EPA Method 1625C.

The probes were allowed to equilibrate for approximately one week prior to conducting the initial round of sampling on October 12, 2004. The samples were collected simultaneously with indoor air sample collection (described in the following section) and in accordance with DTSC's *Advisory for Active Soil Gas Investigation*. The vapor samples were collected in SUMMA<sup>TM</sup> canisters and sent to a stationary laboratory for VOC analyses by EPA Method TO-15. No vapor sample was collected from the depth of 15 feet bgs in VW-2, as the vapor probe was saturated at the time of sampling. In addition soil gas samples were collected near the residence located at 2270 Golden West Lane, at depths of 5 and 14 feet bgs. This sampling location was designated ESG-51.

The soil gas sampling results indicated that TCE was detected in all the samples collected. Detected TCE concentrations ranged from 2.4 µg/l in VW-2 at 5 feet to 910 µg/l in VW-1 at 12 feet. Other VOC compounds, such as trichlorofluoromethane (TCFM), toluene, styrene, PCE, total xylenes, acetone, benzene, chloroform, Freon, cis-1,2-DCE, and vinyl acetate also were detected in soil gas samples at various concentrations.

Ground water sampling results indicated that TCE was detected in ground water samples at concentrations of 10,000 µg/l and 3,400 µg/l in VW-3-GW and VW-1-GW, respectively. In addition, 1,2 dichloroethane, benzene, carbon tetrachloride, chloroform, cis-1,2-DCE, PCE, TCFM, and p-isopropyltoluene were also detected at concentrations that ranged from 1.1 to 240 µg/l. NDMA and perchlorate were detected in VW-3 at 160 ng/l and 15 µg/l, respectively.

On October 11 and 12, 2004, Indoor Air Quality (IAQ) sampling was conducted at three residences located at 2281, 2297, and 2270 Golden West Lane. Sample locations included the bathrooms and the primary living areas. IAQ samples were collected over a 24-hour period and subsequently sent to Calscience Environmental Laboratory of Garden

Grove, a California certified laboratory, under chain-of-custody protocol for VOCs analysis by EPA Method TO-15.

IAQ results did not indicate the presence of chlorinated solvents at 2270 and 2297 Golden West Lane. However, TCE and benzene were detected in indoor air samples collected from the residence located at 2281 Golden West Lane. Based on the detected concentrations, DTSC required mitigation of indoor air at this residence. Mitigation was achieved though replacing the air handling system in the residence to allow circulation of outdoor air throughout the residence at a rate of 500 standard cubic feet per minute (scfm). The new air handling system was installed at the residence on November 20 through 23, 2004. The effectiveness of the air handling system will be monitored to demonstrate a reduction in previously detected VOC concentrations.

ENVIRON currently is preparing a revised Draft Site Boundary Assessment Report, which will include a detailed description of the work conducted and results obtained during the assessment, and will be submitted to DTSC in December 2004.

#### **2.5.1.5 Department of Toxic Substances Control (DTSC)**

On April 4, 2002, the DTSC collected confirmation samples in the Area K4 and J14 to determine if any hazardous waste levels of heavy metals or explosive residuals had been left within the area after the excavation performed by ENVIRON in February and April 2002. In addition, soil samples also were collected from the slow cook off area in J13, the projectile impact area, and a 200-foot intervals along the line of sight between Area K4 and the nearest residences (approximately 1400 feet south southwest of Area K4). Samples were collected from the ground surface to two feet bgs using hand augers. Selected samples were analyzed for metals using EPA Method 6010, for metals specific for aluminum, for metals specific for mercury, for explosive residuals using EPA Method 8330, and for SVOCs using EPA Method 8270.

The DTSC concluded that all soil samples analyzed according to EPA Method 6010 (metals scan) were detected at concentrations below regulatory limits for the metals tested. DTSC also concluded that aluminum was detected at concentrations between 3,300 mg/kg and 14,900 mg/kg and that there was no state limit established for aluminum, and that all samples analyzed for mercury were under regulatory limits for detectable mercury. In addition, DTSC concluded that all samples analyzed for explosive residuals demonstrated non-detectable concentrations for compounds screened for this test and that all samples analyzed for SVOCs did not meet criteria for classification as a hazardous waste.

On October 14, 2004, the DTSC collected a ground water sample from a private well in the garage of a residence located at 998 3rd Street (3rd and Hillside). The ground water was analyzed for VOCs using EPA Method 8260B and for perchlorate using EPA Method 314. The results indicated that TCE was detected at a concentration of 680 µg/l and perchlorate was detected at a concentration of 5.7 µg/l. The homeowner does not use the well for drinking water purposes. DTSC notified the homeowner, who was instructed to cease using the well.

#### **2.5.1.6 United States Environmental Protection Agency (EPA)**

The United States Environmental Protection Agency (EPA) originally conducted a preliminary assessment of the Site in 1988 and issued a No Further Remedial Action Planned (NFRAP). However, due to community concerns and new information, the EPA decided to reassess the Site in April 2003 and retained Weston Solutions Inc. (WESTON) to conduct a preliminary assessment/site investigation of the Site.

In November 2003, WESTON collected a total of 28 soil samples (WL-1-S through WL-1-29), of which 21 soil samples (WL-2-S through WL-13-S, WL-13-S through WL-19-S, WL-27-S, and WL-28-S) were collected from areas of suspected contamination on-site, two soil samples (WL-1-S and WL-29-S) were collected in areas where testing was not reported to establish background concentrations, and seven soil samples (WL-20-S through WL-26-S) were collected off-site to address community concerns. Soil samples were analyzed for one or more of the following classes of compounds depending on the sample location and the history of the area: VOCs using Contract Laboratory Program Analytical Services (CLPAS) OLM04.3, SVOCs using CLPAS OLM04.3, NDMA using EPA Method 625m, PCBs using CLPAS OLM04.3, CLPAS ILM05.2, hydrazine using West Coast Analytical Services (WCAS) 3340, perchlorate using EPA Method 314, metals using CLPAS ILM05.2, and pesticides.

WESTON also collected a total of 10 ground water samples; nine ground water samples (WL-1-GW through WL-9-GW) were collected on-site from existing monitoring wells, and one ground water sample (WL-12-GW) was collected off-site adjacent to Temescal Wash on Hillside Avenue. WL-1-GW was collected from the most upgradient well on-site (MW-3) to establish background concentrations. Selected ground water samples were analyzed for one or more of the following classes of compounds, depending on the well location; VOCs using CLPAS OLM04.3, SVOCs using CLPAS OLM04.3, NDMA using EPA Method 625m, PCBs using CLPAS OLM04.3, metals using CLPAS ILM05.2,

hydrazine using WCAS 3340, perchlorate using EPA Method 314, and anions using EPA Method 300.

WESTON also collected a total of 4 sediment samples (WL-1-SED through WL-3-SED and WL-5-SED). All sediment samples were collected from the on-site intermittent stream with the exception of WL-5-SED, which was collected from Temescal Wash, adjacent to the ground water sample WL-12-GW. Sediment samples were analyzed for perchlorate using EPA Method 314, hydrazine using WCAS 3340, and metals using CLPAS ILM05.2.

WESTON's soil sampling results indicated that SVOCs, NDMA, and hydrazine were not detected in on-site soils. WESTON concluded that TCE, arsenic, cadmium, chromium, iron, and manganese were all detected at concentrations above background levels and above the RPRGs. Perchlorate was detected in two soil samples at concentrations lower than the RPRG of 7,800 µg/kg. The off-site soil samples were non-detect above the respective laboratory reporting limits for the methods analyzed, with the exception of metals. According to WESTON, all metal concentrations detected off-site were below the average concentrations of metals in soils derived from granite and or RPRGs. However, naturally occurring arsenic and thallium were above RPRGs.

The ground water sampling analytical results confirmed the presence of VOCs in the downgradient wells on-site, consistent with previous sampling results.

Sediment sampling results indicated the presence of arsenic, lead, and, mercury at concentrations greater than background concentrations found in WL-1-SED.

## **2.5.2 Results of Previous Assessments**

The following sections of this report provide a summary of the results of the previous subsurface assessments conducted at the Site, Area by Area, including the investigations performed by BB&L, Phase One, Kennedy/Jenks, and ENVIRON, as described above, through mid-November 2004; the subsurface investigations and sampling activities completed at the Site to date have resulted in a database of more than 10,000 sample records.

In an effort to evaluate the usefulness of the historical data collected at the Site by previous consultants, ENVIRON retained Laboratory Data Consultants, Inc. (LDC) of Carlsbad, California to perform a data validation review. Historical data collected at the Site by BB&L, Phase One, Kennedy/Jenks, and ENVIRON, were reviewed by LDC in accordance

with EPA data validation guidelines (*National Functional Guidelines for Organic Data Review*, October 1999, and *National Functional Guidelines for Inorganic Data Review*, February 1994). LDC performed a Level 2 data review of the data sets listed in Appendix B and generated by Advanced Technology Laboratories, Associated Laboratories, Del Mar Analytical, Curtis & Tompkins, Ltd., Cal Science Environmental Laboratories, Inc., and HAZPAK Environmental Services, Inc. LDC's data validation included a review of holding times, method blanks, surrogates, matrix spike/matrix spike duplicates, laboratory control samples, internal standards, and quantitation limits; a copy of LDC's data validation review is attached as Appendix B to this work plan. Based on LDC's review of the data, the overall quality of historical data is considered acceptable, with the limitations noted in the data validation report. Where appropriate, tabulated sample results are flagged with a "J" (results estimated) or "UJ" (reporting limits approximate) qualifier in the historical data tables included in this work plan.

All data collected by ENVIRON undergo a similar Level 2 data validation review in accordance with EPA data validation guidelines; this review is performed internally or by LDC and the tabulated results flagged as appropriate.

Soil sampling results are discussed on an area-by-area basis. Historical sampling locations and locations of soil removal actions, where appropriate, are provided in Figure 2, and by area, in Appendices F through T. Summaries of historical sample data (detected compounds only) are provided by area in Appendices F through T. Soils data, and water sample data not collected from monitoring wells or extraction wells (i.e., grab ground water samples [HydroPunch® or similar sample collection method], sumps, and vaults), are discussed in Sections 2.5.2.1 through 2.5.2.15. Detected concentrations of TCE, PCE, and cis-1,2-DCE in soil, at depths of 0 to 5 feet and 5 to 10 feet are depicted in Figures 3 and 4 respectively. Detected concentrations of TPH-diesel in soil, at depths of 0 to 5 feet, are presented in Figure 5. Data depicted in Figures 3, 4, and 5 are discussed in Section 2.5.5, Potential Source Areas and Distribution of Contamination.

Following the discussion of the soil sampling results, ground water and surface water sampling results for each Area of the Site are presented and discussed. Ground water monitoring well data and extraction well data are discussed in Section 2.5.3. Ongoing ground water remediation is summarized in Section 2.5.4, and the details of the off-site soil, soil gas, and ground water sampling are presented in Section 2.5.5 (data are presented in Appendix U).

### 2.5.2.1 Area A

To date, no subsurface soil sampling has been conducted in Area A (Figure 2; Appendix F). In 2002, as part of the septic system evaluation, Kennedy/Jenks addressed septic system 2, which serviced the concrete-block building located on top of A Hill. The septic tank was dry at the time of sampling; however, a sludge sample was collected from the bottom of the tank. A soil sample was obtained from the leach field associated with septic system 2. Sludge and soil samples were analyzed for TPH using Environmental Protection Agency (EPA) Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for Title 22 metals, mercury, and chromium using EPA Methods 6010, 7196, and 7471, respectively. In addition, the soil and sludge samples were analyzed for nitrate, sulfate, and chloride using EPA Method 300.0, and soil was analyzed for Total Organic Carbon (TOC) using EPA Method 9060.

The results indicate that no VOCs or SVOCs were detected in the sludge or the soil samples. TPH was detected in the sludge and soil samples at concentrations of 33 and 13 mg/kg, respectively. Metals concentrations detected in the sludge and soil samples did not exceed the total threshold limit concentrations (TTLCs) established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the sludge and soil samples at concentrations up to 29 milligrams per kilogram (mg/kg), 1,800 mg/kg, and 6.5 mg/kg, respectively, and TOC was detected in the soil sample at a concentration of 7,400 mg/kg (see Appendix F - Tables 1a, 1b, and 1c).

In November 2003, WESTON, on behalf of the EPA, collected one surface soil sample WL-27-S. The soil sample WL-27-S was analyzed for metals using CLPAS ILM05.2, SVOCs using CLPAS OLM04.3, perchlorate using EPA Method 314, PCBs using CLPAS OLM04.3, and pesticides. Only PCBs and pesticides were detected in the soil sample. The results indicated that PCBs (Aroclor – 1260) was detected at a concentration of 34 µg/kg. The pesticides aldrin, dieldrin, 4,4'-DDE, 4,4'-DDT, and alpha-chlordane were also detected at concentrations of 27 µg/kg, 1.9 µg/kg, 5.4 µg/kg, 3.3 µg/kg, 2.6 µg/kg, 41 µg/kg, and 11 µg/kg, respectively.

### **2.5.2.2 Area B**

In June 1999, Phase One advanced four soil borings (B-100 to B-103) to a depth of 2 feet (Figure 2; Appendix G). Soil samples B-100, 101, 102, and 103 were collected at two feet bgs and were analyzed for VOCs using EPA Method 8260B, and for SVOCs using EPA Method 8270. Soil Boring B-102 was analyzed for TPH using EPA Method 418.1, for VOCs using EPA Method 8260B, and for polychlorinated biphenyls (PCBs) using EPA Method 8080. All compounds analyzed for were not detected above the respective laboratory reporting limits.

### **2.5.2.3 Area C**

In June 1999, Phase One advanced one soil boring (B-99) to a depth of 2 feet (Figure 2; Appendix H). The soil sample was analyzed for VOCs using EPA Method 8260B, and for TPH using EPA Method 8015M. No chemicals were detected above the respective laboratory reporting limits.

In 2002, as part of the septic system evaluation, Kennedy/Jenks sampled the sludge and the leach field soil associated with septic system 1, which serviced the restrooms in Building C1. The septic tank contained water and a layer of sludge at the time of sampling. One sludge sample was collected from the septic tank and one soil sample was obtained from the leach field and were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for Title 22 metals, plus mercury and chromium using EPA Methods 6010, 7196, and 7471, respectively. In addition, the leach field soil sample and the sludge sample were tested for nitrate, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that VOCs were not detected above the laboratory reporting limits in the sludge or the soil samples, and SVOCs were not detected in the soil sample above the laboratory reporting limits. SVOCs, including bis-(2-ethylhexyl) phthalate, butyl benzyl phthalate, and 1,4-dichlorobenzene, were detected in the sludge samples at concentrations of 240, 230, and 890 micrograms per kilograms ( $\mu\text{g}/\text{kg}$ ), respectively. TPH was detected in the sludge at a concentration of 17 mg/kg, but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils

in California, with the exception of zinc, which was detected in one sample at a concentration approximately twice the maximum value detected in background soils (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the samples at maximum concentrations of 10 mg/kg, 460 mg/kg, and 15 mg/kg, respectively, and TOC was detected in the soil sample at a concentration of 1,500 mg/kg (see Appendix G - Tables 1a, 1b, 1c, and 1d).

#### **2.5.2.4 Area D**

On November 7, 2001, Kennedy/Jenks collected four soil samples (OTS-1 through OTS-4) in this area (Figure 2; Appendix I). The upper 1-inch of soil from the area was scraped into a pile, mixed, and a representative portion of the soil was transferred into an appropriate sampling container. This composite procedure was performed to improve the likelihood that explosive residue, if present, would be incorporated into the sample and detected. The samples were tested for explosive residuals using EPA Method 8321 and for percent moisture. Explosive residuals were not detected above the laboratory reporting limits in any of the soil samples submitted to the laboratory. Moisture content ranged from 1.6% to 11.1% (see Appendix I - Table 1).

In November 2003, WESTON, on behalf of the EPA, collected one surface soil sample (WL-18-S). The soil sample was analyzed for perchlorate using EPA Method 314, metals using CLPAS ILM05.2, and VOCs using CLPAS OLM04.3. The results indicated that VOCs and perchlorate were not detected above the laboratory reporting limits. In addition, metal concentrations were below the respective RPRGs.

#### **2.5.2.5 Area E**

In June 1999, Phase One advanced 13 soil borings (B-83 through B-94) in Area E (Figure 2; Appendix J). Soil boring depths varied from surface samples (B-92), to samples collected at 2 feet (B-83, 84, 87 through 91, B-93, and B-94), to samples collected at a depth of 5 feet (B-85 and B-86). Soil samples were analyzed for Title 22 metals using EPA method 6010/7000, for VOCs using EPA Method 8260B, for SVOCs using EPA Method 8270, for hydrazine using a colorimetric method (no established EPA analytical method exists for hydrazine), and for nitrate, using EPA Method 300.

The results indicate that SVOCs and VOCs were not detected above the laboratory reporting limits. According to Phase One, metals were not detected above background

concentrations identified from samples collected at other areas of the Site<sup>6</sup>. Hydrazine was detected in B-86, B-93, B-93A (at 2 feet and 4 feet), and B-94 at concentrations up to 90 µg/kg (see Appendix J - Tables 1b and 1c). Nitrate was detected in B-88 at a concentration of 19 mg/kg.

In April and May 2002, as part of the septic system evaluation, Kennedy/Jenks sampled the sludge and the leach field soil associated with septic system 4, which serviced restrooms in the concrete block building (Building E1) located toward the south end of E-Hill. At the time of sampling, the septic tank was full of sludge. A total of three sludge samples and one leach field soil sample were collected. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, for SVOCs using EPA Method 8270, and for Title 22 metals, mercury and chromium using EPA Methods 6010, 7196, and 7471, respectively. In addition, the leach field soil and sludge sample were tested for nitrate, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that VOCs were not detected in the soil sample. Cis-1,2-dichloroethene (cis-1,2-DCE) was detected in all three sludge samples at concentrations that varied from 6.6 µg/kg to 270 µg/kg. Two SVOC compounds, bis-(2-ethylhexyl) phthalate and butyl benzyl phthalate, were detected in one sludge sample at concentrations of 340 and 220 µg/kg, respectively. Bis-(2-ethylhexyl) phthalate was also detected in the soil sample at a concentration of 250 µg/kg. TPH was not detected above the laboratory reporting limits in any of the samples. Metal concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Sulfate and chloride were detected in the samples at maximum concentrations of 130 mg/kg and 24 mg/kg, respectively; TOC was not detected above the laboratory-reporting limit in the soil sample (see Appendix J - Tables 1a, 1b, 1c, and 1d).

In November 2003, on behalf of the EPA, WESTON collected two soil samples WL-13-S and WL-16-S. Both samples were analyzed for hydrazine using WCAS 3340. The results indicated that hydrazine was not detected in any of the samples collected.

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<sup>6</sup> Phase One did not define “background” concentrations, nor was it indicated how it determined what a background concentration was at the Site.

#### **2.5.2.6 Area F (Areas F1-through F-4 and F-6 through F-10)**

In May 1995, BB&L collected 47 soil samples to investigate the horizontal and vertical extent of soil impacted due to releases of hydraulic oil (see Figure 2; Appendix K). The soil samples were located adjacent to and below certain Area F buildings (F2, F3, F4, F6, and F7), where drainpipes from the vicinity of the test buildings discharge to the ground surface (these drainpipes were used to convey storm water and wash water away from the immediate building areas). Soil samples were analyzed for total recoverable petroleum hydrocarbons (TRPH) using EPA Method 418.1, for Title 22 metals using EPA Method 6010/7000, and for VOCs using EPA Method 8260B. In general, detectable TPH (undifferentiated) concentrations ranged from 37 to 10,000 mg/kg, TPH diesel concentrations ranged from 13 to 7,900 mg/kg, and TRPH concentrations ranged from 11 to 8,700 mg/kg. VOC concentrations, consisting primarily of TCE and PCE, ranged from 10 to 440 µg/kg in the impacted soil samples along the storm water flow path away from the buildings in Area F (Buildings F-2, F-3, F-4, F-6, F-7, F-8, and F-10)(see Appendix K - Tables 1b, 1c, and 1e) (BB&L, 1995).

In March 1996, and based on the results of the previous investigation, BB&L prepared a remedial action plan (RAP) to remediate 850 cubic yards of TRPH and VOC-impacted soil. The RAP described the nature of the hydrocarbon release and documented the excavation work associated with the removal of impacted soil from the areas below the drainpipes in Area F (Figure 2; Appendix K). The proposed treatment method for 800 cubic yards of TPH-impacted soil included on-site bioremediation within a lined treatment cell under the supervision of the DTSC. The remaining 50 cubic yards of VOC- (mainly TCE and PCE) and TPH-impacted soil were proposed to be transported off-site for disposal. Although the BB&L RAP proposed bioremediation of the TPH-impacted soil, as discussed in the ensuing paragraphs, the TPH- and VOC-impacted soil was instead excavated and transported off-site for disposal under the oversight of the County (BB&L, 1996).

In a February 1997 report, BB&L documented additional remedial activities related to the drainpipe discharge areas, including impacted soil adjacent to a concrete vault located approximately 200 feet southwest of Building F-3 (see Figure 2; Appendix K). The report documented the removal of the majority of the impacted soil related to a 1995 hydraulic oil spill around the vault, and the removal of an additional 25 cubic yards of contaminated soil from around the vault on September 26, 1996. In addition, the report documented the collection of confirmatory post-excavation soil samples, and the off-site

transportation and disposal of soil classified as hazardous (118 tons) and soil classified as non-hazardous (1,292 tons)(BB&L, 1997a).

In May 1997, BB&L prepared two documents that were submitted to the County. One letter addressed the County's comments from its review of the February 1997 BB&L report (County letter dated November 13, 1996), while the other letter presented a work plan for additional characterization of TCE in soil. The letter included a scope of work for the drilling and sampling of four additional borings as requested by the County. The soil samples from the borings were to be analyzed for TPH and VOCs to identify the lateral and vertical extent of TCE and TPH in the previously excavated area (BB&L, 1997b).

In January 1998, BB&L summarized the results of the sampling of the four additional soil borings (B-17 through B-20) in the *Area IV, Characterization, Remediation, and Request for Closure Report*; Area IV was located approximately 50 feet south-southwest of Building F-2. According to the report, TRPH were detected in all samples at concentrations ranging from 15 to 420 mg/kg. However, TCE was not detected in any of the soil samples. After performing two additional "rounds" of excavation of soil from Area IV, BB&L concluded, based on the analytical results and on the second bottom of the excavation confirmatory sample (F2-BTM-2 at 13 feet) (150 µg/kg of TCE), that the TCE-impacted soil had been removed successfully from the areas south-southwest (downslope) of Buildings F-2 and F-3. On behalf of Wyle Electronics, BB&L requested regulatory closure from the County (BB&L, 1998). The County reviewed the BB&L report and issued a letter to Wyle Electronics dated January 22, 1998. The County letter indicated that *"based on this review, as well as the extensive oversight by this Department, with the provision that the results obtained from the soil sampling were accurate and properly handled, it has been determined that no further action is required with regards to the remediation of the environmental contamination initially detailed in the "Preliminary Environmental Investigation" submitted by BB&L dated May 1995 and further characterized in subsequent correspondence from the same"* (RWQCB, 1998).

In 1998, in response to an inquiry by Wyle regarding dewatering the area around Building F-10, BB&L conducted a preliminary investigation of ground water quality in the area. Water samples were collected from an equipment vault located in Building F-10, and from a temporary well located adjacent to the vault. TCE was detected at concentrations up to 9,500 micrograms per liter (µg/l) in ground water that had seeped into the vault, and up to 8,500 µg/l in a sample of ground water collected from the temporary well (see Appendix K - Table 1g). The temporary well was removed and,

based on the results of the sampling; the proposed dewatering program was not conducted in the area of F-10.

In 1999, as a follow up to BB&L's investigation, Phase One advanced 25 soil borings in the vicinity of Area F. Soil samples were analyzed for SVOCs using EPA Method 8270, VOCs using EPA Method 8260B (Appendix K - Table 1e), and for TRPH using EPA Method 418.1 (Appendix K - Table 1b). SVOCs were not detected above the laboratory reporting limits. The highest concentrations of VOCs in soil were identified near the northeastern corner of Building F-3, where TCE was detected at a depth of two feet at a concentration of 1,120 ( $\mu\text{g}/\text{kg}$ )(BH-5). Ten additional soil borings were advanced in the vicinity of BH-5, in an effort to delineate the extent of TCE in soil. The analytical results of samples collected to the northeast of BH-5 revealed elevated concentrations of TCE and PCE. The highest concentrations of TCE and PCE were detected in BH-5C, at concentrations of 82,400 and 13,500  $\mu\text{g}/\text{kg}$ , respectively, at two and three feet, respectively. Phase One concluded that detected concentrations of VOCs in soil northeast of Building F-3 decreased with lateral distance and with depth (in all directions) from BH-5C. Although not specifically stated by Phase One, it appears that the VOCs in shallow soil in this area were not remediated due to potential structural impacts to the building.

Other areas of potential environmental concern identified by Phase One included the storm drain catch basins near Buildings F-3 (sample labeled as "bottom of storm drain near F-3") and F-4 (sample labeled as "bottom of storm drain near F-4"), where detectable concentrations of VOCs, PCBs, and TRPH were identified in storm drain grab samples. In the sample collected near Building F-3, PCE was detected at a concentration of 14  $\mu\text{g}/\text{kg}$ , PCBs (Aroclor 1254) were detected at a concentration of 209  $\mu\text{g}/\text{kg}$ , and TRPH was detected at 2,310  $\text{mg}/\text{kg}$ . In the sample collected near Building F-4, PCE was detected at a concentration of 43  $\mu\text{g}/\text{kg}$ , PCBs (Aroclor 1254) were detected at a concentration of 464  $\mu\text{g}/\text{kg}$ , and TRPH was detected at 15,300  $\text{mg}/\text{kg}$  (Phase One, 1999).

In April 2001, Kennedy/Jenks advanced three soil borings (EOP-1, EOP-2, and EOP-3), in an effort to assess any release(s) that may have occurred from operational activities in Buildings F2, F3, and F8 since remedial action was conducted in the mid to late 1990s. The soil samples were analyzed for VOCs. The only VOC detected in the soil samples was TCE, which was detected in EOP-3 (located downgradient of Building F2) in the 15- and 20-foot samples, at concentrations of 690  $\mu\text{g}/\text{kg}$  and 46  $\mu\text{g}/\text{kg}$ , respectively (Table 5e)(Kennedy/Jenks, 2001).

In 2002, as part of the septic system evaluation, Kennedy/Jenks investigated septic system 8, which serviced restrooms in Building F1. A sludge sample was collected from the active septic tank along with a soil sample from the leach line. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for Title 22 metals plus mercury and chromium using EPA Methods 6010,7196, and 7471. In addition, the leach line soil sample and sludge sample were tested for nitrate, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that VOCs were not detected in soil and sludge samples. SVOCs, specifically bis-(2-ethylhexyl) phthalate, butyl benzyl phthalate, and 3,4-methyphenol were detected in the sludge sample at concentrations of 2300, 2200, and 4200 µg/kg, respectively. SVOCs were not detected in the soil sample above the laboratory reporting limits. TPH was detected in the sludge sample at a concentration of 37 mg/kg but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the sludge and soil samples at maximum concentrations of 1.2 mg/kg, 64 mg/kg, and 20 mg/kg, respectively, and TOC was detected at a concentration of 850 mg/kg (see Appendix K - Tables 1a, 1b, 1c, 1d, 1e, 1f, and 1g).

In August and September 2003, ENVIRON advanced 19 soil borings (ESB-1 through ESB-19) in the immediate vicinity of Area F buildings to further assess subsurface conditions in this area (Appendix K). The soil borings were advanced to depths ranging from approximately 23 to 45 feet, and soil samples were collected at approximately 5-foot intervals in each soil boring. Selected soil samples were submitted for laboratory analysis of VOCs using EPA Method 8260B. Ground water was encountered in soil borings ESB-16 and ESB-17 at a depth of approximately 35 feet; ground water samples were collected using a HydroPunch sampling device and were analyzed for VOCs using EPA Method 8260B.

VOCs were detected in only four soil samples collected during this investigation (Appendix K - Table 1e). In Boring ESB-12 (located near Building F-3), PCE, TCE, and *cis*-1,2-DCE were detected in the soil sample collected from a depth of approximately 4.5 feet, at concentrations of 3.8, 120, and 6.5 µg/kg, respectively. TCE was detected in the

13.5 foot sample from this boring at a concentration of 3.8 µg/kg; VOCs were not detected above laboratory reporting limits in the deeper soil samples collected from ESB-12. Ethylbenzene, and xylenes (total) were detected in the 5-foot sample from ESB-4 (located southwest of Building F-7) at concentrations of 8.6 and 71 µg/kg, respectively (see Appendix K - Table 1e). No other VOCs were detected above laboratory reporting limits in any of the other soil samples analyzed from this area during this investigation.

As indicated previously, ground water samples were collected from borings ESB-16 and ESB-17, located west of Buildings F-2 and F-10, respectively. VOCs detected in the ground water samples from ESB-16 and ESB-17 included PCE (6.8 and 21 µg/l), TCE (560 and 1,700 µg/l), and *cis*-1,2-DCE (10 and 81 µg/l). *Trans*-1,2-DCE and chloroform were detected in only one ground water sample, from ESB-17, at concentrations of 1.3 and 1.8 µg/l, respectively (see Appendix K - Table 1g).

In November 2003, on behalf of the EPA, WESTON collected four soil samples (WL-12-S, WL-14-S, WL-15-S, and WL-28-S). All four samples were analyzed for hydrazine using WCAS 3340, metals using CLPAS ILM05.2, and VOCs using CLAPS OLM04.3 with the exception of WL-28-S, which was analyzed for perchlorate using EPA Method 314, PCBs using CLAPS OLM04.3, pesticides, SVOCs using CLAPS OLM04.3, hydrazine using WCAS 3340, and metals using CLPAS ILM05.2. The results indicated that SVOCs, perchlorate, and hydrazine were not detected above the laboratory reporting limits in any of the samples collected. VOCs, TCE and *cis*-1-2-DCE, were detected in the soil sample WL-12-S at concentrations of 2 µg/kg and 94 µg/kg respectively. PCBs (Aroclor-1260) were detected in WL-28 at a concentration of 64 µg/kg. In addition, the pesticides alpha and gamma chlordane were detected in soil sample WL-28-S at concentrations of 5.1 µg/kg and 3.4 µg/kg respectively. Metals concentrations for all the samples were detected below their respective RPRGs.

#### **2.5.2.7 Area F (Area F-5)**

In 1995, BB&L collected one surface soil sample (OD-5) from Area F-5 (Figure 2; Appendix L). The soil sample was analyzed for explosive residues using EPA Method 8330; none were detected.

In 1999, Phase One advanced three soil borings in Area F-5 (B-25, B-26, and B-27; Figure 2; Appendix L). Soil samples were collected at depths varying from 1 to 5 feet. Soil samples were analyzed for SVOCs using EPA Method 8270, TRPH using EPA Method 418.1, and for VOCs using EPA Method 8260B.

The results indicate that VOCs and TRPH were not detected in the soil samples. The SVOC 2,4-dinitrotoluene was detected in the near surface soils (B-27) at a concentration of 350 µg/kg (Appendix L - Table 1d). Because soil boring B-27 was located south of the F-5 Buildings, where runoff water from the eastern F-5 Buildings would collect, Phase One advanced 10 additional soil borings (B-27A through B-27J) in the vicinity of soil boring B-27, and submitted 10 samples to the laboratory for SVOC analysis using EPA Method 8270. The results of the analysis indicated that 2,4-dinitrotoluene was not detected in soil samples collected from the soil borings located to the north, south, or east of B-27. However, 2,4-dinitrotoluene was detected in the soil boring drilled to the west of B-27, B-27F, at a concentration of 890 µg/kg in the 3-foot sample.

In addition, Phase One advanced eight soil borings (B-28 through B-35; Figure 2; Appendix L) to depths ranging from 2 to 5 feet. Soil borings were analyzed for VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for Title 22 metals using EPA Method 6010/7000. SVOCs, VOCs, and TRPH were not detected in soil samples B-28 through B-35, and metals were not detected above background concentrations identified in samples collected from other areas of the Site (Appendix L - Table 1c). In addition, three sediment samples were collected from the bottoms of three open-topped drums partially buried and located in an open field. (F5-5; Appendix L). The soil samples were analyzed for VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for TPH using EPA Method 8015M. SVOCs were not detected in the sediment samples collected from the open drums. Total xylenes were detected at a concentration of 6.7 µg/kg in drum 3, and TPH, at concentrations up to 137 mg/kg, were detected in drums 1 and 2.

In 2002, as part of the septic system evaluation, Kennedy/Jenks investigated septic system 12, which serviced a restroom in the trailer (F5-1) located in Area F-5. A sludge sample was collected from the active septic tank along with a soil sample from the septic system's leach line. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, and for Title 22 metals plus mercury and chromium using EPA Methods 6010,7196, and 7471. In addition, the leach line soil and sludge sample were also tested for nitrate, sulfate, and chloride using EPA Method 200.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicated that VOCs were not detected in soil and sludge samples. Only one SVOC compound, butyl benzyl phthalate, was detected in the soil sample at a

concentration of 240 µg/kg. TPH was detected in the sludge sample at a concentration of 9.8 mg/kg but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the samples at maximum concentrations of 1.2 mg/kg, 18 mg/kg, and 18 mg/kg, respectively, and TOC was detected at a concentration of 2,300 mg/kg (Appendix L - Tables 1a, 1b, 1c, and 1d).

In November 2003, WESTON, on behalf of the EPA, collected two soil samples WL-10-S and WL-11-S. Soil sample WL-10-S was analyzed for hydrazine using WCAS 3340, metals using CLAPS ILM05.2, VOCs using CLAPS OLM04.3, and NDMA using EPA Method 625m. Soil sample WL-11-S was analyzed for perchlorate using EPA Method 314 and metals using CLAPS ILM05.2.

The results indicate that perchlorate and hydrazine were not detected above the laboratory reporting limits. VOCs, specifically toluene, was detected at a concentration of 2 µg/kg. The metals results indicated that arsenic, chromium, iron, and thallium were detected in soil sample WL-11-S at concentrations of 137 mg/kg, 277 mg/kg, 75,500 mg/kg, and 15.6 mg/kg, respectively, which exceeded their respective RPRGs (0.39 mg/kg, 210 mg/kg, 23,000 mg/kg, and 5.2 mg/kg, respectively).

#### **2.5.2.8 Areas G, N, L, and S**

No sampling has been conducted to date in Areas G and L.

In 2002, Kennedy/Jenks investigated septic systems 6 and 7 in Area N, and septic system 5 that serviced restrooms, as well as photographic and meteorology laboratories, in the Central Services Building in Area S (Figure 2; Appendix M). A sludge sample was collected from each septic tank along with a soil sample from each septic system leach line. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the samples were also tested for nitrate, sulfate, and chloride using EPA Method 300.0 and the soil samples were analyzed for TOC in accordance with EPA Method 9060.

Septic system 6 serviced the Administration Building in Area N. The results of these samples indicate that the VOCs benzene and chlorobenzene were detected in the sludge sample only, at concentrations of 290 and 4,000 µg/kg, respectively. Three SVOCs, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and p-dichlorobenzene, were detected in the sludge and soil samples at maximum concentrations of 240 µg/kg, 270 µg/kg, and 500 µg/kg, respectively. TPH was detected in the sludge sample at a concentration of 11 mg/kg but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected at maximum concentrations of 12 mg/kg, 180 mg/kg, and 86 mg/kg, respectively, and TOC was detected in the soil sample at a concentration of 4,700 mg/kg (Appendix M - Tables 1a, 1b, 1c, 1d, and 1e).

Septic system 7 also serviced the Administration Building in Area N. The results of these samples indicate that no VOCs were detected in the samples. One SVOC, p-dichlorobenzene, was detected in the sludge sample at a concentration of 21,000 µg/kg. TPH was detected in the sludge sample at a concentration of 9.3 mg/kg but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Sulfate and chloride were detected at maximum concentrations of 37 mg/kg, and 26 mg/kg, respectively, and TOC was detected in the soil sample at a concentration of 950 mg/kg (Appendix M - Tables 1a, 1b, 1c, 1d, and 1e).

For septic system 5, which serviced the Central Services Building in Area S, the results indicate that vinyl chloride was detected in the sludge sample at a concentration of 1,000 µg/kg; the sludge in the septic tank was resampled and analyzed for VOCs only. The second sample VOC results indicate that TCE, DCE, and vinyl chloride were detected at concentrations of 500, 680, and 6,500 µg/kg, respectively. No VOCs were detected in the soil sample. Three SVOCs, 1,4-dichlorobenzene, naphthalene, and phenanthrene were detected only in the sludge sample, at concentrations of 40,000 µg/kg, 40 µg/kg, and 13 µg/kg, respectively. TPH was detected in the sludge sample at a concentration of 114 mg/kg but was not detected above the laboratory reporting limits in the soil sample.

Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Sulfate and chloride were detected at maximum concentrations of 42 mg/kg and 32 mg/kg, respectively (Appendix M - Tables 1a, 1b, 1c, 1d, and 1e).

#### **2.5.2.9 Area H**

In 1999, Phase One advanced 14 soil borings (B-66 through B-71; B-74 through B-80; and B-109; Figure 2; Appendix N) in Area H. Most soil samples were collected primarily at a depth of 2 feet, with the exception of sample B-66, which was collected at 10 feet, and B-109, which was sampled at depths of 2, 2.5, and 5 feet. Soil samples were analyzed for VOCs using EPA Method 8260B, SVOCs using EPA Method 8270, TPH using EPA Method 8015M, TRPH using EPA Method 418.1, and for Title 22 metals using EPA Method 6010/7000.

SVOCs, VOCs and TPH were not detected above the laboratory reporting limits in any of the soil samples. Metals were not detected above background concentrations identified in other soil samples collected in other areas of the Site.

In 2002, as part of the septic system investigation, Kennedy/Jenks investigated septic system 9, which serviced restrooms in Building H-2 in Area H. A sludge sample was collected from the septic tank, along with a soil sample from the septic system's leach lines. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8260B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the leach line soil and sludge samples were also tested for nitrite, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that benzene and chlorobenzene were detected in the sludge sample; at concentrations of 370 µg/kg and 3,200 µg/kg, respectively. No VOCs were detected in the soil sample. The SVOC p-dichlorobenzene was detected in the sludge sample at a concentration of 690 µg/kg. TPH was detected in the sludge sample at a concentration of 14 mg/kg but was not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical

background concentrations for soils in California, with the exception of zinc, which was detected in one sample at a concentration slightly exceeding typical background concentrations of zinc in soil (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrite (as N), sulfate, and chloride were detected in the samples at maximum concentrations of 2.2 mg/kg, 25 mg/kg, and 27 mg/kg, respectively. TOC was detected at a concentration of 2,600 mg/kg (Appendix N - Tables 1a, 1b, 1c, 1d, and 1e).

In August 2003, ENVIRON advanced six soil borings (ESB-20 through ESB-25; Figure 2; Appendix N) to depths varying from 15 to 35 feet. Soil samples were collected from depths of 5, 10, and/or 15 feet. Ground water samples were collected from each of the six soil borings using HydroPunch sampling techniques. Soil and ground water samples were analyzed for VOCs using EPA Method 8260 B.

The results indicate that VOCs, with the exception of TCE in ESB-24 at 5 feet (5.2 µg/kg), were not detected in any of the soil samples. However, TCE, PCE and *cis*-1, 2 DCE were detected in ground water samples. TCE concentrations ranged from 83 µg/l in ESB-22 to 2,200 µg/l in ESB-21, PCE concentrations ranged from 1.1 µg/l in ESB-22 to 95 µg/l in ESB-20, and *cis*-1, 2-DCE concentrations ranged from 3.2 µg/l in ESB-22 to 81 µg/l in ESB-17 (Appendix N - Table 1f).

#### **2.5.2.10 Area I**

In June 1999, Phase One advanced two soil borings (B-97, B-98; Figure 2; Appendix O) to a depth of 2 feet. The soil samples were analyzed for SVOCs using EPA Method 8270, and Title 22 metals using EPA Method 6010/7000 (Appendix O - Table 1c).

SVOCs were not detected above the laboratory reporting limits and metals were not detected above background concentrations identified in samples collected in other areas of the Site.

In 2002, as part of the septic system investigation, Kennedy/Jenks investigated septic system 3, which serviced restrooms in the wooden building that contained control rooms for Area I. A sludge sample was collected from the active septic tank along with a soil sample from the septic system's leach line. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the samples were also tested for nitrate, sulfate, and

chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that chlorobenzene was detected in the sludge sample at a concentration of 400 µg/kg; no VOCs were detected in the soil sample. SVOCs were detected only in the sludge sample at concentrations that ranged from 8 µg/kg to 97,000 µg/kg. TPH was detected in the sludge sample at a concentration of 87 mg/kg but were not detected above the laboratory reporting limits in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. Metals detected in the samples were detected within typical background concentrations for soils in California, with the exception of zinc, which was detected in one sample at a concentration slightly exceeding typical background concentrations of zinc in soil (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the sludge and soil samples at maximum concentrations of 17 mg/kg, 28 mg/kg, and 35 mg/kg, respectively, and TOC was detected at a concentration of 1,400 mg/kg (Appendix O - Tables 1a, 1b, 1c, 1d, and 1e).

#### **2.5.2.11 Area J**

In 1995, BB&L collected five soil surface samples, OD-3, OD-4, OD-6, OD-7, and OD-8, as part of a preliminary environmental investigation (Figure 2; Appendix P). Soil samples OD-3, OD-4, and OD-6 were analyzed for SVOCs using EPA Method 8270, explosive residues using EPA Method 8330 and TPH using EPA Method 8015M. Soil samples OD-7, and OD-8 were analyzed only for explosive residues using EPA Method 8330 and TPH using EPA Method 8015M. The results indicate that SVOCs, explosive residues, and TPH were not detected above the laboratory reporting limits in any of the samples.

In 1999, Phase One advanced 21 soil borings (B-38, B-39, B-41, B-44, B-45 through B-49, B-51 through B-55, B-58 through B-64, and B-110). Most soil samples were collected at depths that ranged from two feet bgs to 2.5 feet bgs. Soil samples B-62 and B-110 were collected at 5 feet bgs, and soil samples B-47, B-48, B-61, and B-64 were collected at 10 feet bgs. Soil samples B-44, B-58, B-61, B-110 were analyzed for VOCs using EPA Method 8260 B, soil samples B-38, B-45 through B-49, B-58, and B-62 through B-64 were analyzed for SVOCs using EPA Method 8270. Soil samples B-41, B-44, B-61, and B-110 were analyzed for TRPH using EPA Method 418.1, soil sample B-63 was analyzed for TPH using EPA Method 8015M. Soil samples B-39, B-47, B-48, and B-49

were analyzed for metals using EPA Method 6010/7000, and soil sample B-61 was analyzed for PCBs using EPA Method 8080. Soil samples B-59 and B-60 were not submitted for analysis.

The results indicate that VOCs, SVOCs, TRPH, TPH, and PCBs were not detected above the laboratory reporting limits in any of the soil samples. In addition, metals were not detected above background concentrations identified in samples collected from other areas of the Site (Appendix P - Table 1c).

During the initial Site reconnaissance, Phase One identified a capacitor that had leaked oil into the adjacent soil. On March 12, 1999, based on Phase One's recommendation, Wyle notified the EPA-DTSC and reported that a PCB spill had been discovered at the Site. On March 15, 1999, Phase One removed the capacitor, which was located in Area J-11, and approximately 13.5 cubic feet of PCB-impacted soil and placed the capacitor and soil into a 55-gallon drum for temporary storage. The total excavation depth was between 3 and 6 inches bgs. After completing the excavation, Phase One collected seven soil samples from the bottom of the excavation and analyzed them for PCBs using EPA Method 8080. The results indicated that PCB concentrations (Acrolor-1260) ranged from 94 to 19,700 mg/kg. To further define the extent of PCB contamination, Phase one advanced eight hand auger borings (B-1 through B-8), collected samples at 0.5 feet, 1.5 feet, and at 2.5 feet, and analyzed the soil samples for PCBs using EPA Method 8080. The results indicated that PCB concentrations ranged from non-detect to 292 mg/kg. The highest PCB concentration was detected below the former capacitor.

On May 17, 1999, Wyle retained a subcontractor to remove the capacitor and further excavate oil-impacted soil. The total depth of the excavation attained a depth of approximately 3 feet bgs. The excavated soil was placed into two roll-off bins and was transported under manifest to Chemical Waste Management Inc., a disposal facility located in Kettleman Hills, California. Phase One collected a total of seven confirmation samples (CS-1 through CS-7) and analyzed them for PCBs using EPA Method 8080. The sampling results indicated that six of the seven samples were below the regulatory action limit for PCBs of 25 mg/kg for a restricted access site (source for this action limit not provided). Detected PCB concentrations ranged from 0.039 mg/kg in CS-3 to 37.7 mg/kg in CS-4.

Phase One addressed the remaining PCB impacted area by excavating approximately five cubic feet of soil in a limited area near CS-4. After the excavation was completed, Phase One collected three confirmation samples (CS4A, CS4B, and CS4C) for PCB analysis.

The analytical results indicated that PCB concentrations ranged from 0.323 mg/kg in CS-4C to 1.59 mg/kg in CS-4B, all below the regulatory action limit for PCBs of 25 mg/kg for restricted access site.

On March 8, and 12, 1999, Phase One contracted with Spectrum Geophysics to conduct a geophysical investigation to locate buried metallic debris in a reported dumpsite area, currently known as Area J11, at the eastern part of the site. The equipment used during this investigation included a Geometrics 856AX proton precession magnetometer, a Geonics EM-31 terrain conductivity meter, and electromagnetic utility locators. Buried metals were identified in J11 Area. However, Phase One concluded that the features did not appear large enough to represent a drum, buried tank, or other such substantial features.

On March 5, 2002, ENVIRON collected 16 soil samples (SB-01 to SB-16, collected from the ground surface) from Area J14 and three soil samples (SB-17 to SB-19, collected from the ground surface) from the area adjacent to the western berm of J14. In addition, two soil borings, SB-20, and SB-21, were advanced inside a 10-foot by 10-foot detonation test area located within J14 (Figure 2; Appendix P). Soil samples SB-20 and SB-21 were obtained by scraping soil from the hardened discolored surface. Soil sample SB-21 was also collected at one and three feet bgs. All soil samples were analyzed for Title 22 metals using EPA Method 6010B/7471.

The analytical results indicate that soil samples collected from within the 10 foot by 10 foot test cell located within J14, SB-20 and SB-21, exceeded the RPRG for one or more metals (SB-20 [antimony, lead], SB-21 [antimony, chromium, lead, and nickel], SB-21-1' [antimony, chromium, lead], and SB-21-3' [lead])(Appendix P - Table 1c). In addition, the majority of the soil samples exceeded the RPRG for arsenic. Arsenic results were considered to be within the documented "background" range for Southern California soils. Metal concentrations (excluding arsenic) were not detected above the RPRG in any of the samples collected outside of the 10 foot by 10 foot test cell (samples SB-01 to SB-19).

Using the RPRG as a guide, ENVIRON excavated soil from within the test area to a depth of approximately 4 feet. The excavated soil was temporarily placed in a roll-off bin, pending appropriate off-site disposal. Subsequently, two confirmation soil samples were collected from the bottom of the excavation (SB-27, SB-28) and one confirmation sample was collected from the middle of each sidewall (SB-28-1 through SB-31-1.0). Confirmation soil samples were analyzed for Title 22 metals using EPA Method

6010/7471; detected metals concentrations for all confirmation soil samples were below their respective PRGs (Appendix P - Table 1c).

During the activities performed by ENVIRON, the work area was sprayed with water when necessary to mitigate the potential occurrence of fugitive dust. A dust monitor (MIE Personal DataRAM) was stationed in the work area, and used to record airborne particulate concentration at one-minute intervals throughout each field day. Time averaged dust concentrations did not exceed the action level set to protect on-site workers ( $4 \text{ mg/m}^3$ ). Monitoring results verified that no off-site impacts or concerns were recorded.

In March 2002, ENVIRON advanced four soil borings adjacent to a concrete slab in the “Cook-Off” area (J8) (SB-22 through SB-25; Figure 2; Appendix P). Tests conducted in this area used diesel fuel. A total of 10 soil samples were submitted for analysis; two soil samples from SB-22 and from SB-24 (collected from the surface and at 2 feet), and three samples from SB-23 and SB-25 (collected at the surface, at 2 feet, and at 3.5 feet). Soil samples were analyzed for TPH using EPA Method 8015M. Extractable fuel hydrocarbons (EFH) were detected in seven of the ten samples above the laboratory reporting limits of 5 mg/kg. EFH concentrations ranged from 5.7 mg/kg in SB-24-2’ to 2,600 mg/kg in SB-23-2’ (Appendix P - Table 1b).

In April 2002, after soil remediation was completed in Area J14, DTSC advanced six soil borings (A2-1 through A2-6; Figure 2; Appendix P) in Area J14 to determine if hazardous waste levels of heavy metals or explosive residuals had been left within the area after excavation was completed by ENVIRON. A total of 12 soil samples were submitted for analysis (three samples were analyzed from each soil boring at the surface and depths of one foot and two feet, with the exception of A2-3, A2-4, and A2-5, from which only surface samples were collected). All soil samples were analyzed for metals, specifically aluminum and/or mercury, using EPA Method 6010. In addition, soil samples A2-1-SA, A2-3, A2-4 were also analyzed for explosive residues using EPA Method 8330, and for SVOCs using EPA Method 8270 (Appendix P - Tables 1c and 1d).

Soil sampling results indicated that *“all samples analyzed for EPA 8270 did not meet criteria for classification as a hazardous waste; all sample analyzed under EPA 6010 were under regulatory limits for metals<sup>7</sup>; aluminum was detected at levels between 3,300 mg/kg and 14,900 mg/kg, but there is no state limit established for aluminum; all samples analyzed for metals specific for mercury were under regulatory limits for detectable*

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<sup>7</sup> It is noted that lead was detected in three soil samples at concentrations that exceeded the RPRG for lead of 400 mg/kg; therefore, this statement is erroneous.

*mercury; and all samples analyzed under EPA 8330 (explosive residues) demonstrated non-detectable limits for compounds screened for this test.”*

DTSC also collected nine additional soil samples in Area J. Three soil samples (SC-1 through SC-3) were collected at the ground surface in J13 (east side, center, and west side of area), three soil samples (PI-1 through PI-3) were collected at a depth of 2 feet from a wall of the projectile impact area, and three surface soil sample (T-4 to T-6) were collected as a part of a 1,400 foot long transect line extending from the “new arena (K3) to the nearest residence located south of Wyle. Soil samples SC-1 through SC-3 were analyzed for metals using EPA Method 6010, explosive residuals using EPA Method 8330, and for SVOCs using EPA Method 8270. Soil samples PI-1 through PI-3 were analyzed for metals using EPA Method 6010, and soil samples T-4 to T-6 were analyzed for Title 22 metals using EPA Method 6010/7000 (Appendix P - Tables 1c and 1d).

*The DTSC concluded that “all samples analyzed for EPA 8270 did not meet criteria for classification as a hazardous waste; all samples analyzed under EPA 6010 were under regulatory limits for metals; aluminum was detected at levels between 3,300 mg/kg and 14,900 mg/kg, but there is no state limit established for aluminum; all samples analyzed for metals specific for mercury were under regulatory limits for detectable mercury; and all samples analyzed under EPA 8330 (explosive residues) demonstrated non-detectable limits for compounds screened for this test.”*

In 2002, Kennedy/Jenks investigated the septic system (septic system 11) that serviced a restroom in Building J1. A sludge sample was collected from the active septic tank along with a soil sample from where the septic system’s leach line was anticipated to be located<sup>8</sup>. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the leach line soil and sludge samples were also tested for nitrite, sulfate, and chloride using EPA Method 300.0.

The results indicate that chlorobenzene was detected in the sludge sample at a concentration of 170 µg/kg; no VOCs were detected in the soil sample. SVOCs were detected only in the sludge sample at concentrations that ranged from 2,600 µg/kg to 20,000 µg/kg. TPH were detected in the sludge sample at a concentration of 19 mg/kg

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<sup>8</sup> The location of the leach line could not be confirmed; as a result, the soil sample was collected from a moist area behind Building J1.

but were not detected above the laboratory reporting limit in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. Metals detected in the samples were detected within typical background concentrations for soils in California, with the exception of zinc in the sludge sample, which was detected at a concentration greater than typical background concentrations for zinc (Kearny Foundation of Soil Science, 1996 and Dragun, 1991). Nitrate, sulfate, and chloride were detected in the sludge and soil samples at maximum concentrations of 1.1 mg/kg, 2.7 mg/kg, and 47 mg/kg, respectively (Appendix P - Tables 1a, 1b, 1c, 1d, and 1e).

In November 2003, WESTON, on behalf of the EPA, collected seven soil samples WL-1-S through WL-7-S) to a depth of 1 foot bgs. The sample WL-1-S was analyzed for perchlorate using EPA Method 314, hydrazine using WCAS Standard Operating Procedures 3340, metals using CLPAS ILM05.2, SVOCs using CLPAS OLM04.3, VOCs using CLPAS OLM04.3, for NDMA using EPA Method 625m, pesticides, and for PCBs using CLPAS OLM04.3. WL-1-S was considered by WESTON to be a background sample because it was collected from a location where Wyle activities have not occurred. Soil sample WL-2-S was analyzed for perchlorate hydrazine, metals, pesticides, and PCBs using the same methods discussed above. Soil sample WL-3-S was analyzed for pesticides and PCBs using the method mentioned above. Soil samples WL-4-S and WL-5-S were analyzed for perchlorate and metals. Soil sample WL-6-S was analyzed for hydrazine and soil sample WL-7-S was analyzed for perchlorate, hydrazine, metals, VOCs, pesticides, and PCBs.

The results indicated that PCBs (Aroclor-1260) were detected in the soil sample WL-3-S at a concentration of 120 µg/kg. Perchlorate was detected in WL-4-S at a concentration of 19 µg/kg. The pesticides gamma-BHC and endrin were detected in soil sample WL-3-S at concentrations of 3.2 µg/kg and 7 µg/kg respectively. The pesticide beta-BHC was also detected in soil sample WL-7-S at a concentration of 2.1 µg/kg. No other analytes were detected above the laboratory reporting limits.

#### **2.5.2.12 Quarry**

In 1995, BB&L collected two soil surface samples (OD-1, OD-2; Figure 2; Appendix Q) from the quarry, where BB&L had identified two “craters” as areas of potential environmental concern. One surface sample was collected from each crater and analyzed for TPH-diesel using EPA Method 8015M, and explosive residues using EPA Method

8330. In addition, soil sample OD-1 was analyzed for SVOCs using EPA Method 8270. TPH-diesel, explosive residues, and SVOCs were not detected above the laboratory reporting limits.

In 1999, Phase One collected two additional surface soil samples (B-36, B-37) from between surface samples OD-1 and OD-2. The soil samples were analyzed for Title 22 metals using EPA Method 6010/7000. Metals were not detected above background concentrations identified in samples collected from other areas of the Site. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny Foundation of Soil Science, 1996 and Dragun, 1991).

### **2.5.2.13 Area K**

In February 2002, ENVIRON advanced 20 soil borings (SB-1 through SB-20) in the new arena (Area K3), and four soil borings within the test area (SB-21 through SB-24) (See Figure 2; Appendix R). Soil borings SB-1 through SB-20 were collected from the ground surface to a depth of six inches bgs. Soil samples from borings SB-21 through SB-24 were collected from the surface, at one foot, and at three feet bgs. The three-foot samples in SB-23 and SB-24 were not collected due to refusal. All soil samples were analyzed for total lead using EPA Method 6010B. In addition, soil samples obtained from SB-16, SB-21, and SB-21-1 (at one foot bgs) were analyzed for California Title 22 Metals by EPA Methods 6010B/7471.

The results indicated elevated lead concentrations in soil samples SB-21 (8,200 mg/kg), SB-22 (11,000 mg/kg), SB-23 (8,600 mg/kg), SB-24 (5,300 mg/kg), and SB-23-1 (940mg/kg) in the 10 foot by 10 foot test area. Lead was not detected in the arena-wide samples (SB-1 through SB-20). Lead concentrations in these samples ranged from 6 mg/kg to 130 mg/kg, with the majority of the samples having total lead concentrations below 20 mg/kg.

Using the RPRG for lead (400 mg/kg) as a guide to identify areas of the arena impacted with lead, ENVIRON excavated soil from within the 10 foot by 10 foot test area to a depth of approximately 2 feet bgs. In addition, a 10 foot by 10 foot area near SB-6 was also excavated down to a depth of approximately 6 inches bgs. A composite sample was collected from the excavated soil to ensure appropriate soil disposal. A total of 10 confirmation samples were collected from each of the excavated areas. Confirmation samples (SB-25 through SB-29) were obtained from the test area, and SB-6, SB-6A-0.5 through SB-6D-0.5 were collected from another excavated area near soil boring SB-6.

Confirmation soil samples were analyzed for total lead using EPA Method 6010B. Confirmation soil sampling results ranged from 11 mg/kg to 55 mg/kg in the test area, and from 3.9 mg/kg to 11 mg/kg in the area surrounding SB-6.

In April 2002, DTSC advanced seven soil borings in the new arena area (A1-1 through A1-7). Soil borings A1-1, A1-2, and A1-4 were collected from the surface, at one foot, and at 2 feet bgs., A1-3, A1-5, A1-6, and A1-7 were all collected from the ground surface. In addition DTSC collected one surface sample (T-1) as a part of a 1,400-foot long transect line. Surface soil samples A1-1 and A1-2 were analyzed for metals using EPA Method 6010, for explosive residuals using EPA Method 8330, and for SVOCs using EPA Method 8270. The remainder of the samples were analyzed only for metals using EPA Method 6010.

Based on the results of the sample analysis, the DTSC concluded that *“all samples analyzed under the EPA Method 6010 were under regulatory limits for metals; aluminum (Al) was detected at levels between 3300 mg/kg and 14900 mg/kg; however there is no state limit established for Al; for metals specific for mercury, all samples analyzed were under regulatory limits for detectable mercury; for explosive residue, all samples analyzed were under this method demonstrated non-detectable limits for compounds screened for this test; for SVOCs, all samples analyzed under this method did not meet criteria for classification as a hazardous waste.”*

In 2002, as part of the septic system investigation, Kennedy/Jenks investigated septic system 10, which serviced two trailers located in K1 and K2. A sludge sample was collected from each septic tank, along with a soil sample from the septic system's leach lines. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8260B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the samples were also tested for nitrate/nitrite, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

No VOCs were detected in the samples. One SVOC, butyl benzyl phthalate, was detected in the sludge sample at a concentration of 240 µg/kg. TPH was detected in the sludge sample at a concentration of 14 mg/kg but was not detected above the laboratory reporting limit in the soil sample. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. In addition, metals detected in the samples were detected within typical background concentrations for soils in California (Kearny

Foundation of Soil Science, 1996 and Dragun, 1991). Nitrite (as N), nitrate, sulfate, and chloride were detected in the samples at maximum concentrations of 1.0 mg/kg, 1.9 mg/kg, 10 mg/kg, and 4.2 mg/kg, respectively, and TOC was detected at a concentration of 1,200 mg/kg (Appendix R - Tables 1a, 1b, 1c, and 1d).

In November 2003, WESTON, on behalf of the EPA, collected two soil samples WL-8-S and WL-9-S. Both soil samples were analyzed for perchlorate using EPA Method 314 and metals using CLPAS ILM05.2. The results indicated that perchlorate was not detected in any of the samples. Of the metals, only manganese was detected in WL-8-S at a concentration of 5,070 mg/kg, a concentration exceeding the RPRG of 1,800 mg/kg.

#### **2.5.2.14 Area M**

In June 1999, Phase One advanced two soil borings (B-95, B-96; Figure 2; Appendix S) to depths of 2 feet. Soil boring B-95 was analyzed for VOCs using EPA Method 8260B and TRPH using EPA Method 418.1. Soil Boring B-96 was analyzed for TRPH using EPA Method 418.1, and for TPH using EPA Method 8015M. VOCs, TRPH, and TPH were not detected in the soil samples above their laboratory reporting limits.

A 4,000 gallon gasoline UST was formerly located in the motor pool area. The UST, along with its associated dispenser and piping, was removed under County oversight on June 2, 1988. After the UST was removed, three confirmation soil samples (TE-WW-7'6", TE-EW-7'6", TE-SEC-8'5") were collected from the bottom and sidewalls of the excavation. In addition, one ground water sample (TB-C-8') was collected from the bottom of the excavation. Soil and ground water samples were analyzed for TPH using EPA Method 8015M, and for benzene, toluene, ethylbenzene, xylenes, and methyl tertiary butyl ether (MTBE) in accordance with EPA Method 8020. The results indicated that all analytes were non-detect. The County issued a closure letter for the UST removal in 1989.

In November 2003, WESTON on behalf of the EPA, collected one soil sample (WL-17-S) and analyzed it for VOCs using CLPAS OLM04.3, SVOCs using CLPAS OLM04.3, and metals using Method CLPAS. The results indicated that VOCs and SVOCs were not detected above the laboratory reporting limits, and that metal concentrations were below their respective RPRGs.

### **2.5.2.15 Guard Shack**

In 2002, Kennedy/Jenks investigated septic system 13 that serviced a restroom in the guard shack. A sludge sample was collected from the active septic tank along with a soil sample from the septic system's leach line. The samples were analyzed for TPH using EPA Method 8015M, VOCs using EPA Method 8260B, SVOCs using EPA Method 8270B, and for Title 22 metals plus mercury and chromium using EPA Methods 6010, 7196, and 7471. In addition, the samples were also tested for nitrate/nitrite, sulfate, and chloride using EPA Method 300.0, and the soil sample was analyzed for TOC using EPA Method 9060.

The results indicate that VOCs were not detected in sludge and soil samples above the laboratory reporting limits. Diethyl phthalate (DEP), a SVOC compound, was detected only in the sludge sample at a concentration of 100 µg/kg. TPH was not detected in any of the samples above the laboratory reporting limits. Metals concentrations detected in the sludge and soil samples did not exceed TTLCs established by the State of California for classification of the soil and sludge as hazardous waste. Nitrate, sulfate, and chloride were detected in the sludge and soil samples at maximum concentrations of 19 mg/kg, 210 mg/kg, and 48 mg/kg, respectively, and TOC was detected in the soil sample at a concentration of 4,700 mg/kg.

### **2.5.3 Ground Water and Surface Water Investigation**

Ground water and surface water sample data were collected at the Site from the time that water sampling was initiated in 1999 through October 2004; ground water data are summarized (detected compounds only) in Table 1 (general chemistry compounds), Table 2 (petroleum hydrocarbons), Table 3 (metals), Table 4 (semivolatile organic compounds), Table 5 (volatile organic compounds), and Table 6 (emergent compounds), and surface water data are summarized in Table 7 (general chemistry compounds), Table 8 (metals), Table 9 (VOCs), and Table 10 (emergent compounds). Well locations are depicted on Figure 2. Table 11 presents the well construction details for existing wells at the Site and Table 12 provides ground water elevation data for all monitoring wells.

Ground water and surface water sampling activities were conducted by Phase One in 1999, by Kennedy/Jenks, quarterly between June 1999 and April 2003, and by ENVIRON since July 2003 (Phase One Inc., 1999, Kennedy/Jenks, 2000a, 2000b, 2001, 2002a, 2002d, and 2003a, and ENVIRON, multiple listings).

In May 1999, Phase One installed eight monitoring wells (MW-1 through MW-8; Figure 2) as part of a site-wide due diligence investigation. The initial ground water sampling results indicated that no VOCs were detected in upgradient wells MW-1 through MW-4. PCE and TCE were detected in downgradient wells MW-6, MW-7, and MW-8 at concentrations that exceeded State of California MCLs for both compounds.

In 2002, in addition to conducting quarterly sampling of existing wells, as requested by the RWQCB, Kennedy/Jenks installed six new ground water monitoring wells at the Site (MW-1A, MW-2A, MW-9, through MW-11, and MW-13; Figure 2). Well MW-5 was replaced by Well MW-5A, which had been destroyed by residential construction activity on an adjacent property. In accordance with an agreement with the RWQCB, a vapor well (VW-12) was installed at the proposed location of monitoring well MW-12, because ground water was not encountered prior to drilling refusal. The monitoring wells were sampled quarterly, first by Kennedy/Jenks (until March 2003), and then by ENVIRON (through October of 2004).

In September 2003, ENVIRON installed 12 extraction wells (EX-1 through EX-12) in the immediate vicinity and downgradient of Area F buildings. Additional wells were installed in March of 2004 as part of implementation of the RAW (MW-1B, MW-4B, MW-6B, MW-17, and MW-18) and Site Boundary Assessment (MW-14, MW-15, and MW-16). These wells have been sampled quarterly since their installation.

### **2.5.3.1 Summary of Ground Water Sampling Results**

To date, only four VOCs (TCE, cis-1,2-DCE, benzene, and vinyl chloride) have been detected in upgradient Wells MW-1, MW-1B, MW-2, MW-3, MW-4, and MW-4B. TCE was detected in a ground water sample collected from Well MW-1 in December 2001 at a concentration of 0.99 µg/l, and recently in the newly installed well MW-4B sampled in April and July, 2004 at concentrations of 3.6 µg/l and 2.4 µg/l respectively. Cis-1,2-DCE was detected in a ground water sample collected from Well MW-4 in May 1999 at a concentration of 52 µg/l. Most recently, benzene was detected in a duplicate sample collected from Well MW-1 in April 2004 at a concentration of 0.59 µg/l (but was not detected in the primary sample collected from this well) and in the newly installed well MW-1B at a concentration of 1.1 µg/l. In addition, vinyl chloride was also detected in Well MW-1B in July 2004 at a concentration of 1.9 µg/l.

Several VOCs were detected in the remaining monitoring wells and extraction wells; however, most compounds (e.g., 1,1-dichloroethene, 1,2-dichloroethane, chloroform, cis-1,2-dichloropropene, Freon 113, trichlorofluoromethane, toluene, and vinyl chloride)

were detected at very low concentrations in only a few samples. The most prevalently detected VOCs in the ground water samples included TCE (15 monitoring wells and 11 extraction wells), cis-1,2-dichloroethene (cis-1,2-DCE)(9 monitoring wells and 9 extraction wells), PCE (6 monitoring wells and 10 extraction wells), and trans-1,2-DCE (5 monitoring wells and 1 extraction well). Of those compounds, TCE was detected at the highest concentrations, ranging up to 5,300 µg/l (in EX-10).

TCE concentrations were detected historically in Wells MW-5 (non-detect to 47 µg/l), MW-5A (non-detect to 7.5 µg/l), MW-6 (410 µg/l to 1,700 µg/l), MW-7 (88 µg/l to 1,100 µg/l), MW-8 (6.7 µg/l to 191 µg/l), MW-9 (1,500 to 2,400 µg/l), MW-10 (410 µg/l to 3,400 µg/l), MW-11 (18 µg/l to 1,100 µg/l), and MW-13 (130 to 4,800 µg/l); these wells are located between the Area F Buildings and the ephemeral stream. In April 2002, Kennedy/Jenks concluded *“that there is a general decline of TCE concentrations in the direction of ground water flow and the presence of dechlorination breakdown products of TCE in downgradient wells, particularly MW-5A and MW-8, continue to suggest that natural attenuation processes are active in portions of the lower basin.”* (Kennedy/Jenks, 2003b). Ground water data collected by ENVIRON since Kennedy/Jenks work was completed support this conclusion.

TCE was detected in newly installed wells MW-14, MW-15, MW-16, MW-17, and MW-18. Elevated concentrations of TCE were detected in Wells MW-14 (detected TCE concentrations ranged from 8,900 µg/l to 12,000 µg/l) and to a lesser extent, MW-15 (detected concentrations of TCE ranged from 2,100 µg/l to 2,500 µg/l).

Low concentrations of NDMA were detected in Wells MW-5A (2.5 to 7.2 nanograms per liter [ng/l]), MW-7 (3.5 ng/l), and MW-8 (2.0 and 5.5 ng/l) during three sampling events. NDMA was also detected in new Wells MW-14 (at concentrations up to 140 ng/l) and MW-15 (at concentrations up to 13 ng/l).

Perchlorate was detected in Wells MW-2 and MW-11 during three sampling events, at concentrations ranging from 4 to 7.9 µg/l, and 3.5 to 7.4 µg/l, respectively. During the quarterly sampling conducted in July 2003, perchlorate was also detected in Wells MW-3 (2.5 µg/l), MW-7 (2.5 µg/l), MW-10 (3.5 µg/l), and MW-13 (2.5 µg/l). The detection of perchlorate in Wells MW-3, MW-7, MW-10, and MW-13 is likely the result of lowering the laboratory reporting limits for perchlorate from 3.0 µg/l to 2.0 µg/l beginning in second quarterly sampling round. During the October 2003 sampling event (Fourth Quarter 2003), perchlorate was detected in Wells MW-1, MW-7, MW-11, and MW-13 (at concentrations of 2.9, 2.5, 5.3, and 2.8 µg/l, respectively). Perchlorate was detected in

various wells during the First, Second, and Third Quarters of 2004, including newly installed wells MW-14, MW-15, MW-17, and MW-18, at concentrations up to 18, 4.3, 2.5, and 2.6 µg/l, respectively.

Hydrazine was detected in Wells MW-6 and MW-8 at concentrations of 0.005 µg/l and 0.014 µg/l, respectively, in May 1999. However, during subsequent sampling events, the analytical method for hydrazine was changed from the colorimetric method to a more refined testing method, EPA Method 8315M, after which time hydrazine was not detected in Wells MW-6 and MW-8. Most of the wells have been analyzed for hydrazine five times since the initial detections. The continued absence of hydrazine indicates that the earlier detections were a false positive, likely due to use of a non-specific analytical method.

### **2.5.3.2 Summary of Surface Water Sampling Results**

No VOCs have been detected in surface water samples collected from the ephemeral stream near the mid-basin portion of the Site, adjacent to Well MW-1. TCE, cis-1,2-DCE, and trans-1,2-DCE were detected in surface water samples collected between 2001 and 2004 from the ephemeral stream adjacent to Wells MW-5A, MW-6, and MW-8. Detected TCE concentrations ranged from non-detect to 20 µg/l, concentrations of cis-1,2-DCE ranged from non-detect to 18 µg/l, and detected concentrations of trans-1,2-DCE ranged in concentration from non-detect to 24 µg/l. Vinyl chloride was detected at concentrations of 6.9 µg/l and 3.5 µg/l in the surface water samples collected adjacent to Well MW-5A on January 15, 2004 and April 13, 2004. In addition, NDMA was detected in surface water samples collected adjacent to Well MW-5A on January 15, 2004 and April 13, 2004, at concentrations of 3.7 ng/l and 7.3 ng/l, respectively. The detectable presence of VOCs in the ephemeral stream near Wells MW-5A, MW-6, and MW-8, at similar concentrations to those compounds detected in ground water samples from the same wells, suggests that surface water at this segment of the stream is primarily comprised of discharging ground water, mixed with a lesser volume of surface water.

### **2.5.4 Removal Action Work Plan**

On November 24, 2003, ENVIRON submitted a Draft RAW to the DTSC. The RAW was prepared to address known VOC-impacted ground water in proximity to Areas F and H at the Site. The Draft RAW was approved by the DTSC on May 7, 2004 and was resubmitted as a Final RAW on May 14, 2004.

Three 2-PHASE™ Extraction and remediation systems were installed at the Site and are being operated in accordance with the RAW and the Final System Operation, Maintenance, and Monitoring Plan (O & M Plan), dated April 21, 2004. Permits were obtained from the South Coast Air Quality Management District (SCAQMD) for the discharge of the treated vapors from each of the three extraction units (Permit numbers F67904, F67905, and F67906), and a NPDES permit was obtained from the RWQCB – Santa Ana Region for discharge of treated ground water (Permit number R8-2002-0007-129).

Remediation system installation was completed in April 2004. Each of the three 2-PHASE™ systems was operated intermittently, using batch discharge (in accordance with DTSC approval), from April through early August 2004. DTSC granted permission to continuously discharge treated ground water on August 20, 2004. Startup and continuous operation of the 2-PHASE™ extraction systems at the Site began on August 23, 2004.

The extraction systems at the Site draw from extraction wells at the Site, including: Wells MW-9, EX-1, EX-2, EX-3, and EX-11 (Compound One); Wells MW-10, MW-11, EX-4, EX-5, and EX-6 (Compound Two); and Wells MW-7, MW-13, EX-7, EX-8, EX-9, EX-10, and EX-12 (Compound Three).

Compounds One and Two were operated continuously beginning August 23, 2004. Compound Three began continuous operation on September 9, 2004.

### **2.5.5 Off-Site Investigation**

In August 2003, ENVIRON advanced a total of six soil borings OESB-1 through OESB-6 (Figure 3). The soil borings were located in the area downgradient of Well MW-5A, perpendicular to the anticipated historical path of the ephemeral stream on Hillside Avenue. ENVIRON collected soil and ground water samples from all six soil borings, each of which were drilled to a maximum depth of 40 feet bgs.

Two soil samples were selected and analyzed from each soil boring at 5 and 15 feet bgs (only the five foot soil sample was analyzed from OESB-4 due to lack of soil recovery). Ground water was encountered at approximately 25 feet bgs in the soil boring. Ground water samples were collected at two depths in OESB-1, OESB-2, OESB-3, and OESB-4; (1) from just below the water table (between 25 and 28 feet bgs), and (2) from the base of the boring at approximately 40 feet bgs. Ground water samples in OESB-5 and OESB-6 were collected only from the depth interval of 25 and 28 feet bgs.

Soil samples were analyzed for VOCs using EPA Method 8260B, trace explosive residues by EPA Method 8330, perchlorate by EPA Method 314, and SVOCs by EPA Method 8270C. Ground water samples were analyzed for VOCs using EPA Method 8260B, trace explosive residues by EPA Method 8330, perchlorate by EPA Method 314, and NDMA using EPA Method 1625C.

Soil sample results indicated that VOCs, trace explosive residues, perchlorate, and SVOCs were not detected above the respective laboratory reporting limits.

Ground water sampling results for the off-site investigation are summarized in Tables 26 (VOCs) and 27 (emergent compounds). Detected TCE concentrations ranged from 2.3 µg/l in OESB-5-GW-25 to 7.4 µg/l in OESB-1-GW-40. TCE was not detected in OESB-6-GW-25 above laboratory reporting limit. Cis-1,2-DCE and trans-1,2-DCE were detected at low concentrations in some of the samples. NDMA was detected in three samples, OESB-1-GW-40, OESB-2-GW-40, and OESB-4-GW-26D, at concentrations of 4.2 ng/l, 2.5 ng/l, and 2.2 ng/l, respectively. Perchlorate was detected in four samples, OESB-4-GW-26, OESB-4-GW-40, OESB-5-GW-26, and OESB-6-GW-25, at concentrations of 2.2 µg/l, 2.9 µg/l, 3.3 µg/l, and 6.4 µg/l, respectively. These results indicate that TCE and its degradation byproducts (cis-1,2-DCE and trans-1,2-DCE), perchlorate, and NDMA have migrated off-site.

In November 2003, on behalf of the EPA, WESTON collected seven soil samples (WL20-S through WL26-S) to establish background concentrations for metals. Two soil samples were collected from Norco Elementary School (WL-20-S and WL-21-S), two samples were collected from Norco High School Bleachers (WL-22-S and WL-23-S), one soil sample was collected from Norco High School Field (WL-24-S), one soil sample was collected from Golden West lane (WL-25-S), and one soil sample (WL-26-S) was collected near Temescal Wash. In addition, WESTON collected one sediment sample and one ground water sample from Temescal Wash (WL-5SED and WL-12-GW, respectively). All soil and ground water samples were analyzed for VOCs, SVOCs, perchlorate, hydrazine, metals, and NDMA, with the exception of the sediment sample, which was analyzed for perchlorate, hydrazine, and metals only.

The soil sampling results indicated that concentrations of detected metals, with the exception of arsenic and thallium, were below the average background concentrations of metals in soils derived from granite and/or RPRGs. Concentrations of arsenic in all soil samples ranged from 0.42 mg/kg to 3.1 mg/kg, and for thallium from 8.9 mg/kg to 11.9 mg/kg, naturally occurring concentrations above the RPRGs (0.39 mg/kg and 5.2 mg/kg, respectively).

VOCs, SVOCs, perchlorate, hydrazine, and NDMA were not detected in any of the soil samples.

The sediment sampling results indicated the presence of arsenic at a concentration of 2.9 mg/kg, which is slightly higher than the RPRG for arsenic of 0.39 mg/kg, but well within the upper limit of the background range reported to ENVIRON by DTSC (12 mg/kg). No perchlorate and/or hydrazine were detected in the sediment sample.

The ground water sampling results indicated the presence of VOCs, SVOCs, and metals. Carbon disulfide, trans-1,2-DCE, cis-1,2-DCE, chloroform, TCE, toluene, and total xylenes were the VOCs detected at concentrations of 0.2 µg/l, 0.44 µg/l, 1.1 µg/l, 0.1 µg/l, 1.7 µg/l, 0.8 µg/l, and 0.75µg/l respectively. The SVOCs caprolactam and bis (2-ethylhexyl) phthalate were detected in the ground water sample at concentrations of 3.4 µg/l and 3.3 µg/l respectively. Antimony and arsenic were detected above their respective MCLs of 6 µg/l and 10 µg/l, at concentrations of 11.1 µg/l and 16.8 µg/l, respectively

In March 2004, ENVIRON installed one monitoring well, MW-16, along Hillside Avenue in proximity to the OESB borings and analyzed the ground water for VOCs using EPA Method 8260B, SVOCs by EPA Method 8270, perchlorate by EPA Method 314, TPH (full-range hydrocarbons) by EPA Method 8015M, metals by EPA Method 200.7 and 6010B, NDMA by EPA Method 1625C, and for hydrazine using WCAS SOP 3340. In addition, ENVIRON collected soil gas samples from MW-16 and from four soil borings advanced along El Paso Avenue (ESG-1 - ESG-4). Soil gas samples were collected at 5 and 15 feet bgs and were analyzed for VOCs using EPA Method TO-15.

The results indicated that TCE, cis-1,2-DCE, and trans-1,2-DCE were detected in ground water from Well MW-16 at concentrations of 8.2 µg/l, 2.7 µg/l, and 1.6 µg/l, respectively. NDMA, perchlorate, and hydrazine were not detected in the ground water sample. Barium, calcium, magnesium, manganese, molybdenum, sodium, and vanadium were detected in the ground water samples at concentrations of 0.12 mg/kg, 130 mg/kg, 60 mg/kg, 0.022 mg/kg, 0.048 mg/kg, 250 mg/kg, 0.014 mg/kg, respectively.

No TCE and/or vinyl chloride were detected in the soil gas samples collected. 12 VOCs were detected in the soil gas samples collected from locations ESG-1, ESG-2, ESG-3, and ESG-4, all at low or very low concentrations relative to the laboratory reporting limits, with the exception of isopropanol. Due to the presence of elevated concentrations of isopropanol (a tracer gas) in the samples, it appears that leakage likely occurred during collection of the soil gas samples; as a result of this leakage, the reported soil gas sample results could be

biased low. DTSC requested a second round of confirmation sampling at these locations. Therefore, ENVIRON conducted soil gas sampling using an on-site mobile laboratory on May 10, 2004 and resampled ESG-1 through ESG-4, renaming them RESG-1 through RESG-4. The results of the resampling on El Paso indicated that PCE was detected at 5 feet bgs in RESG-2 and RESG-4 at concentrations of 0.02 µg/l and 0.11 µg/l, respectively. In addition, vinyl chloride was detected at RESG-1 (13 feet) at a concentration of 0.03 µg/l. No other VOCs were detected in the soil gas samples.

ENVIRON collected soil gas samples from 10 soil borings advanced along Golden West Lane (ESG-5 through ESG-14). At each location, a soil gas probe was attempted to be advanced to two depths, 5 and 15 feet bgs; however refusal was typically encountered prior to reaching 15 feet bgs. All samples were collected at 5 feet bgs and only ESG 5, ESG 6, ESG-7, ESG-8, ESG-11, and ESG-14 were advanced deeper depths that ranged from 9 to 12 feet. All samples were analyzed for PCE, TCE, and vinyl chloride using EPA Method 8260B Modified by a certified on-site mobile laboratory. Additionally, samples collected were analyzed for isobutene, the leak detection compound used during sampling, by the mobile laboratory.

The results of Golden West Lane sampling indicated that TCE was detected in samples collected from 8 of the 10 borings advanced on Golden West Lane at concentration ranging from 0.4 µg/l to 350 µg/l. The analytical results are summarized in Tables 1a through 1f in Appendix. PCE was detected in ESG-11 at a concentration of 0.5 µg/l at the 5-foot interval. Vinyl chloride was not detected in any of the samples. The presence of TCE in the soil gas samples is likely the result of off gassing from the ground water.

In June 2004, 18 soil gas samples (ESG-24, ESG-25, ESG-27 through ESG-30, ESG-32 through ESG-36, and ESG-38 through ESG-44) were collected in proximity to selected residences on Golden West Lane. All borings were attempted to reach a total depth of 15 feet but refusal was typically encountered at approximately 9 feet bgs. The sampling results indicated that TCE was detected at varying depths in 15 of the 18 soil gas borings. Detected TCE concentrations ranged from 0.2 µg/l in ESG-42 to 81 µg/l in ESG-29. TCE was not detected above the laboratory reporting limits in ESG-32, ESG-33, and ESG-41.

On September 21, 2004, two soil gas borings (ESG-45 and ESG-46) were advanced adjacent to the 2301 and 2313 Hillside Avenue residences. Drilling refusal was encountered at approximately 3 feet bgs in boring ESG-45 and at 5 feet bgs in boring ESG-46. Therefore, a soil gas sample was collected from only ESG-46 at 5 feet bgs. Due to drilling refusal, a hollow stem auger was mobilized to install temporary dual nested vapor probes at 5 and 15

feet bgs, and a temporary vapor probe also was installed at ESG-46 to a total depth of 15 feet. The probes were installed in accordance with DTSC guidelines. To allow for subsurface conditions to equilibrate, the soil gas samples were collected from ESG-45 and ESG-46 probes on October 1, 2004, 48 hours after probe installation. Immediately after collection, soil gas samples were submitted to the on-site mobile laboratory for VOCs analysis by EPA Method 8260B. Following sample collection and analysis by the mobile laboratory, soil gas probes were abandoned with hydrated bentonite chips and the surface completed to match the surrounding ground surface.

On September 28, 2004, four soil gas probes (ESG-47 through ESG-50) were advanced in the middle of the City of Norco High School football field. The soil gas probes were installed at 5 feet bgs and at the maximum depth of penetration of 15 feet bgs in ESG-47, 12 feet in ESG-48 through ESG-49 and 6 feet in ESG-50. All probes were installed according to DTSC guidelines. After a 30-minute equilibration time, a soil gas sample was collected from each sampling depth and submitted to the on-site mobile laboratory for VOCs analysis by EPA Method 8260B. At ESG-47, a purge-volume study was conducted according to DTSC guidelines to determine the appropriate purge volume to be used during sample collection. Additionally, two soil gas samples were collected in SUMMA™ canisters from ESG-48 at 12 feet bgs and from ESG-50 at 5 feet bgs, and were sent to a stationary laboratory for VOCs analysis by EPA Method TO-15.

The soil gas sampling results from samples collected on September 21 and 28, 2004, indicated that TCE was not detected in any of the soil gas samples above laboratory reporting limits.

On September 27 and 28, 2004, five permanent dual-nested soil vapor probes (VW-1 through VW-5) were advanced along Golden West Lane and adjacent to the residences located at 2281 and 2297 Golden West Lane. The soil borings were advanced to a maximum depth of approximately 15 feet or to the first ground water, whichever was shallower. Each vapor probe was dual nested, and attached to 1/8-inch Nylaflo tubing. During drilling, ground water was encountered in Borings VW-1, VW-3, and VW-4 at depths of 13.9 feet bgs, 12.7 feet bgs, and 15.4 feet bgs, respectively. Before installing the vapor wells, ground water samples were collected from Borings VW-1 and VW-3 and were analyzed for VOCs by EPA Method 8260B (insufficient water was present to permit sampling of VW-4). The ground water sample collected from VW-3 also was analyzed for perchlorate by EPA Method 314 and for NDMA by EPA Method 1625C.

After ground water sample collection, deeper vapor probes were installed approximately 2 feet above the water table and shallower probes were installed as planned at 5 feet bgs. In Borings VW-2 and VW-5 ground water was not encountered to the total depth drilled, 15 feet bgs, therefore, deeper vapor probes were installed at 15 feet bgs. The borings were packed with approximately 1 foot of sand within the probe depth, and approximately 1 foot of dry granular bentonite was placed above each sand pack. The remainder of each boring was filled with hydrated medium bentonite chips. Nested vapor probes were completed below grade in water-tight, traffic-rated boxes. The probes were allowed to equilibrate for approximately one week prior to the initial round of sampling conducted on October 12, 2004. The samples were collected simultaneously with indoor air sample collection (described in following paragraphs) and in accordance with DTSC's *Advisory for Active Soil Gas Investigation*. The vapor samples were collected in SUMMA™ canisters and sent to a stationary laboratory for VOCs analyses by EPA Method To-15. No vapor sample was collected from the depth of 15 feet bgs in VW-2 well because the vapor probe was saturated at the time of sampling. In addition to the nested vapor probes, a soil gas boring (ESG-51) was advanced near the residence located at 2270 Golden West Lane and vapor samples were obtained at 4 and 14 feet.

The soil gas sampling results indicated that TCE was detected in all the samples collected. TCE concentrations ranged from 2.4 µg/l in VW-2 at 5 feet to 910 µg/l in VW-1 at 12 feet. Other VOC compounds (such as TCFM, toluene, styrene, PCE, total xylenes, acetone, benzene, chloroform, Freon, cis-1,2-DCE, and vinyl acetate) also were detected in soil gas samples at various concentrations.

Ground water sampling results indicated that TCE was detected in ground water samples at concentrations of 10,000 µg/l and 3,400 µg/l in VW-3-GW and VW-1-GW, respectively. Other VOCs were also detected in ground water. 1,2 dichloroethane was detected at concentrations of 2 µg/l and 0.85 µg/l in VW-3 and VW-1 respectively, benzene was detected in VW-1 at a concentration of 0.5 µg/l, carbon tetrachloride was detected in VW-3 at a concentration of 4.2 µg/l, chloroform was detected at concentrations of 5.6 µg/l and 3.1 µg/l in VW-3 and VW-1 respectively, cis-1,2-DCE was detected at concentrations of 4.6 µg/l and 2 µg/l in VW-3 and VW-1 respectively, PCE was detected at concentrations of 7.1 µg/l and 5 µg/l in VW-3 and VW-1 respectively, TCFM was detected at concentrations of 240 µg/l and 61 µg/l in VW-3 and VW-1 respectively, and p-isopropyltoluene was detected in VW-1 at a concentration of 1.1 µg/l. NDMA and perchlorate were also detected in VW-3 at 160 ng/l and 15 µg/l.

On October 11 and 12, 2004, IAQ sampling was conducted inside three residences located at 2281, 2297, and 2270 Golden West Lane. Heating and air conditioning systems were operated normally for the season and time of day. The air samples were collected using 6-liter pre-cleaned, individually certified, and vacuumed SUMMA™ Canisters equipped with flow controllers. The flow rate of the flow controllers was pre-set at the laboratory for a 24-hour sampling duration. Sample locations included the bathrooms and the primary living areas. The sampling containers were placed in the breathing zone, approximately 3- to 5-feet off the ground. One upwind outdoor air sample, placed approximately 5-feet off the ground, was collected for each home, for a total of three outdoor ambient air samples. After a period of 24 hours, sample containers were closed and sent to Calscience Environmental Laboratory of Garden Grove, a California certified laboratory, under chain-of-custody protocol for VOCs analysis by EPA Method TO-15.

Acetone was the only VOC detected in all of the IAQ samples collected. Acetone concentrations, detected in the background samples collected outside the residences ranged from  $13 \mu\text{g}/\text{m}^3$  to  $22 \mu\text{g}/\text{m}^3$ , and in the indoor air samples, detected acetone concentrations ranged from  $13 \mu\text{g}/\text{m}^3$  to  $82 \mu\text{g}/\text{m}^3$ . TCE and benzene were detected in the indoor samples collected from one of the three residences, 2281 Golden West Lane. TCE concentrations ranged from  $35 \mu\text{g}/\text{m}^3$  to  $49 \mu\text{g}/\text{m}^3$ , and benzene was detected at concentrations ranging from  $9.8 \mu\text{g}/\text{m}^3$  to  $11 \mu\text{g}/\text{m}^3$ . Ethylbenzene, xylenes, and methyl ethyl ketone were detected in all of the indoor air samples collected at 2281 Golden West Lane. Detected concentrations of these compounds ranged from  $5.1 \mu\text{g}/\text{m}^3$  to  $5.3 \mu\text{g}/\text{m}^3$  for ethylbenzene,  $5.7 \mu\text{g}/\text{m}^3$  to  $6.1 \mu\text{g}/\text{m}^3$  for o-xylene, and from  $15 \mu\text{g}/\text{m}^3$  to  $17 \mu\text{g}/\text{m}^3$  for p/m-xylenes. Toluene was detected in all of the samples collected inside the three residences at concentrations ranging from  $4.7 \mu\text{g}/\text{m}^3$  to  $46 \mu\text{g}/\text{m}^3$ . Toluene was reported in one of the three samples collected outside the residences at a concentration of  $4 \mu\text{g}/\text{m}^3$ . Chloromethane was reported in one indoor air sample and in one outdoor air sample at a concentration of  $1.7 \mu\text{g}/\text{m}^3$ . Dichlorodifluoromethane and trichlorofluoromethane were reported in two air samples, 2270-OUT ( $4.7 \mu\text{g}/\text{m}^3$ ) and 2281-BATH ( $4.2 \mu\text{g}/\text{m}^3$ ), respectively.

Following receipt of the analytical results for the IAQ sampling, a HVAC system test was performed in the residence located at 2281 Golden West Lane, to assess whether operation of the HVAC system, with the introduction of outside air, could be successful in controlling VOC vapor concentrations within the residence; the test results 4- and 8-hours of operation indicated that TCE and benzene were not detected in indoor air.. As a result, a replacement HVAC system was installed in the home on November 20 through 23, 2004. The replacement system will enable outside air to be introduced into the house, and the fan will

be operated continuously to ensure that air exchange within the residence occurs on a set timed basis. Additional air sampling will be performed within the residence once the new HVAC system has been installed and is operating to demonstrate that operation of the HVAC system is successful in controlling VOC vapor concentrations in the house.

On October 14, 2004, the DTSC collected a ground water sample from a private well located on 998 3rd Street residence (3rd and Hillside). The ground water was analyzed for VOCs using EPA Method 8260B and for perchlorate using EPA Method 314. The sampling results indicate that TCE was detected at a concentration of 680 µg/l, Freon-11 at concentration of 29 µg/l, cis-1,2-DCE at a concentration of 0.96 µg/l, and chloroform at a concentration of 2 µg/l. In addition, perchlorate was detected at a concentration of 5.7 µg/l.

### **2.5.5 Data Gaps and Priorities**

As indicated in the preceding sections of this work plan, a significant amount of subsurface investigation and sampling has been conducted at the Site to date, beginning in 1994. Sampling was initiated at the Site based on observations made during Site visits and a review of Site use history. Initially, the County, then the RWQCB provided oversight of the Site investigations; the DTSC is currently the lead agency for the Site.

Although several potential source areas have been identified and investigated, as described in the preceding sections of this work plan, and removal actions have been performed, data gaps exist for the Site. The purpose of this RI work plan is to address those data gaps; to provide a detailed plan for the further assessment and characterization of chemicals in soil gas, soil, and ground water at the Site; to obtain additional information regarding the hydrogeology of the Site; and to perform a HHRA and a ecological risk assessment for the Site. The RI investigations will be performed and prioritized in accordance with the *General Strategy and Priorities for Investigations/Mitigation* Technical Memorandum submitted to the DTSC on November 2, 2004. The findings of the RI investigation will be used to assess whether additional subsurface investigation is needed to define the areal and/or vertical extent of contamination at the Site, and to determine if additional removal or remedial actions, if any, are necessary.

## **3.0 INITIAL EVALUATION AND CONCEPTUAL SITE MODEL**

### **3.1 Site Hydrogeologic Model**

The conceptual hydrogeologic model presented in this section is based on the results of the ongoing investigations conducted at Wyle to date, and presents ENVIRON's current understanding of the relationship between detected chemicals, subsurface geology, and hydrogeology at the Site.

Selected geologic cross-sections for the Site are presented on Figures 7 (Cross Section A – A') and 8 (Cross Section B – B'); cross section locations are shown on Figure 2. Boring logs are included in Appendix C.

#### **3.1.1 Contaminant Distribution**

Soil samples have been tested for a variety of chemical constituents, including VOCs, SVOCs, TPH, metals, PCBs, explosive residuals, and general chemistry compounds. In general, VOCs were not detected in most of the areas of the Site tested for VOCs; where VOCs were detected, TCE and PCE were the predominant analytes detected. As depicted on Figures 3 and 4, the presence of TCE and PCE in the areas tested was limited to certain Area F buildings, in addition to Area F drainpipe discharge areas. TPH (hydraulic oil) were also detected in soil in these same portions of Area F (Appendix K). In response to the presence of TPH in the soil, three areas in Area F were excavated and regulatory closure was received by the County. Soil sampling conducted in the new arena (Area K3) indicated the presence of elevated total lead concentrations in soil and soil sampling conducted in Area J14 indicated the presence of elevated metals concentrations; both areas were subsequently excavated and remediated. In addition, during the initial Site reconnaissance, a capacitor in Area J was observed to be leaking; the capacitor and the PCB and oil-impacted soil were removed and taken off-site for disposal.

Recent site boundary investigations indicated TCE concentrations in soil gas along the northwest section of the Site, and on-site along Golden West Lane and in one private residence. These areas will be addressed further as part of this RI Work plan.

Ground water samples have been tested for a variety of chemical constituents, including VOCs, SVOCs, perchlorate, NDMA, TPH, metals, explosive residuals, and general chemistry compounds. Generally, ground water in the upper basin (MW-1 through MW-4)

has not been impacted by chemicals. VOC-impacted ground water has historically been observed in all monitoring wells located in the vicinity of and downgradient of the Area F buildings, with the highest VOC concentrations observed in Wells MW-9, MW-10, EX-1, and MW-13. Recently installed wells indicate that VOCs have also impacted ground water in the northwest corner of the Site, with the highest VOC concentrations observed in Well MW-14. Elevated VOC concentrations also were detected off-site along Golden West Lane, with the highest VOC concentration detected in vapor well VW-3 where a grab ground water sample was collected. In addition, TCE was detected in a private well located at the intersection of 3<sup>rd</sup> Street and Hillside Avenue. Ground water impacted with perchlorate, and NDMA has also been detected in monitoring wells downgradient from Area F (in the lower basin) and at and beyond the northwest site boundary (Wells MW-14 and 15 and grab ground water sample VW-3).

The source of VOCs found in ground water is believed to be parts cleaning solvents, or wash water containing parts cleaning solvents that were accidentally released to the ground surface. Releases are believed to have occurred over a period of years near the Area F buildings (specifically buildings F-2, F-3, F-4, F-9, and F-10) and Building H-3, resulting in impact to ground water, and accumulation of VOC mass in soil that continues to act as a contaminant source. Currently, ENVIRON is implementing a RAW (as approved by the DTSC on February 4, 2004) to address remediation of chemicals in ground water in this area.

The recently discovered VOC, petroleum hydrocarbon, perchlorate and NDMA concentrations detected along the northwestern boundary of the Site and on-site along Golden West Lane could originate from areas A, B, C, E, M, and/or I. The source and nature of this contamination is not well understood and will be investigated and characterized further as part of this RI Work plan.

### **3.1.2 Site Surficial Geology**

According to geotechnical investigations conducted in early 2003 by Zeiser-Kling Consultants, Inc., the Site geology is comprised of three surficial units: artificial fill, colluvium, and alluvial fan deposits, as described below (Zeiser-Kling, 2003)

The artificial fill is composed of silty sands and has been pushed up around the base of Site buildings, presumably to act as sound and/or explosion barriers. Undocumented artificial fill is estimated to be as thick as 12 feet in some areas of the Site.

Holocene colluvium (Qcol) was observed near the base of hillsides and generally consists of light yellowish brown, fine to coarse-grained, silty sands. Colluvium was observed to be generally porous and was observed to be as thick as three feet at the Site.

Holocene alluvial fan deposits (Qaf) were observed in the low lying drainages and generally consist of interlensing sand, clayey sand, and silty sand, with varying amounts of gravel and cobble-sized granitic clasts. The fan deposits are locally porous, generally dry, and loose in the upper 15 feet, and slightly porous, damp, and medium dense to dense below 15 feet. The alluvial fan deposits on-site have been found to be more than 31 feet thick.

Granitic bedrock underlies the Site, and is generally buried beneath both colluvium and alluvial fan deposits. In several areas of the Site (primarily the northern portion), bedrock surface exposures can be observed along the hillsides. Granite buried by surficial soil was generally observed by Zeisler-Kling to be decomposed or weathered near the bedrock/soil contact, with the degree of weathering decreasing with increasing depth. Based on a seismic refraction survey conducted by Zeiser-Kling, the thickness of weathered bedrock varies from 25 to 45 feet at the Site.

### **3.1.3 Site Subsurface Geology**

Based on the investigations conducted to date, geologic units at the Site can be described in reasonable detail to the total depth explored, approximately 40 feet. There are two water-bearing units at the Site that appear to be hydraulically connected, an alluvium/colluvium unit and weathered granitic bedrock. The weathered granite is underlain by competent granitic bedrock.

The alluvium/colluvium is composed primarily of silty sand that ranges in size from fine- to coarse-grained, and contains small percentages of granitic decomposed gravel. The silty sand varies from yellowish brown to dark yellowish brown. It is the main water-bearing unit at the Site, varying in thickness across the Site from several inches in the northern part of the Site, to approximately 15 feet in the southwestern area of the Site, near the ephemeral stream.

According to the seismic refraction survey conducted by Zeiser-Kling, weathered granitic bedrock underlies the alluvium/colluvium unit, and appears to be as much as 40 feet thick in certain areas of the Site. According to the boring logs, the weathered bedrock crumbles under light pressure. This shallow weathered granite appears to be hydraulically similar to a porous medium due to the degree of weathering. The color varies from yellowish brown to mottled black to gray. Its presence and thickness appear to be consistent across the Site.

The weathered bedrock transitions to competent bedrock with increasing depth, where drilling refusal is reached.

Competent granitic bedrock underlies the weathered bedrock. Because it was not encountered in the upper 40 feet of soils drilled during any of the subsurface investigations conducted at the Site to date, little is known about this unit. However, based on the seismic refraction survey conducted by Zeiser-Kling in 2003, competent bedrock was interpreted by Zeiser-Kling to occur at depths of up to approximately 45 feet at the Site.

#### **3.1.4 Surface Drainage**

An unnamed ephemeral stream occupies the low point axis of the Site drainage, entering the Site from the east/northeast, at an elevation of approximately 880 feet, and exiting the Site near the southwest corner of the Site (near Well MW-5A), at an elevation of approximately 710 feet. The stream is typically dry from spring (April/May) to early winter (late November/early December). After the ephemeral stream exists the Site, it is channelized in a culvert that extends below El Paso Drive, and resurfaces west of Hillside Avenue in a concrete-lined channel. In the channel, intermittent stream flow combines with other runoff and finally enters the Prado Dam, approximately three miles away from the Site.

There are two distinct drainage areas for the developed portion of the Site. The majority of the Site (approximately 80 percent), including all of the areas with known environmental concerns, lies within a westerly sloping drainage basin. The remaining portions of the Site, the western-most portions, lie on westward or northward draining slopes. Steep bedrock exposures are generally thought to encourage rapid runoff of precipitation and minimize infiltration of water beneath the drainage. Other potentially significant sources of basin recharge include an unknown volume of irrigation water runoff from the Hidden Valley Golf Course, located to the east of the Site.

#### **3.1.5 Site Ground Water**

Based on the results of the most recent quarterly monitoring conducted in July 2004,, ground water at the Site is encountered at depths ranging from approximately 2.90 to 25.49 feet (ground water elevation data are provided in Table 12). Data from monitoring wells installed at the Site indicate that ground water levels vary with annual and seasonal precipitation; seasonal variations of as much as 8 feet having been observed in some wells at the Site. Depth to ground water measured during the Third Quarter 2004 sampling event in July 2004 indicated a general decline in water levels (up to 4.16 feet) when compared to Second

Quarter 2004 measurements collected in April 2004. The general direction of ground water flow is to the southwest and west, generally parallel to the axis of the ephemeral stream channel. The measured ground water gradient is on the order of 3 feet per 100 feet; however the gradient varies based on the location of the well and the season. A potentiometric surface map depicting the most recent ground water elevation data at the Site (July 2004) is presented on Figure 8.

Along the slopes of the drainage basin, ground water occurs in the weathered granite, and appears to discharge to saturated alluvium along the drainage axis in the lower lying areas of the Site. At the lower elevations, mixing of surface water and ground water occurs in proximity to Wells MW-6 and MW-8, as evidenced by comparing ground water data from Wells MW-6 and MW-8 to surface water data collected from the ephemeral stream adjacent to each of the two wells. The results of this comparison indicate that the constituents detected in the surface water samples (i.e., TCE, cis-1,2-DCE, and trans-1,2-DCE) are similar to the ground water sample results, but are present at lower concentrations. Where the ephemeral stream exits the Site to the southwest, near MW-5A, the occurrence of bedrock below the alluvium becomes shallow enough to allow ground water to mix with surface water in the ephemeral stream, or to be comprised totally of ground water. A comparison of the analytical results from Well MW-5A to surface water sample results collected from the ephemeral stream adjacent to MW-5A, indicates that similar VOC concentrations were detected in both ground water samples and ephemeral stream samples collected in this area, suggesting that surface water is actually ground water. The highest concentrations of VOCs in surface water near MW-5A might be expected to occur in the late spring/summer when stream flow in the lower reach of the stream is entirely ground water. During the spring, surface water flows from direct precipitation and overland flow ceases. During the wet season, VOC concentrations in surface water may become diluted by precipitation.

Currently, there is insufficient information to evaluate the occurrence of ground water in competent bedrock or the role of fractures (if any) in ground water flow within the competent bedrock.

### **3.1.6 Regional Water Wells**

According to the EDR report, the nearest active ground water production well (FRDS Well #3310037008, District number 14), operated by the City of Corona, is located approximately 2 miles south-southwest of the Site. However, because some City of Norco residents have water rights and potentially may own private wells that are unregistered and will therefore not appear in the EDR report, ENVIRON and DTSC are in the process of distributing a

Water Supply Survey to residents located within approximately one-half mile to the northwest, west, and southwest of the Site to inquire about private wells in the vicinity of the Site..

### **3.1.7 Summary and Future Evaluation**

Previous investigations at the Site indicate areas of localized soil contamination, always in association with chemical use areas. In certain areas, releases have migrated through soil, resulting in impact to ground water downgradient of Areas F and H, and off-site to the southwest towards Hillside Avenue, and to the northwest along Golden West Lane. Ground water in both alluvium and weathered granite has been impacted by VOCs and to a lesser extent, perchlorate and NDMA. VOC concentrations are indicative of dissolved phase contamination in most of the wells on-site, with the exception of Well MW-14. Based on the EPA document *Estimating Potential for Occurrence of DNAPL at Superfund Sites* (January 1992), evidence of dense non-aqueous phase liquid (DNAPL) is present in this well (concentrations of TCE are greater than 1% of its solubility) and the potential presence of dense non-aqueous phase liquid (DNAPL) in this specific area will be investigated as part of this RI Work plan.

In addition, VOC concentrations were detected in soil gas and ground water along the northwest portion of the Site and off-site along Golden West Lane. VOC concentrations in soil gas declined to a non-detect level at the junction of Golden West Lane and Third Street. Further northwest on-site at the intersection of Hillside Avenue and Third Street, TCE was detected in a private well used for irrigation and livestock watering.

In other areas of the Site, concentrations of VOCs in ground water are highest near certain Area F buildings and decline markedly downgradient of Areas F and H. Due to the basin configuration and geologic constraints, ground water migrating along the ephemeral stream channel exits the basin near MW-5A, and also discharges to the ephemeral stream in proximity to Wells MW-6, MW-8, and MW-5A. Further, due to the physical environment (organic-rich soils and vegetation in proximity to the ephemeral stream), reductive dechlorination of VOCs is occurring in areas of the lower basin. Ground water exiting the Site to the southwest appears to migrate along the historic path of the ephemeral stream channel. Ground water along Hillside Avenue, downgradient of Well MW-5A, is present at approximately 25 feet bgs and contains low concentrations of VOCs, perchlorate, and NDMA

The RI has been developed with this overall conceptual model in mind. Through a detailed review of agency records, site inspections, and employee interviews, ENVIRON has identified known and suspected use areas of the Site. These areas, and associated impacted and potentially impacted off-site areas, are targeted for soil gas and soil sampling as specified in the ensuing sections of the work plan. Depending on use history, ground water sampling and well installation also are proposed. Selection of ground water sampling locations is based on information regarding Site use history, the current known distribution of contamination, and known or suspected ground water migration pathways.

In addition to soil, soil gas, and ground water sampling, limited trenching in the former Area K landfill, and soil excavation of the lithium battery deactivation area in Area F-5 and of the buried deactivated lithium batter storage drums southeast of Area F5-5, are also planned. Details of the planned trenching and excavation activities are discussed in Section 5.0 of this Work plan.

To refine the Site and off-site hydrogeologic model, lineament analysis, used in conjunction with field mapping, will be performed in an effort to understand the exposed surface geology. Based on the lineament analysis and field mapping, a total of 10 oriented continuously cored coreholes will be drilled during performance of the RI work plan. The coreholes (numbered Corehole 1 – through Corehole 10) may be drilled at the approximate locations depicted in Figure 2; corehole locations were selected to investigate more fully selected areas of the Site where additional geologic and hydrogeologic would be useful in understanding the distribution of contamination and the geologic controls governing contaminant migration. Coreholes will be drilled to depths up to approximately 100 feet bgs. The core hole locations depicted on Figure 2 are subject to change depending on the results of the lineament analysis. Depending on field conditions and the results of the lineament analysis, surface geophysics may be added to the scope of work

## 4.0 WORK PLAN RATIONALE

### 4.1 Data Quality Objective Development

Quality assurance objectives for data generated during the RI work plan are intended to provide guidance for the laboratory analysis of samples to ensure that the data are representative of Site conditions. Specific data quality objectives (DQO) were developed through the DQO process (USEPA, August 2000), to ensure that data collected are of the appropriate type and quality to achieve and support the objectives of the RI work plan; the DQO planning process is included as an appendix to the RI work plan Quality Assurance Project Plan (QAPP)(Appendix D). The QAPP was prepared to describe the QA/QC procedures that the project team will follow during implementation of the RI work plan at the Wyle site, and assure reporting of data that are representative of field conditions and that are legally defensible. Also included in the QAPP are a summary of the identified data needs and uses for this project, along with a list of method detection limits and reporting limits for the analytes to be tested.

Performance and acceptance criteria are often expressed in terms of data quality indicators. The principal data quality indicators (DQI) are precision, accuracy, representativeness, comparability, and completeness, defined in the USEPA Guidance document (USEPA, 2002) as:

**Precision** of the data is the measure of agreement among repeated measurements of the same sample under identical, or substantially similar conditions. It is calculated as either the range or as the standard deviation. Precision may also be expressed as a percentage of the mean of measurements, such as relative range or relative standard deviation. The level of effort of precision will be a minimum of 1 in 20 samples analyzed.

**Accuracy** of the data is the measure of the overall agreement of a measured value to the true value. It includes a combination of systematic error (bias) and random error (precision) components of sampling and analytical operations. To estimate the accuracy of the data, a selected sample is spiked with a known amount of a standard and is analyzed; the results of which are used to calculate percent recovery. Accuracy measurements will be carried out with a minimum frequency of 1 in 20 samples analyzed.

**Representativeness** is a qualitative term used to express the degree to which data accurately and precisely represent a characteristic of a population. Sample collection and handling

methods, sample preparation, analytical procedures, holding times, and QA protocols developed for this project, and discussed in the subsequent sections of this document, have been established to ensure that the collected data are representative.

**Comparability** is a qualitative term used to express the confidence with which one data set can be compared to another data set. Data comparability will be sustained in this project through the use of defined procedures and consistent sampling methods (sample collection and handling, sample preparation, and analytical procedures). Actual detection limits will depend on the sample matrix and will be reported by the laboratory as defined for specific samples.

**Completeness** is defined as a measure of the amount of valid data to be obtained from the analytical measurement system and the complete implementation of defined field procedures. The target completeness objective for this project is 90%, however the actual completeness may be different, depending on the intrinsic nature of the samples. The data completeness will be evaluated during the data validation review process.

## **4.2 Data Review, Validation, and Verification Requirements**

Data generated during performance of the RI work plan will undergo two levels of review and validation, one at the laboratory, and a second review after the data are received by ENVIRON. The second data validation review will be performed by ENVIRON's designated independent QA/QC officer, or by a third party. Data validation procedures performed by ENVIRON or the third party reviewer will be performed at the following level of effort:

- 80% of the analytical data (in batches) will be reviewed for all analytical parameters, detections, and non-detections at Level 2, as defined by the USEPA in *Contract Laboratory Program National Functional Guidelines* (1999 and 2002a).
- 20% of the analytical data (in batches) will be reviewed for all parameters, detections, and non-detections at Level 3, as defined by USEPA.

### **4.2.1 Validation and Verification Methods**

Initial data reduction, validation, and reporting will be performed by the laboratory as described in the laboratory SOPs (see Appendix D).

Data validated outside the laboratory will be reviewed at the level of effort described in the USEPA CLP National Functional Guidelines (1999 and 2002a). If necessary, and as appropriate, the QA Officer may determine that more than 20% of the analytical data will undergo Level 3 data validation; however, no less than 20% of the data will undergo Level 3 data validation for each sampling event.

#### 4.2.2 Reconciliation with Data Quality Objectives

Analytical results obtained from the project will be reconciled with the requirements specified in this QAPP. Data validation and usability includes the final project checks to evaluate if the data obtained will conform to the project's objectives, and to estimate what the effect is if the deviations occur. Assessment of data for precision, accuracy, and completeness will be performed according to the following quantitative definitions.

##### 4.2.2.1 Precision

If calculated from duplicate measurements:

$$RPD = \frac{(C_1 - C_2) * 100\%}{(C_1 + C_2) / 2}$$

where:

- RPD = relative percent difference
- C<sub>1</sub> = larger of the two observed values
- C<sub>2</sub> = smaller of the two observed values

If calculated from three or more replicates, use relative standard (RSD) rather than RFD:

$$RSD = (s/\bar{y}) 100\%$$

- RPD = relative standard deviation
- s = standard deviation
- $\bar{y}$  = mean of replicate analyses

Standard deviation is defined as follows:

$$s = \sqrt{\frac{\sum_{i=1}^n (y_i / y)^2}{n - 1}}$$

- s = standard deviation
- y<sub>i</sub> = measured value of the i<sup>th</sup> replicate
- y = mean of replicate analyses
- n = number of replicates

#### 4.2.2.2 Accuracy

For measurements where matrix spikes are used:

$$\%R = 100\% \left[ \frac{S - U}{C_{sa}} \right]$$

$\%R$  = percent recovery

$S$  = measured concentration in spiked aliquot

$U$  = measured concentration in unspiked aliquot

$C_{sa}$  = actual concentration of spike added

For situations where a standard reference material (SRM) is used instead of or in addition to matrix spike:

$$\%R = 100\% \left[ \frac{C_m}{C_{sm}} \right]$$

$\%R$  = percent recovery

$C_m$  = measured concentration of SRM

$C_{sm}$  = actual concentration of SRM

#### 4.2.2.3 Completeness (Statistical)

Defined as follows for all measurements:

$$\%C = 100\% \left[ \frac{V}{T} \right]$$

$\%C$  = percent completeness

$V$  = number of measurements judged valid

$T$  = total number of measurements

### 4.3 Data Collection Rationale

Data collection rationale is provided in Section 5.0, Remedial Investigation Tasks.

## 5.0 REMEDIAL INVESTIGATION TASKS

As indicated previously, the scope of work outlined in this RI work plan was prepared to address identified data and information gaps for the Site and areas immediately adjacent to but outside of the Site boundaries, and is based on existing historical information and soil, soil gas, and ground water data for the Site and off-site, DTSC's letter dated October 15, 2003 (DTSC comments and ENVIRON responses to those comments are provided in tabular form in Appendix E), DTSC's letter received by ENVIRON on July 1, 2004 regarding comments to the RI Work plan (initial draft), DTSC's letter received by ENVIRON on October 13, 2004 regarding additional comments to the RI Work plan, recent interviews with long time Wyle employees, a series of detailed site inspections conducted recently at the Site, and ENVIRON's review of records obtained from various regulatory agencies. Information obtained during the employee interviews was combined with the detailed area-by-area inspections, and is summarized (by area) in Appendices F through U. Each historical use summary includes a description of each feature/building in that area, the approximate construction date of the feature/building, a description of the uses of the feature/building, a list of the chemicals used in and in the vicinity of the feature/building, and the type of investigation recommended for that area. Accompanying each historical use summary are photographs (referenced in the historical use summary), and a Proposed Sample Summary table, the latter of which includes the sample media, number of samples, sample depth, proposed analysis, and sample rationale. Proposed soil, soil gas, grab water sample, and monitoring well locations for all areas are depicted in figures included in Appendices F through U.

In general, sampling locations were selected to address the following:

- Known or suspected chemical use areas that have not been sampled previously.
- Known or suspected chemical use areas where previous data indicate that additional sampling is warranted.
- Known or suspected chemical use areas that were sampled previously, but were not sampled for all chemicals used in the area.
- Areas near potential source of contamination such as surface runoff, drain lines, and pipes.

- Areas where more data are needed to evaluate the lateral/vertical extent of impacted media.
- Areas where more data are needed to further evaluate subsurface hydrogeology.

Based on ENVIRON's review of information available for the Site, the use areas at the Site are known, and there is no indication that Wyle conducted test operations in any other areas. Further, based on the results of the DTSC's limited transect sampling, and ENVIRON's soil sampling conducted in 2003 and 2004, areas of the Site that were not used for testing purposes do not appear to have been adversely impacted. Therefore, ENVIRON has not included random sampling in the scope of work for this RI work plan, although ENVIRON understands that DTSC may select several locations for random sampling during the execution of the planned fieldwork (See October 15, 2004 DTSC letter).

The subsurface investigation is divided into two primary areas: on-site and off-site. The on-site investigation includes all areas located on the Wyle Site and it includes Areas A through M and the Quarry. Proposed sample locations are summarized in Proposed Sample Summary Tables presented in Appendices F through S. The off-site investigation encompasses areas to the northwest and west of the Site and include Golden West Lane, Hillside Avenue, and Third Street. And finally, to gain a better understanding of subsurface conditions, a review of the geology and hydrogeology of the Site and vicinity will be conducted.

The execution of the fieldwork proposed in this RI Work plan will be prioritized according to the Technical Memorandum *General Strategy and Priorities for Investigation/Mitigation* submitted by ENVIRON to the DTSC on November 2, 2004. One high priority issue will be to evaluate potential complete exposure pathways on-site and address those that present an unacceptable risk level. As part of this phased approach, ENVIRON and DTSC are in the process of mitigating VOCs in indoor air at 2281 Golden West Lane, and conducting a private well survey of residences located in the vicinity of the Site. Following completion of the private well survey, further evaluation of the private well located at 998 3<sup>rd</sup> Street will be conducted, followed ultimately by abandonment of the well. Further investigation also will be conducted along Golden West Lane, Third Street, and Hillside Avenue to evaluate the lateral extent of VOCs and other soluble contaminants in the subsurface potentially emanating from the Property. Concurrent with collection of these data, geologic and hydrological conditions at the Site and in the vicinity of the Site will be assessed further to develop a conceptual model of contaminant migration and the controls on contaminant transport using various methods, as discussed below. The chemical, geologic, and hydrogeologic data collected will be incorporated into the conceptual model for the Site and site vicinity and will be

used to design and implement an interim remedial action for the northwest area of the Site and off-site in the same area, as appropriate.

## **5.1 On-Site Investigation**

The on-site investigation consists of conducting soil, soil gas, and ground water sampling where data gaps have been identified. Sampling locations were selected based on a thorough historical review of activities conducted at the Site and multiple site visits conducted with DTSC on August 12 and 13 and September 2 and 7, 2004. Planned on-site field activities are summarized in the Proposed Summary Tables included in Appendices F through S. In addition to area-specific sampling, other on-site investigations will be performed as part of the RI Work plan, as described in the ensuing subsections.

### **5.1.1 Area K Limited Landfill Investigation**

In a meeting with DTSC on September 24, 2004, the agency requested further evaluation of the landfill located east of Area K, due to the uncertainty regarding past disposal practices in the area. ENVIRON conducted a site inspection of this area on October 13, 2004 to assess the extent and approximate thickness of the landfilled area. The visual inspection consisted of walking on the landfill surface, observing the terrain, and using exposed and partially buried debris as indicators of the lateral extent of the landfill. At the time of inspection, observed debris consisted of automobile parts, furniture remains, broken glass, faucets, etc. The depth of the landfill could only be estimated, due to the presence of soil cover over the debris in most areas.

Based on observations made in the field, trenching will be conducted to profile the contents of the landfilled area. Proposed trench locations are depicted in Appendix R. Area K Figure. Both trenches, one in the northern portion of the landfill and one in the southern portion of the landfill, will transect the landfilled area from west to east. A backhoe or similar earth moving equipment will be utilized to perform the trenching. The trenches will be advanced to native soil or until refusal. The removed soil or debris will be stockpiled on-site adjacent to the trenches and will be appropriately disposed or put back in the trench, depending on the nature of material. If items containing potentially hazardous substances are revealed during trenching, the item will be left in place and the location flagged until the potentially hazardous nature of the item can be assessed. If the item proves to be hazardous, it will be removed from the Site and disposed of in accordance with state and federal requirements.

Trenching activities will be described using the daily field log and through photographing and mapping the trenches. Field personnel overseeing trenching activities will map the trench and record observations regarding the trench, including the depth of the trench, the depth at which native, undisturbed material is encountered, soil type, contacts between soil types, debris and other items encountered, and the nature of debris and other items encountered.

Once trenching is completed, a total of 3 soil samples will be collected in native soil underlying the fill in each trench at locations identified in the field (i.e., at locations where there is field evidence of contamination and/or suspect landfilled materials); soil samples will be collected using a hand-auger, GeoProbe or similar direct push rig, depending upon the nature of the native materials. Soil samples will be collected at 0.5 and 2 feet. In addition, three soil samples will be obtained from each area of stockpiled soil (one stockpile per trench) for characterization of excavated material. Soil samples will be analyzed for SVOCs, metals, PCBs, perchlorate, explosives residuals, hydrazine, and TPH. If laboratory results indicated that the excavated soil is non-hazardous, it will be used to fill the trenches.

### **5.1.2 Areas F5-5 and South of F5-5**

Interviews with Wyle employees and other historical reports indicate the possibility that lithium batteries were deactivated in Area F5-5 in a concrete vault that now is filled in and covered by mounded soil (Figure 2, Figure Area F5 in Appendix L). ENVIRON will use a backhoe or other earth-moving equipment to remove the soil overlying the vault and inside the vault. The interior of the vault will be inspected and photographed. If feasible, two soil samples will be collected from the base of the vault and three soil samples also will be collected from the stockpiled soil. If lithium batteries are discovered, they will be collected, staged, and appropriately disposed of on-site. Collected soil samples will be analyzed for metals using EPA Method 6010. If the soil sampling results indicate that the excavated cover soil is non-hazardous, the soil will be placed back in the vault.

In addition, at a location south of F5-5, three open-top drums were observed partially buried in the ground (Figure Area F5 in Appendix L). According to a previous consultant's report, Phase One sampled soils in these drums in 1999. To address this area further, the three drums will be excavated and removed from the Site. Once the drums have been removed, one soil sample will be obtained from the base of each excavation and from approximately 5 feet below the base of the excavation. Soil samples will be analyzed for metals, SVOCs, and explosive residues.

### 5.1.3 Northwest Area

To evaluate potential on-site source(s) for VOCs, perchlorate, and NDMA detected in off-site ground water along Golden West Lane and on 3<sup>rd</sup> Street, additional soil gas and ground water sampling will be conducted on-site and on-site (immediately north of Area A) at the locations depicted on Figure 1 in Appendix U.

On-site locations (HP-1 through HP-6) will be advanced adjacent to previously collected soil gas samples (ESG-16 through ESG-21). At these locations borings will be advanced using hollow stem auger drilling techniques. The soil borings will be advanced to first encountered ground water, where a ground water sample will be collected using HydroPunch or similar techniques. If drilling refusal is encountered prior to contacting ground water, a soil gas sample will be collected from the base of the soil boring after setting a temporary vapor probe. Soil gas sampling will be conducted using the same techniques as those used at 2301 and 2313 Hillside Avenue.

On-site of the northwest area, four soil borings (ESG-69 through ESG-72) will be advanced using hollow stem auger drilling techniques. The soil borings will be advanced to first encountered ground water, where a ground water sample will be collected using HydroPunch or similar techniques. If drilling refusal is encountered prior to contacting ground water, a soil gas sample will be collected from the base of the soil boring after setting a temporary vapor probe. The boring will be backfilled to approximately 5 feet bgs, where a second temporary vapor probe will be installed for subsequent soil gas sampling. Soil gas sampling will be conducted using the same techniques as those used at 2301 and 2313 Hillside Avenue.

Soil gas samples will be analyzed for VOCs using EPA Method 8260B or TO-15. Ground water samples will be analyzed for VOCs, perchlorate, and NDMA. The Proposed Sample Summary On-site Table in Appendix U includes the sample media, number of samples, sample depth, proposed analysis, and rationale for samples collected in this area.

In addition, the subsurface geology in this area will be assessed through advancing approximately three coreholes in the area at the locations depicted on Figure 2 and in Figure 1 in Appendix U (note that these locations may be revised depending upon the results of the lineament analysis and surface mapping tasks as described in Section 5.3). Coring will be conducted using oriented coring techniques (NX wireline or similar) to an approximate depth of 100 feet. Coreholes will be geophysically logged; such logging may include caliper,

resistivity, spontaneous potential and sonic. In addition, the potential for DNAPL in these three coreholes will be assessed through use of the FLUTE or similar technique. The FLUTE system uses a color reactive liner that is inserted in the borehole and changes color in the presence of variety of DNAPL substances. If possible, vertical ground water quality will be evaluated in the borehole. Techniques that can be used to evaluate ground water quality at discrete depths in the borehole include FLUTE, passive diffusion bags (PDBs)<sup>9</sup>, and Snap samplers. The method used, and depths/intervals sampled will depend upon the coring, geophysical, and DNAPL evaluation results. General information regarding geophysical logging FLUTE, PDBs, and Snap samplers is provided in Appendix W.

## **5.2 Off-Site Investigation**

Recent investigations along Hillside Avenue and Golden West Lane indicated the presence of VOCs, perchlorate and NDMA in ground water and VOCs in soil gas samples. In addition, DTSC sampled a private well located at the residence at 998 3rd Street and the results of the sampling indicated the presence of TCE and perchlorate. To characterize further the potential source(s) of the off-site impacted ground water, lateral and vertical extent of ground water contamination on-site, and the potential for a complete exposure pathway, the following scope of work will be performed.

### **5.2.1 Golden West Lane**

Soil gas and ground water data collected along Golden West Lane indicated detectable VOC concentrations, which decreased with increasing distance from the Site. To monitor ground water quality in this area, two ground water monitoring wells will be installed. One well (MW-19) will be drilled adjacent to VW-3, where elevated concentrations of TCE were detected. The second well (MW-20) will be installed near the intersection of Golden West Lane and Third Street to monitor the downgradient extent of VOC-impacted ground water. The monitoring well borings will be advanced using hollow-stem auger drilling techniques to approximately 15 below static ground water, which is anticipated at approximately 15 feet below ground surface. Therefore, each well will be approximately 30 feet deep. The wells will be installed and developed in accordance with the protocols included in Appendix W.

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<sup>9</sup> PDB samplers are composed of a semi permeable membrane that contains reagent-grade organic free water. When the PDB is placed in contact with water, contaminants diffuse through the semi-permeable membrane and into the reagent-grade organic free water. After a specific period of time, the bag is retrieved and the water inside is drained into a sampling vial for subsequent chemical analysis.

Approximately 24 hours after development, the wells will be sampled in accordance with standard ground water sampling protocols described in Appendix W. Ground water samples will be analyzed for VOCs in accordance with EPA Method 8260B, for perchlorate using EPA Method 314, and for NDMA using EPA Method 1625C. The newly installed wells (MW-19 and MW-20) will be incorporated in the quarterly ground water monitoring program.

### **5.2.2 Third Street**

#### **998 3rd Street Residence (3rd and Hillside)**

Ground water samples collected by the DTSC from an irrigation/livestock supply well located at 998 3<sup>rd</sup> Street indicated elevated concentrations of TCE. Upon receiving the analytical results of the sampling, DTSC advised the homeowner to cease using the well water. If access is granted to the private well, DTSC will perform a video log of the well to assess well construction and well depth. If the well is not cased, geophysical logging using focused resistivity will be performed inside the well to help characterize subsurface lithology and hydraulic conductivity. In addition, measurement of the horizontal flow of ground water into the well will be performed using GeoFlo<sup>10</sup> or similar technique and discrete depth sampling will also be performed using the PDB sampling or similar technology. Sampling depths and the number of samples will depend upon the results of the video and geophysical logging and the horizontal flow measurements.

If the well is not cased, geophysical logging using e-logging techniques will be conducted, and measurement of the horizontal flow of ground water into the well will be performed using GeoFlo<sup>11</sup> or similar technique. In addition, discrete depth sampling will also be performed using the PDB sampling or similar technology. Sampling depths and the number of samples will depend upon the results of the video and geophysical logging, and the horizontal flow measurements.

On completion of the testing, the well will be abandoned in place by pressure grouting from the base of the well to the ground surface. The ground surface will be patched to match existing grade and cover.

The potential for VOCs in soil gas in proximity to the residence also will be assessed. Three borings (ESG-73 through ESG-75) will be advanced adjacent to the residence at the locations

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10 The GeoFlo is an instrument that can measure the horizontal flow rate of the ground water in situ or within a well. Flow direction and flow rate can be determined simultaneously at a single well.

11 The GeoFlo is an instrument that can measure the horizontal flow rate of the ground water in situ or within a well. Flow direction and flow rate can be determined simultaneously at a single well.

depicted on Figure 1 in Appendix U using Geoprobe direct push equipment. Soil gas samples will be obtained from approximately 5-feet below ground surface, and if possible, at 10-feet below ground surface in accordance with the methods described in Appendix W. Soil gas samples will be analyzed for VOCs using EPA Method 8260B or TO-15.

### **Third Street (General)**

To date, no VOCs have been detected in soil gas samples collected along Third Street. However to further characterize the potential northwestern extent of chemicals in ground water, 11 soil borings (ESG-52 through ESG-62) will be advanced along Third Street at 100 foot intervals, beginning approximately 100 feet west of Hillside Avenue and ending approximately 200 feet east of Golden West Lane (Figure 1 in Appendix U). In addition, two soil borings (ESG-67 and ESG-68) will be advanced in the backyard of the house located at 814 Third Street (see Figure 1 in Appendix U), which is located adjacent to the northern Site boundary, directly north of ESB-32 and east of MW-15, both of which are located on the northern boundary of the Site.

At these locations borings will be advanced using hollow stem auger drilling techniques. The soil borings will be advanced to first encountered ground water, where a ground water sample will be collected using HydroPunch or similar techniques. If drilling refusal is encountered prior to contacting ground water, a soil gas sample will be collected from the base of the soil boring after setting a temporary vapor probe. The boring will be backfilled to approximately 5 feet bgs, where a second temporary vapor probe will be installed for subsequent soil gas sampling. Soil gas sampling will be conducted using the same techniques as those used at 2301 and 2313 Hillside Avenue.

Soil gas samples will be analyzed for VOCs using EPA Method 8260B or TO-15. Ground water samples will be analyzed for VOCs, perchlorate, and NDMA. The Proposed Sample Summary in the On-site Table in Appendix U includes the sample media, number of samples, sample depth, proposed analysis, and rationale for samples collected in this area.

### **5.2.3 Hillside Avenue**

To assess the potential western extent of the VOCs, perchlorate and NDMA in this area, four soil borings (ESG-63 through ESG-66) will be advanced along Hillside Avenue. At these locations borings will be advanced using hollow stem auger drilling techniques. The soil borings will be advanced to first encountered ground water, where a ground water sample will be collected using HydroPunch or similar techniques. If drilling refusal is encountered prior to contacting ground water, a soil gas sample will be collected from the base of the soil

boring after setting a temporary vapor probe. The boring will be backfilled to approximately 5 feet bgs, where a second temporary vapor probe will be installed for subsequent soil gas sampling. Soil gas sampling will be conducted using the same techniques as those used at 2301 and 2313 Hillside Avenue.

Soil gas samples will be analyzed for VOCs using EPA Method 8260B or TO-15. Ground water samples will be analyzed for VOCs, perchlorate, and NDMA. The Proposed Sample Summary On-site Table in Appendix U includes the sample media, number of samples, sample depth, proposed analysis, and rationale for samples collected in this area.

### **5.3 Site and Site Vicinity Geology and Hydrogeology Review**

To develop a conceptual model integrating the geology, hydrogeology, source areas, and chemical migration pathways at the Site and in the Site vicinity, lineament analysis will be performed. The lineament analysis will be conducted using historical and recent aerial photographs of the Site at different scales, a United States Geologic Survey (USGS) topographic map, and an area map from the Thomas guide. The lineament analysis will be performed to look for geologic surface expressions to assist in evaluating preferential directional fracturing in the bedrock, if any. The lineament analysis will be supplemented by field mapping to evaluate the overall morphology of the Site.

To provide additional information regarding subsurface geology approximately 10 coreholes will be advanced at the locations depicted on Figure 2 (3 of these coreholes were discussed in Section 5.1.3; note that these locations may be revised depending upon the results of the lineament analysis and surface mapping tasks). Coring will be conducted using oriented coring techniques (NX wireline or similar) to an approximate depth of 100 feet. Coreholes will be geophysically logged; such logging may include caliper, resistivity, spontaneous potential and sonic. If possible, vertical ground water quality will be evaluated in each borehole. Techniques that can be used to evaluate ground water quality at discrete depths in the borehole include FLUTE, PDBs, and Snap samplers. The method used, and depths/intervals sampled will depend upon the coring and geophysical logging results.

## **6.0 WORK PLAN IMPLEMENTATION PROCEDURES**

The following subsections of this section describe field procedures to be implemented before and during completion of the RI Work plan.

### **6.1 Health and Safety Plan**

A site-specific Health and Safety Plan (HASP) is included as Appendix V; the work described in the RI Work plan will be performed in accordance with this HASP.

### **6.2 Documentation**

ENVIRON personnel working on-site will document field activities conducted during the RI work plan. The sampling activities will be documented to: (1) provide a record of procedures as performed in the field; (2) record key events during field operations; (3) identify samples and track status in the field and during transfer to the laboratory; and (4) facilitate chain-of-custody and accountability procedures by providing legible, concise information. Example field forms are included in Appendix W; specific documentation requirements are included with each field protocol also presented in Appendix W.

### **6.3 Utility Clearance and Permitting**

Prior to initiating fieldwork (well installation and public street drilling), ENVIRON will obtain the necessary well installation permits from the County of Riverside, Department of Health Services. In addition, ENVIRON will obtain an encroachment permit to drill in the public right of way on Third Street, Hillside Avenue, and Golden West Lane from the City of Norco. Fieldwork will be performed in accordance with permit requirements.

In addition, each sample location will be cleared for the presence of underground pipes and utilities. In addition, Underground Services Alert will be notified and will mark utilities at the Site boundaries.

## 6.4 Sampling Procedures and Protocols

As part of the RI Work plan, soil gas (both active and passive), soil, and ground water (using HydroPunch® or similar “grab” sample collection method<sup>12</sup>, Passive Diffusion Bags (PDB), or Snap Sampler technology) samples will be collected and analyzed; field protocols and/or information regarding PDBs and Snap Samplers are included in Appendix W.

### 6.4.1 Sample Designation

Soil gas, soil, and ground water samples will be collected for chemical analysis during implementation of the RI work plan. These samples will be labeled in an appropriately consistent manner to allow identification of the sampling location, type of sample, and depth of sample collection. The sample labeling system is described below.

Samples will be labeled using the designated Site sub-area number, followed by the boring number (which will be sequential for each sub-area, starting with B1); the sample matrix designation (SG for soil gas, PSG for passive soil gas, S for soil, and HP for HydroPunch); and the depth of the sample. Using this labeling scenario, a soil sample collected in sub-area A3, from the first boring drilled in that sub-area at a depth of 5 to 6.5 feet, would be labeled “A3-B1-S-5-6.5” and a soil gas sample collected from a depth of 5 feet in the third boring drilled in sub-area K1 would be “K1-B3-SG-5”.

Sample qualifiers will be used as appropriate, and may include:

FD	Field Duplicate
EB	Equipment blank
TB	Trip Blank
TeB	Temperature Blank

In addition to the sample number, each sample container will be labeled with company name, project name, project number, and the initials of the sample collector.

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<sup>12</sup> The term HydroPunch® will be used in subsequent sections of this report; however, it is noted that the actual HydroPunch® technology may or may not be used in collecting the sample. As necessary and appropriate, a similar sample collection method may be used in place of the HydroPunch® sampling method.

## **6.4.2 Quality Control Samples**

As part of the RI work plan quality control samples will be collected, including trip blanks, field duplicates, equipment blanks, and temperature blanks; such samples will be labeled using the appropriate qualifiers as listed above.

Trip blanks and temperature blanks will be prepared by the analytical laboratory. The frequency of analysis for trip blanks will be one per day for each day that water samples are collected and samples are analyzed for VOCs. One temperature blank will be submitted to the laboratory in each sample cooler for temperature measurement. Field duplicates will be collected at a frequency of 10%, or a minimum of one per sampling event. Equipment rinseate blanks will be collected at a frequency of one per day for each day that sampling is conducted using non-dedicated sampling equipment, whenever there is change in equipment used, and when field personnel change.

All quality control samples will be labeled, stored, and handled as described in Appendix W.

## **6.4.3 Sample Custody Procedures**

Chain-of-custody procedures will be implemented for all samples collected during implementation of the RI work plan. Samples will be clearly labeled immediately after collection, and each sample will be assigned a unique identification number. Chain-of-custody forms will be filled out in the field immediately after the sample has been collected and labeled. Chain-of-custody forms will remain with the samples until such are delivered to the laboratory. General custody procedures are described in the individual protocols presented in Appendix W.

## **6.4.4 Equipment Calibration**

Equipment used to obtain measurements in the field will be calibrated according to the equipment manufacturer's instructions prior to initial use in the field on each day that sampling is conducted.

## **6.5 Equipment Decontamination**

All drilling and sampling equipment will be steam-cleaned prior to rig mobilization, and before use at each probe or boring location; the subcontractor will be responsible for decontamination of the rig and associated equipment. Steam cleaning will be performed in an area designated for that purpose,

and decontamination water will be placed in portable holding tanks or drums prior to removal for off-site disposal.

## **6.6 Handling of Drilling Residuals**

Drilling cuttings and decontamination rinse water generated during drilling and sampling activities will be contained in drums or poly tanks fixed to the sampling support truck. Drilling cuttings and decontamination water will be transferred from the support truck to drums or poly tanks placed in a designated on-site staging area at the end of each day. Analytical test results generated during sampling will be used to characterize the drilling residuals prior to disposal. Purge water, decontamination water, used Personal Protective Equipment (PPE), and disposable sampling equipment will be disposed of at an appropriate off-site location, in accordance with applicable State and Federal regulations, including, as appropriate, investigation derived waste guidance provided in EPA's Office of Emergency and Remedial Response Directive 9345.3-02, dated May 1991.

## **6.7 Analytical Program**

Soil gas, soil, HydroPunch ground water samples, and quality control samples will be collected and analyzed for specific chemicals during performance of this work. It is anticipated that samples will be submitted to Del Mar Analytical (Del Mar), located in Irvine, California, with the exception of the hydrazine analysis, which Del Mar will likely subcontract to West Coast Analytic Service (WCAS), located in Santa Fe Springs, California. Both Del Mar and WCAS are California State-certified laboratories.

Passive and active soil gas samples will be analyzed for:

- VOCs, by EPA Method 8260B and/or EPA Method TO-15 (as appropriate)

Soil and HydroPunch® ground water samples will be selectively analyzed for:

- VOCs, by EPA Method 8260B
- Perchlorate, by EPA Method 314.0
- N-Nitrosodimethylamine (NDMA), by EPA Method 1625C M
- Hydrazine, by gas chromatography (Truesdale Laboratories EPA Method 8315 Modified)
- SVOCs, by EPA Method 8270
- Explosive residuals, by EPA Method 8330
- Total petroleum hydrocarbons (TPH) (full range), by EPA Method 8015 Modified
- PCBs, by EPA Method 8082

- Metals (Title 22), by EPA Method 6010/7000
- Metals (calcium, copper, iron, magnesium, manganese, sodium, zinc), by EPA Method 200.7
- Hexavalent chromium, by EPA Method 7196
- General minerals
  - Major anions (chloride, sulfate), by EPA Method 300.0
  - Nitrate as N, by EPA Method 300.0
  - Nitrite as N, by EPA Method 300.0
  - Alkalinity, by SM2320 B
  - Hardness, by SM2340 B Method
  - Total dissolved solids (TDS), by SM2540 C
  - Total organic carbon (TOC), by EPA Method 415.1

Physical testing parameters (i.e., TOC, moisture content, porosity, etc.) may be performed on selected samples; these samples will be submitted to a State-certified physical testing laboratory.

### **6.7.1 Background Sampling for Metals**

DTSC has indicated to ENVIRON that it will provide background metals data for soil in the Site vicinity. Once received, ENVIRON will review and evaluate the data provided and assess if the data are appropriate for use as background data for the Site. If ENVIRON believes that the DTSC-provided background data are not representative of conditions at the Site, ENVIRON will collect soil samples according to the following procedure and will calculate site-specific background concentrations for metals in soil.

ENVIRON will collect soil samples for Title 22 metals analysis from undeveloped areas of the Site to calculate background concentrations of metals in soil at the Site. A total of 30 background soil samples, 15 samples from alluvial soils and 15 samples from the weathered granite, will be collected. Each set of 15 samples will be collected from a minimum of four borings. Boring locations will be selected based on-site use history and visual inspection to assure samples are collected from soils that are representative of background conditions (without anthropogenic deposition of metals), and proposed locations will be submitted to DTSC for approval prior to sample collection.

Metals results for the background samples will be grouped and used to calculate separate background metals concentrations for the alluvial soils and the weathered granite. The upper bound background concentration of each metal in a soil type will be described as the mean

plus two standard deviations. These data will be used when evaluating the significance of detected metals concentrations from known use areas of the Site.

## **6.8 Data Generation and Management**

Standard EPA procedures will be implemented to identify, track, monitor, and maintain chain-of-custody for samples collected

### **6.8.1 Analytical Methods**

Samples will be analyzed according to the methods listed above. In general, samples will be processed as a batch. Samples will be processed sequentially, and samples to be analyzed by a given method will be generally processed on the same apparatus. Samples will be processed without interruption of samples from other projects. At a minimum, the laboratory will perform matrix spikes on one of each 20 project samples, or one per sample delivery batch, per matrix type, whichever is more frequent, and independent of the number of analytical instruments used. Samples will be analyzed so that each detected analyte will be quantified within its respective linear range of calibration of the analytical instrument; if analytes are detected outside the linear range of calibration, the sample will be re-analyzed with an appropriate dilution and within holding times so that the analyte can be properly quantified.

Corrective actions for any failures in the analytical system will be handled by Del Mar.

### **6.8.2 Quality Control**

The requirements and procedures for maintaining laboratory quality control for project data are described in the QAPP (Appendix D).

### **6.8.3 Data Review**

The Project Manager, Project Engineer, Project QA Officer, or appropriate Task Leader assigned by the Project Manager, will review the laboratory data. If comparison of data to previous measurements or known conditions at the Site indicates anomalies, the laboratory will be instructed to review the submitted data while the methods used to collect and handle the samples are reviewed. If anomalies remain, the laboratory may be asked to re-analyze selected samples; other possible corrective actions are discussed below.

#### **6.8.4 Corrective Actions**

Corrective actions may be initiated if the precision or accuracy goals are not achieved. The initial step in corrective action will be to instruct the analytical laboratory to examine its procedures to assess whether analytical or computational errors caused the anomalous results. At the same time, sample collection and handling procedures will be reviewed to assess whether they could have contributed to the anomalous results. Based on this evaluation, the Project Manager and/or the Project Engineer, with the Project QA Officer, will evaluate the detection limits used, the sample collection procedures, the analytical parameters, sample custody and sample documentation, and will assess whether re-analysis or resampling is required or whether any protocol should be modified for future sampling events. Any changes in laboratory methods, or quality assurance parameters or limits require written approval prior to implementation by the laboratory.

#### **6.8.5 Data Management**

New analytical data for the sampling will be generated and reported by Del Mar. Analytical data will be provided to ENVIRON by the laboratory in electronic format via email followed by a mailed hard copy report. The electronic data will be entered and maintained in the electronic project database. Analytical results in the database will be checked against the hard copy report upon their receipt.

## **7.0 BASELINE HUMAN HEALTH RISK ASSESSMENT**

### **7.1 Baseline Human Health Risk Assessment**

This section of the RI work plan describes the proposed human health risk assessment (HHRA) to be conducted for the Site. The objective of the HHRA is to characterize potential human health risk due to exposure to chemicals detected in environmental media at the Site. The results of the HHRA will be used to identify any areas of potential human health concern and to evaluate the need for additional corrective or risk management measures that are needed for the future proposed uses of the Site. To accomplish this, the major tasks of the HHRA are to:

- Characterize the Site for risk assessment,
- Identify potentially exposed human populations and exposure pathways,
- Select chemicals of human health concern,
- Perform fate and transport modeling,
- Assess toxicity,
- Characterize potential risks, and
- Analyze uncertainty.

### **7.2 Human Risk Assessment Approach**

When evaluating potential human health risks at a Site, there are two ways in which a risk assessment can be performed. The first, and more traditional method, is to estimate average exposure concentrations for the potentially exposed populations and to calculate the risk associated with that level of exposure. This approach is often referred to as a "forward" risk assessment. The second approach is to calculate risk-based target concentrations (RBTCs) for human health and to compare these levels to measured chemical concentrations in the media of concern; this approach is often referred to as a "back-calculated" risk assessment. The second approach is often the most efficient and useful approach to evaluate sites when there are multiple proposed uses and these uses have not been limited to a certain area of the property. Since the ultimate land uses for the Site have not been finalized, the "back-calculated" approach will be used in the HHRA.

The objective of the HHRA will be to calculate site-specific RBTCs that will be protective of human receptors potentially exposed to Site-related chemicals. The calculations used to develop the RBTCs will be conducted according to state and federal risk assessment guidelines. It should be noted that

there will likely be more than one RBTC developed for each chemical of potential concern (COPC) in order to be protective of different proposed land uses, and therefore, different populations exposed to different exposure media.

The methodology used to conduct the HHRA will be based primarily on California Environmental Protection Agency (Cal/EPA) and United States Environmental Protection Agency (USEPA) risk assessment guidance provided in the documents listed below:

- *Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities* (Cal/EPA 1992),
- *Preliminary Endangerment Assessment Guidance Manual* (Cal/EPA 1994),
- *Risk Assessment Guidance for Superfund. Volume I – Human Health Evaluation Manual (Part A)* (USEPA 1989),
- *Risk Assessment Guidance for Superfund. Volume I – Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals)* (USEPA 1991a),
- *Human Health Evaluation Manual, Supplemental Guidance: “Standard Default Exposure Factors”* (USEPA 1991b),
- *Exposure Factors Handbook* (USEPA 1997a), and
- *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Ground water and Soils (Subsurface Vapor Intrusion Guidance)*(USEPA 2002a).

When appropriate, the HHRA will incorporate Site-specific information based on key aspects of the Site's use history and the conceptual site model (CSM).

### **7.2.1 Site Characterization**

The purpose of this task is to provide an overview of the physical features and investigations conducted at the Site that are relevant to the HHRA. The information summarized will support conclusions drawn in later tasks, including the selection of potentially exposed populations and exposure pathways, the selection of chemicals of concern, and the estimation of chemical migration. Most of the information presented will be summarized from the RI

Report; sufficient Site description information will be presented in the HHRA report so that it can be read as a stand-alone document.

### **7.2.2 Potentially Exposed Populations and Pathways**

The purpose of this task is to identify potentially exposed populations and exposure pathways to be included in the quantitative risk assessment. In evaluating the potential human health risks posed by a site, it is necessary to identify the populations that may potentially be exposed to the chemicals present and to determine the pathways by which these exposures may occur. Identification of the potentially exposed populations requires evaluating the human activity and land-use patterns at the Site and in the vicinity of the Site.

Once the potentially exposed populations are identified, the complete exposure pathways by which individuals in each of these potentially exposed populations may contact chemicals present at the Site are determined. An exposure pathway is defined as "the course a chemical or pollutant takes from the source to the organism exposed" (USEPA 1988). An exposure route is "the way a chemical or pollutant enters an organism after contact" (USEPA 1988). A complete exposure pathway requires the following four key elements:

- On-site chemical source,
- Migration route (i.e., environmental transport),
- An exposure point for contact (e.g., soil, air, or water), and
- Human exposure route (e.g., inhalation).

An exposure pathway is not complete unless all four elements are present.

A CSM is used to show the relationship between a chemical source, exposure pathway, and potential receptor at a site. The CSM identifies all potential or suspected chemical sources, potentially impacted media, and potential receptors. It also identifies the potential human exposure routes for contacting impacted media. These source-pathway-receptor relationships provide the basis for the quantitative exposure assessment. In fact, only those complete source-pathway-receptor relationships are included in the quantitative risk evaluation. A preliminary CSM for the Site is shown on Figure 10; this model will be refined as part of the HHRA.

The CSM developed for the Site will reflect a comprehensive evaluation of the potential exposure pathways for each identified population. The HHRA report will include

justification for inclusion or elimination of any exposure pathway from further consideration in the risk assessment.

#### **7.2.2.1 Potentially Exposed Populations**

Based on the unknown future land use, the HHRA will be prepared to address the most conservative land use scenario, residential use. On-site populations that could potentially be exposed to chemicals in soil, ground water, and/or surface water include residents (adults and children). Additional on-site populations would include short-term construction/maintenance workers involved in redevelopment activities.

#### **7.2.2.2 Exposure Pathway Evaluation**

Based on the CSM, potential exposure media at the Site would include ground water, surface/subsurface soil, soil vapor emanating from ground water and/or soil, and surface water.

Each of these media is discussed separately in the following sections.

#### **Ground Water**

Ground water beneath the Site currently is not used as a municipal water source. In the future, domestic ground water at the Site will be supplied by the City of Norco (as it is currently).

Two potentially complete exposure routes exist for ground water. The first potential exposure route would be exposure to VOCs via the inhalation of chemicals that have migrated from ground water through the soil column and into indoor or ambient air. Therefore, potential exposures resulting from the inhalation of ground water vapors that have migrated through the soil column will be quantified in this assessment for residents (indoor air) and construction workers (trench air). Only the inhalation of VOCs in indoor air will be modeled for residential populations because outdoor concentrations of VOCs will be lower than indoor air concentrations due to higher mixing with outdoor air in the ambient environment.

The second potential exposure route would be direct contact with ground water. Potential direct contact with ground water could occur during construction in areas of shallow ground water. Therefore, it is assumed that a construction worker involved in trenching could directly contact ground water. Potentially complete exposure

pathways for this construction worker could include inhalation of volatile chemicals in ambient trench air and dermal contact with ground water.

### **Surface and Subsurface Soil**

Adult and children residents and construction workers could be exposed directly to chemicals remaining in Site surface soils. Potential routes of exposure would include incidental ingestion, dermal contact, and inhalation of volatile chemicals and windblown particulates.

For a residential scenario, Cal/EPA has typically required that soils down to a depth of approximately 10 feet be remediated for direct contact (Cal/EPA 1992). This level of cleanup ensures that residents will be able to perform any activity in their yard, including installing a swimming pool, without resulting in any unacceptable adverse health effects due to direct exposure to chemicals in soil.

Because no direct contact is likely to occur with soils deeper than 10 feet bgs (termed subsurface soils), exposures to chemicals in subsurface soil is limited to the inhalation of VOCs that have migrated through the overlying soil into indoor and ambient air. Therefore, potential exposures resulting from the inhalation of subsurface soil vapors that have migrated through the soil column will be quantified in this assessment for residents (indoor air) and construction workers (trench air). Only the inhalation of VOCs in indoor air will be modeled for residential populations since outdoor concentrations of VOCs will be lower than indoor air concentrations due to higher mixing with outdoor air in the ambient environment.

### **Surface Water**

The ephemeral stream present at the Site exits the Wyle property near monitoring well MW-5A. Ponded water has been observed in proximity to MW-5A during certain times of the year. During the past several years, surface water has been observed sporadically from January through March. Water ponding in this area drains to an underground culvert.

Based on observations to date, the depth of water in this area is approximately 1 foot, therefore to establish the exposure scenario average ENVIRON will assume a creek visitor wading in the surface water. Potential routes of exposure would include dermal contact with surface water. It is assumed that both inhalation of volatile chemicals from surface water and ingestion of surface water are not significant exposure pathways under a limited wading scenario.

The creek visitors are defined as children 9-15 years of age. Children in this age group are expected to be more mobile and engage in unsupervised play, beyond the boundary of a particular residence. Younger children typically would not likely play beyond the boundary of their residence without parental supervision. Therefore, it is unlikely that smaller children would engage in activities near the ponded water. In addition, the ponded water is not located near any playground equipment or other attractions that may draw younger children to the area.

### **7.3 Chemicals of Potential Concern**

The purpose of this task is to identify the COPCs to be quantitatively evaluated in the HHRA. It is not anticipated that the list of chemicals to be addressed will be reduced through the use of a formal toxicity-concentration screen. The list of COPCs will include all chemicals detected to date, as summarized in Table 13. In addition, any new chemicals detected during the implementation of the RI work plan will be added to this list.

### **7.4 Fate and Transport Modeling**

The purpose of this task will be to estimate the intermedia transfer factors needed to evaluate potential risks from various inhalation pathways. These factors will be derived using standard fate and transport models that estimate the movement of chemicals between environmental media.

#### **7.4.1 Modeling of Vapor Intrusion from Soil and Ground Water to Air**

Chemicals detected in soil or ground water can potentially migrate in a vapor phase through the unsaturated zone to indoor or ambient air. This migration will be quantified for the purposes of risk assessment through an intermedia transfer factor. This transfer factor is defined so that when it is multiplied by the source concentration of a chemical in soil (in  $\mu\text{g}/\text{kg}$ ) or ground water (in  $\mu\text{g}/\text{L}$ ), the product is the resulting steady-state concentration that is predicted in indoor or ambient air (in  $\mu\text{g}/\text{m}^3$ ).

For this risk assessment, the following transfer factors are required:

- Soil to residential indoor air,
- Soil to construction trench ambient air,
- Ground water to residential indoor air,
- Ground water to construction trench ambient air (no ground water in trench), and
- Ground water to construction trench ambient air (ground water present in trench).

Intermedia transfer factors will be estimated using the screening-level model of vapor migration described by Johnson and Ettinger (1991). Specifically, Version 2.3 of the spreadsheet implementation developed by the USEPA (2000) will be used. The Johnson and Ettinger model was originally developed to predict vapor intrusion into buildings. However, it is easily adapted to predict vapor intrusion into the ambient air above a construction trench.

The calculation of transfer factors is based on parameters describing the properties of the COPCs, the vadose zone, the surface barrier, and the air dispersion zone. The values used for each of these parameters and their sources will be summarized in the HHRA. Site-specific parameters will be used where available; otherwise, standard default assumptions from Cal/EPA or USEPA guidance documents will be used.

#### **7.4.2 Windblown Dust**

ENVIRON will assume that residents may be exposed to airborne particulates on a daily basis under regular site conditions. Based on USEPA screening guidelines (USEPA 2002b), a particulate emission factor (PEF) of  $1.316 \times 10^9 \text{ m}^3/\text{kg}$  will be used to estimate airborne concentrations of a chemical from corresponding soil concentrations. This PEF reflects an airborne concentration of dust of approximately  $0.76 \text{ } \mu\text{g}/\text{m}^3$ . For construction workers, a PEF of  $1.44 \times 10^6 \text{ m}^3/\text{kg}$  will be used (SF-RWQCB 2003). This PEF reflects an airborne concentration of dust of approximately  $700 \text{ } \mu\text{g}/\text{m}^3$ .

As part of the estimation of the potential exposure via inhalation of dust, it is assumed that the inhaled dust has the same chemical composition as the surface soil at the Site. This is thought to be a conservative assumption because not all of the dust in the air at the Site will have originated from the Site.

### **7.5 Exposure Assessment**

The purpose of this task is to develop an upper-bound estimate of the theoretical intake for each of the potentially exposed human populations via each of the exposure routes identified in the CSM. Estimates of human intake are a function of exposure parameters such as duration, frequency, and contact rates. Intakes will be estimated using equations recommended by USEPA and Cal/EPA. For this assessment, ENVIRON will primarily rely on exposure assumptions recommended by USEPA and Cal/EPA for the values of individual exposure parameters. Where data is available to support more site-specific assumptions, the site-specific assumptions will be used and the basis for these

assumptions will be provided. The exposure assumptions selected for use in this evaluation are presented in Table 14.

## 7.6 Toxicity Assessment

The purpose of this task is to collect the dose-response data that will be used to calculate the RBTCs. The hierarchy of sources for the toxicity factors used in this task will be consistent with those recommended by the Cal/EPA DTSC for risk assessments. This hierarchy is as follows:

- Cal/EPA Cancer Slope Factors (CSFs), Reference Doses (RfDs), and Reference Concentrations (RfCs) (Cal/EPA 2003a and Cal/EPA 2003b)
- CSFs, RfDs, and RfCs developed by the USEPA and listed in the Integrated Risk Information Service (IRIS) (USEPA 2004),
- Non-promulgated USEPA CSFs, RfDs, and RfCs listed in the USEPA Health Effects Assessment Summary Tables (HEAST) (USEPA 1997b), and
- Non-promulgated USEPA RfDs and RfCs recommended by USEPA's National Center for Environmental Assessment (NCEA).

Because there are currently no toxicity standards for weathered petroleum hydrocarbon mixtures, toxicity surrogates will be derived following an approach developed by the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG 1997). The DTSC has reviewed and approved the use of this surrogate approach for weathered petroleum for risk assessments conducted for other fuel spill sites in California.

In general, petroleum hydrocarbons are comprised of four major groups: alkanes, alkenes, cycloalkanes, and aromatics. From a human health-risk standpoint, the main chemicals of concern in total petroleum hydrocarbon (TPH) mixtures are the aromatics. These aromatics, such as BTEX, have been individually characterized and will be included in this risk assessment by the development of chemical-specific soil and ground water RBTCs. However, many other hydrocarbon constituents exist in TPH-gasoline, TPH-diesel, and TPH-residual ranges. The toxicity of the other constituents in these ranges will be addressed using an indicator/surrogate approach as recommended by the TPHCWG (1997).

The TPHCWG approach is the product of a collaborative effort between industry, government, and academia and reflects the most current theories on evaluating complex mixtures. The basis for the

TPHCWG methodology is the examination of a mixture as the product of several smaller subsets, which are defined by specific carbon ranges and are referred to as fractions. For example, the components of diesel fall into two of the four fractions (i.e., C<sub>>5</sub>-C<sub>8</sub>, C<sub>>8</sub>-C<sub>16</sub>, C<sub>>16</sub>-C<sub>35</sub>, C<sub>>35</sub>) established by the TPHCWG for toxicity. These two fractions are C<sub>>8</sub> through C<sub>16</sub> and C<sub>>16</sub> through C<sub>35</sub>. Within each fraction, toxicity surrogates are conservatively selected to be representative of the entire TPH mixture in that range where one RfD is representative of the aliphatics (i.e., alkanes, alkenes, alkynes, and cycloalkanes) and one RfD is representative of the aromatics (i.e., polynuclear aromatics, diaromatics, and monoaromatics). This is based upon the TPHCWG assumption that within a given carbon range and structural class (i.e., aliphatic or aromatic), individual chemical components have similar toxic effects.

In order to identify the appropriate toxicity of the aliphatic and aromatic fractions for each of the four carbon ranges, the TPHCWG examined all available toxicity data for each subgroup (e.g., aliphatics within the range C<sub>>8</sub>-C<sub>16</sub>) and provided recommendations for the most representative values of each fraction. As recommended by the TPHCWG (1997), the inhalation RfDs used in this assessment for the aliphatic fraction ranges of C<sub>>5</sub>-C<sub>8</sub> and C<sub>>8</sub>-C<sub>16</sub> were 5.3 and 0.3 mg/kg-d, respectively.

Since no inhalation RfDs were recommended by the TPHCWG for the aliphatic fractional ranges of C<sub>>16</sub>-C<sub>35</sub> and C<sub>>35</sub>, route-to-route extrapolations from the recommended oral RfDs of 2 and 20 mg/kg-d were used. As recommended by the TPHCWG (1997), inhalation RfDs of 0.1 and 0.06 mg/kg-d for the aromatic ranges of C<sub>>7</sub>-C<sub>8</sub> and C<sub>>8</sub>-C<sub>16</sub>, respectively, were used in this assessment. Since an inhalation RfD for the aromatic fraction of the range C<sub>>16</sub>-C<sub>35</sub> was not available, the oral RfD of 0.3 mg/kg-day for the aromatic range of C<sub>>16</sub>-C<sub>35</sub> was used to evaluate the inhalation route.

As is apparent from the previous discussion, the fractional composition of a TPH mixture in terms of both carbon range and structural form (i.e., aliphatic or aromatic) is required to calculate surrogate toxicity criteria under the TPHCWG approach. In this assessment, fractional compositions for carbon ranges are assumed to be 74% C<sub>>8</sub>-C<sub>16</sub> and 26% C<sub>>16</sub>-C<sub>35</sub> for TPH-diesel, 75% C<sub>>5</sub>-C<sub>8</sub> and 25% C<sub>>8</sub>-C<sub>16</sub> for TPH-gasoline, and 100% C<sub>>16</sub>-C<sub>35</sub> for TPH-motor-oil (Metcalf & Eddy 1993). In regards to structural composition, it is assumed that TPH-diesel consists of 70% aliphatics and 30% aromatics, TPH-gasoline consists of 75% aliphatics and 25% aromatics, and TPH-motor-oil consists of 67% aliphatics and 33% aromatics (Metcalf & Eddy, 1993).

Lead will also be evaluated differently than that outlined above. Rather than use a toxicity value, for which there is none in the sources outlined above, the Cal/EPA modified preliminary remediation goal for residential soil (150 mg/kg) will be used to screen lead concentrations in soil.

No other toxicity factors will be derived for this assessment. The HHRA report will present a tabulation of the toxicity factors used in the assessment. Text describing the source of the toxicity information and any critical uncertainties associated with the toxicity factor for a particular COPC, and the derivation of the reference doses for petroleum hydrocarbons, will also be included. A preliminary compilation of the toxicity factors associated with COPCs detected at the Site is presented in Table 15.

## **7.7 Risk Characterization**

The purpose of this task will be to calculate pathway-specific RBTCs for each COPC, which will be used to assess whether residual concentrations detected at the Site are within acceptable risk ranges. RBTCs represent concentrations below which exposures via the relevant pathways will not result in unacceptable increases in cancer risk or adverse non-cancer health effects. RBTCs will be calculated using the exposure assumptions, exposure-based fate and transport modeling, and toxicity values obtained in the tasks listed above.

For carcinogenic chemicals, RBTCs will be calculated to correspond to an acceptable cancer risk of one in 100,000 (i.e.,  $1 \times 10^{-5}$ ). This is the middle of the target risk range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$  identified in the National Contingency Plan for hazardous waste sites (40 CFR 300-399). For non-carcinogenic chemicals, RBTCs will be calculated to correspond to a hazard index of one (1), the exposure at which there is no appreciable health effects.

In order to determine whether or not residual concentrations in soil, ground water, and surface water at the Site could result in unacceptable risks based on the potential land uses, measured levels in each media will be compared to RBTCs. By comparing these RTBCs to measured concentrations it is possible to determine whether or not residual chemicals at the Site could pose unacceptable risks to human health.

In this task, soil, ground water, and surface water data will be compared to the site-specific RBTCs. These comparisons will help identify areas of concern where remediation or risk management actions are needed in order to protect human health. As a screen, the maximum detected concentration in each area investigated will first be compared directly to the calculated RBTCs. Since naturally occurring background concentrations for some metals occasionally exceed risk-based levels, some metals will also be compared to literature or site-specific background concentrations, when available.

Several studies have been published that summarize the native concentrations of metals throughout the State of California. The study of Bradford et al. compiles a database of background

concentrations of trace and major elements in California soils (Bradford, 1996) while Dragun and Chiasson summarize background concentrations of metals by state in North American soils (Dragun, 1991). These studies are summarized in Table 16.

For those chemicals that are detected at concentrations exceeding the lowest RBTCs for each media (or exceeding background concentrations for some metals), the calculated exposure concentration will be compared to the target concentration if sufficient data are available. ENVIRON's experience with standard regulatory practice is that a concentration equal to the 95th percentile upper confidence limit (UCL) of the arithmetic mean concentration in a potential exposure area is estimated as the exposure point concentration (USEPA 1992). Potential exposure areas will be identified according to proposed future land uses for each area evaluated.

Exposure point concentrations below the RBTCs (or background levels) would support the conclusion that risks posed by the Site are within acceptable limits, while the presence of exposure concentrations above or at the high end of this risk range may require additional investigation or risk management measures.

The HHRA report will summarize all RBTCs calculated for this assessment. In addition, the comparison of measured chemical concentrations to these RBTCs will also be presented. Accompanying text will identify any areas of human health concern and focus on the results pertinent to deciding if any further action or risk management is needed.

## **7.8 Uncertainty Analysis**

The process of estimating risk or developing RBTCs has inherent uncertainties associated with the calculations and assumptions used. The approach that will be used in the HHRA will be health protective whenever possible and will tend to overestimate exposures. This may result in RBTCs that are likely to be lower than may be required to be protective of public health. Consistent with agency guidance for risk assessment, key uncertainties associated with the risk assessment results in the HHRA (e.g., uncertainties associated with exposure assessment, fate and transport modeling, and toxicity assessment) will be discussed. preceding section on the HHRA.

## **8.0 ECOLOGICAL SCREENING EVALUATION**

Ecological risk assessment (ERA) is a process that evaluates the likelihood that adverse ecological effects may occur, or are occurring, as a result of exposure to one or more stressors (EPA, 1992). While ecological risk assessment cannot provide absolute proof of the occurrence of adverse impacts or the lack thereof (EPA, 1989), it can provide the quantitative basis for comparing and prioritizing risks, as well as a systematic means of improving the understanding of risks.

The purpose of the ERA will be to evaluate potential impacts to key organisms posed by physical and chemical stressors at portions of the Site, which may be designated as open space, recreational areas, or sensitive habitats. Particular emphasis will be placed on areas that may be suitable for recreational areas (assuming the Site's future use will be residential), including the ephemeral stream and adjacent riparian areas. The ERA will be conducted following DTSC ERA guidance, beginning with the Part B Scoping Assessment (DTSC, 1996b). The Scoping Assessment includes three key components: Biological Characterization, Identification of Contaminants of Potential Ecological Concern (COPECs), and Identification of Potentially Complete Exposure Pathways.

### **8.1 Biological Characterization**

Biological characterization will include identification of habitats and potentially exposed ecological receptors present on and near the Site. A list of wildlife and plant species and their habitats will be produced via a review of electronic databases (i.e., California Natural Diversity Database) for habitats and species suspected to occur in the vicinity of the Site and from information provided by the St. Clair Company. This list will be verified by Site visits conducted by a certified field biologist. Site visits will include evaluation and characterization of habitats and ecological receptors on-site and within one mile of the Site to the extent that such evaluation and characterization has not been completed previously, with particular emphasis on "special status" species and their habitats. "Special status" species include species that are presently listed or are being considered for listing as endangered, threatened, or special-concern species. To ensure complete biological characterization of the Site, visits will be conducted at various times throughout the day.

## **8.2 Identification of Contaminants of Potential Ecological Concern (COPECs)**

A list of COPECs and their spatial extent of contamination will be developed based on available sampling results and site-specific history. Chemical analysis results will include available surface water sampling data. Sediment and soil chemistry, which has not been characterized at this time, will also be investigated as these media may contain COPECs. Method detection levels will be compared with ecological effect concentrations to ensure that levels are sufficiently low to allow selection of COPECs.

## **8.3 Identification of Potentially Complete Exposure Pathways**

The final step in the Scoping ERA will identify the potential for contact between COPECs and ecological receptors. Potential exposure pathways will be identified where points of contact and exposure routes co-exist. Points of contact are locations in which COPECs and ecological receptors co-exist or have the potential to co-exist according to predictive fate and transport modeling. Both direct (e.g., absorption, inhalation, ingestion) and indirect (e.g., biomagnification) exposure pathways will be considered. This process will result in a qualitative description of the magnitude, duration, and frequency of exposure to biological receptors, including a pathway analysis for each habitat type, identifying the most significant exposure pathways given the COPECs and ecological receptors.

If the Scoping Assessment demonstrates that the Site and areas actually or potentially impacted by COPECs are not significantly utilized by ecological receptors or there are no actual or potentially complete exposure pathways, it may not be necessary to conduct further assessment. However, if potentially complete exposure pathways exist, a Part A Phase I Predictive Assessment will be conducted to quantitatively evaluate ecological risks (DTSC, 1996a).

## **9.0 SCHEDULE**

A schedule for the entire RI/FS process was submitted to DTSC on January 16, 2004. A new schedule, revised to reflect current anticipated conditions is provided herein (see the following page). This schedule will be revised monthly, as the project progresses, and in the future will be included with the monthly status reports that are submitted to DTSC.

**Insert schedule here**

## 10.0 PROJECT MANAGEMENT

### 10.1 Project Organization/Roles and Responsibilities

The purpose of defining the project organization and the roles and responsibilities of the individuals involved in the project is to provide all involved parties with a clear understanding of the role that each party plays, and to provide the lines of authority and reporting for the project.

Personnel assigned to the project will be required to familiarize themselves with pertinent protocols and procedures presented in this RI work plan. Key project positions relate to project management, data quality management, and field operations management.

Regulatory oversight will be provided by the DTSC. The DTSC Project Team consists of: designated Project Manager Juan Osornio, assisted by Peter Garcia, Shahir Haddad, Ronald Okuda, Kim Foreman, William Bosan, and Theodore Johnson.

Corporate Director- Environmental, Safety & Health, Matthew Letany of Wyle Laboratories is acting Project Manager for Wyle. Wyle's environmental consultant is ENVIRON. ENVIRON personnel working on this project include:

Project Manager, **Carol L. Serlin, R.G.** – The Project Manager is responsible for overall technical and policy decisions involving the project, including interaction and coordination with ENVIRON International Corporation (ENVIRON) project staff, Wyle Laboratories (Wyle), and the lead regulatory agency for the project (California Environmental Protection Agency - Department of Toxic Substances Control [DTSC]).

Project Engineer, **Bitia Tabatabai, P.E.** /Project Geologist, **Rebekah J. Wale** – The Project Engineer/Project Geologist is responsible for scope, cost, and technical considerations of the project; staff and project coordination; and implementation and review of overall project quality of the collection, completeness, and presentation of the data.

Technical Peer Review, **George O. Linkletter, Ph.D, R.G.** – The Technical Peer Reviewer is responsible for reviewing technical aspects of the work, including Quality Assurance/Quality Control (QA/QC), strategies, and key reports.

Project Quality Assurance Officer, **David K. Liu, Ph.D.** – The QA Officer is responsible for reviewing the project QA program as it relates to the collection and completeness of data from field and laboratory operations.

Task (Field) Leaders, **Safaa Dergham, Maria Szweminska, Tim Knapp, Liz Miesner, and Jason Conder** – The Task Leaders are responsible for executing the approved work plan, in this case, the RI work plan. Task Leaders will work with the Project Manager/Project Engineer and QA Officer to ensure that work is conducted in compliance with project-specific objectives and applicable QA procedures.

Data Management, **Devon Rowe** – The data manager is responsible for management of the database, including updating and maintaining the database as needed, and preparing data tables.

## **10.2 Assessment and Oversight**

Assessments and evaluations are designed to determine whether the QAPP is being implemented as approved, to increase confidence in the information obtained, and ultimately, to determine whether the information may be used for its intended purpose(s).

### **10.2.1 Assessment and Response Actions**

During the performance of the RI work plan, the Project Manager, the Project Engineer, the Project QA Officer, or other person designated by the Project Manager, will perform periodic assessments of compliance with the RI work plan. When problems or issues are identified, the Task Leader(s) will be notified of the issue and instructed as to how to proceed going forward. If a subsequent assessment reveals that the problem has not been corrected, a field audit will be conducted. In addition, periodic unannounced QC audits may be conducted of field operations. Such QC audits may include evaluation of the following actions: field procedures, sampling activities, field notes, chain-of-custody procedures, field measurements, field equipment calibration procedures, and sample packaging and shipment.

The laboratory will be responsible for its own compliance with the QAPP. During the data validation process, ENVIRON will review selected elements of the laboratory's performance as it relates to the QAPP. If non-compliance issues are identified, the laboratory will be notified as to what issue(s) has been identified and will be required to prepare a written response to ENVIRON regarding what corrective action will be taken to address the issue. If non-compliance problems persist, audits and/or performance evaluation sampling may be implemented.

### **10.2.2 Reports to Management**

The Project Manager/Project Engineer and the Task Leader(s) will meet on a regular basis to discuss progress on the project, and resolve any issues or problems to be corrected. In addition, the Task Leader(s) will notify the Project Manager/Project Engineer immediately of any changes to the scope of work or the analytical program that could potentially impact the usability of the data collected.

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