FINAL

Presumptive Removal Action Workplan For Soil Gas At The Northwest Area Wyle Laboratories, Inc 1841 Hillside Avenue Norco, California

Submitted to

California Environmental Protection Agency
Department of Toxic Substances Control

On behalf of

Wyle Laboratories, Inc.
Norco, California

Prepared by

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EXECUTIVE SUMMARY

This report presents the Presumptive Removal Action Workplan (RAW) for VOC-impacted soil gas at the Northwest Area, prepared by ENVIRON International Corporation (ENVIRON) for Wyle Laboratories, Inc. (Wyle), located at 1841 Hillside Avenue, in the City of Norco, California (Site, see Figures 1, 2A and 2B). In October 2003, the Department of Toxic Substances Control (DTSC) became the designated lead agency for the Site and a Consent Order was executed (Consent Order HSA-CO 03/04-042). Since that time, all investigative and remedial work has been overseen and directed by DTSC. Under the DTSC Consent Order, Site-wide characterization and remediation, if necessary, will be conducted.

This RAW contains an interim remedial measure that will be used to reduce the concentrations of volatile organic compounds (VOCs) in soil gas at the Northwest Area of the Site in the area of the southern terminus of Golden West Lane. The purpose of the RAW is to address the potential indoor air exposure pathway to residents at the southern terminus of Golden West Lane through active removal of VOC-impacted soil gas at the Northwest Area. The removal action proposed in the RAW will be protective of public health, safety, and the environment. This RAW has been prepared in a manner consistent with the National Contingency Plan (NCP), in accordance with California Health and Safety Code, Section 25356.1, and in accordance with DTSC Guidance for Removal Action Workplans (1998).

The RAW draws its guidance from recent correspondence and meetings with DTSC, as well as ongoing subsurface investigations conducted at the Northwest Area. Based on the results of these investigations, it is known that VOCs, primarily trichloroethene (TCE), are present in ground water and soil gas in proximity to Golden West Lane. Vapor partitioning of TCE from shallow ground water appears to be the source of TCE in soil gas. The RAW addresses the VOCs at the locations of highest measured soil gas concentrations underlying Golden West Lane, which are at the southern terminus of Golden West Lane.

According to DTSC's direction, the only removal action objective (RAO) for the Presumptive RAW is to reduce the concentration and control migration of VOCs to reduce the potential for indoor air intrusion into residences at the southern terminus of Golden West Lane. Consistent with the RAO, TCE-impacted ground water, presently approximately 5 feet below ground

surface (bgs) at the Northwest Area, is not considered in this RAW and will be addressed in a future Interim Remedial Measure (IRM) or Remedial Action (RA).

In order to expedite remedy selection, at DTSC's direction, ENVIRON chose a presumptive remedy approach for consideration of removal actions (United States Environmental Protection Agency [USEPA], 1993a, 1996). This approach eliminates the need of the initial step of identifying and screening all available remedial technologies. Based on ENVIRON's review of presumptive remedies, there are no presumptive remedies addressing solely soil gas. Therefore, because the soil gas is present in the unsaturated zone in interstices between soil particles, ENVIRON has selected presumptive remedies for soil. According to USEPA (1993a) soil vapor extraction (SVE), thermal desorption, and incineration are three presumptive remedies for sites where volatile organic compounds are present in soils and remedial actions are warranted (USEPA, 1993a, 1996). Thermal desorption and incineration were dropped from consideration since they involve excavation and remediation of soils, which would have no effect on VOCs in soil gas that originate from ground water. Although VOCs in soil gas at the Northwest Area are thought to be present in the interstitial unsaturated pores and generally not adsorbed to soil particles, SVE is appropriate to meet the RAO, and is the preferred USEPA presumptive technology because it will remove soil gas from the unsaturated zone. On the basis of this argument, appropriate removal action alternatives considered for mitigation of soil gas in the Northwest Area were limited to the following:

No Action
Soil Vapor Extraction

The No Action and SVE Alternatives were the only two alternatives screened based on the criteria effectiveness, implementability, and cost, consistent with the presumptive remedy approach, the NCP (Section 300.430(e)(7)), and DTSC's guidance for RAWs (1998). A numerical rating scheme was developed for use in addition to the qualitative comparisons to facilitate selection of a preferred alternative. Based on our evaluation, the recommended removal alternative is SVE. The implementation schedule for this action is presented as Figure 6.

1.0 INTRODUCTION

ENVIRON International Corporation (ENVIRON) presents this RAW for soil gas-impacted with VOCs near homes at the southern terminus of Golden West Lane, off-site to the immediate north and northwest of Wyle Laboratories, Inc., located at 1841 Hillside Avenue in the City of Norco, California (Site, Figure 1), in an area designated as the Northwest Area. The focus of the RAW is a portion of the Northwest Area at the southern terminus of Golden West Lane, where the highest VOC concentrations were detected during previous soil gas sampling conducted along the entire length of the street. (Figures 2A and 2B).

Historical operations at the Site resulted in primarily VOC impacts to soil and ground water in localized areas. Subsurface environmental investigations, which began in the mid-1990s, have encompassed soil, surface water, stormwater runoff, soil gas, sediment, and ground water at the Site, and off-site to the north, west, and south. Beginning in 1999, these investigations were overseen by the Santa Ana Regional Water Quality Control Board (RWQCB). In October 2003, the DTSC became the designated lead agency for the Site and a Consent Order was executed (Consent Order HSA-CO 03/04-042). Since that time, all investigative and remedial work conducted at the Site has been overseen and directed by DTSC.

Under the DTSC Consent Order, Site-wide characterization and remediation, if necessary, will be conducted. ENVIRON completed a RAW addressing the central portion of the Site in May 2004, which currently is being implemented. A Draft RAW addressing ground water, the recognized source of TCE in soil gas in the Northwest area, was submitted to the DTSC on March 1, 2005. Per DTSC's direction, this new Presumptive RAW addresses only soil gas at the Northwest Area. The RAW has been prepared in a manner consistent with the United States Environmental Protection Agency (USEPA) presumptive remedy approach, the National Contingency Plan (NCP), in accordance with California Health and Safety Code, Section 25356.1, and in accordance with the DTSC Guidance for Removal Action Workplans (1998).

1.1 Purpose and Scope of Report

The purpose of the RAW is to provide an IRM that effectively mitigates the potential indoor air exposure pathway to residents at the southern terminus of Golden West Lane in the Northwest

Area, through the active removal of soil gas. The removal action proposed in the RAW is protective of public health, safety, and the environment. The RAW includes the following:

- A discussion of available data showing VOC distribution in soil gas at the Northwest Area;
- A description of the RAO of the RAW;
- Development and analysis of appropriate removal action alternatives;
- Comparison of the developed alternatives, selection of a preferred alternative, and the basis for selection; and
- An implementation plan.

1.2 Presumptive Remedy Approach

In order to streamline and expedite the completion of this RAW, and thus its review and ultimate implementation, a presumptive remedy approach, per USEPA guidance has been selected. The presumptive remedy approach prescribes the most appropriate remedial alternatives for specific categories of sites contaminated with specific types of chemicals (USEPA, 1993b). The USEPA (1996a) defines presumptive remedies as:

> *"Preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation."*

The USEPA (1993a) conducted a detailed review of technologies for presumptive remedies and determined that certain technologies were routinely omitted from consideration on the basis of their effectiveness, implementability, and cost, or were not selected under the nine criteria analysis identified in NCP Section 300.430 (e) (9). Conversely, it was noted that certain technologies were routinely selected for remediation of specific sites contaminated with specific types of chemicals. Based on these efforts, the USEPA issued presumptive remedies for the following five site types:

- contaminated ground water
- municipal landfills
- metals in soils
- VOCs in soils
- wood treaters

The premise behind the presumptive remedy approach is that it should accelerate most phases of a remedial investigation or feasibility study (RI/FS) by focusing efforts on technologies that, in the past, have proven to be effective for a given contamination scenario. Sites that qualify under the presumptive remedy approach limit remedial cleanup considerations to the "no action" alternative and appropriate presumptive remedy technologies, as prescribed by USEPA (1993a). For the Northwest Area, the three presumptive remedial technologies considered are SVE, thermal desorption, and incineration.

1.3 Report Organization

The RAW is divided into several sections, as described below. Following this introduction (Section 1.0), historical information regarding Site use history and previous investigations at the Northwest Area is presented in Section 2.0. Information regarding the nature, source, and extent of contaminants is presented in Section 3.0. The identification of RAOs, and applicable or appropriate and relevant requirements (ARARs) for the Northwest Area are presented in Section 4.0. An engineering evaluation and cost analysis, and a comparative analysis are presented in Sections 5.0 and 6.0, respectively. The implementation plan for the selected remedial alternative is presented in Section 7.0. Limitations are included in Section 8.0. References are provided in Section 9.0.

The content of the RAW is based on the USEPA guidance for preparing an Engineering Evaluation/Cost Analysis report (USEPA, 1993c). California Health and Safety Code Sections 25323.1 and 25356.1(h) require that DTSC approve a RAW for non-time-critical removal actions that cost less than $1 million and that information regarding the removal action be provided to the local affected community.

2.0 SITE BACKGROUND

2.1 Site Description

The Site occupies approximately 429 acres of land in the City of Norco, Riverside County, California (Figure 1). Adjacent properties include residences in all directions, Norco High School to the west, and a golf course to the east. There are two distinct surface drainage areas for the developed portion of the Site. The majority of the Site (approximately 80 percent) lies within a westerly sloping drainage basin. The remaining portion of the Site (approximately 20 percent), the westernmost portion, lies on westward or northward draining slopes and is located topographically downgradient from recognized test areas (designated as Areas A, B, C, D, E, I, and M).

Wyle first occupied the Site in approximately 1957, starting in the western portion and later expanding in an easterly direction. The various on-site buildings and test areas historically were used for testing aerospace components and systems, and for performing environmental and dynamic simulation tests. Several buildings not used for testing were used for administrative functions, chemical storage, vehicle maintenance, metal machining/parts fabrication, and photographic developing. Chemical use at the Site 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 ceased operations at the Site in October 2004.

2.1.1 Site Name and Address

The name of the Site is Wyle Laboratories, and the Site address is 1841 Hillside Avenue, Norco, California, 92860.

2.1.2 Site Contact Information

Mr. Matt Letany, Director – ES&H
Wyle Laboratories
128 Maryland Street
El Segundo, California 90245
(310) 563-6630

2.1.3 USEPA Identification Number and CalSites Database Number

The USEPA Identification Number for the Site is CAD021219340. The CalSites Database Number for the Site is 33730084.

2.1.4 Assessor's Parcel Number and Map

The Site is comprised of 13 parcels of land in Riverside County, with the following Assessor's Parcel Numbers (APNs): 123-250-005, 123-250-006, 123-250-007, 123-320-001, 123-330-011, 123-330-001, 123-300-038, 123-330-036, 123-260-003, 123-260-004, 123-080-038, 123-260-010, 123-080-028.

2.1.5 Ownership

The current Site owner is CRV-SC Norco Partners L.P. (CRV). The Site was purchased by CRV in November 2002 from Norhill Properties, LLC. Wyle was the former lessee under CRV. Arrow is successor to the former owner and operator, Wyle Electronics.

2.1.6 Township, Range, Section, and Meridian

The Site is located in Sec 17 T3S R6W (San Bernardino Meridian).

2.1.7 Historical Site Use

Historical Site use is explained in detail in ENVIRON's Final Remedial Investigation Work Plan, dated March 18, 2005, and approved April 1, 2005.

2.2 Topography

The Site is located on the western slope of the La Sierra Hills. Site elevations range from approximately 700 feet above mean sea level (MSL) at the lowest point (southwest corner of Site) to more than 1,000 feet above MSL in the hills along the northern, eastern and southern Site boundaries. The surrounding hills reach maximum elevations of approximately 1,400 feet above MSL to the north and east of the Site. Steep granitic outcrops occupy the northern and southern portions of the Site and are separated by an east-west flowing ephemeral stream, which results in considerable topographic relief across the Site. Topography at the Northwest Area slopes to the north-northwest away from hilly terrain on the Wyle property to the east.

2.3 Geology and Hydrogeology

2.3.1 Regional Geology

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

The vicinity of the Northwest Area is mapped from west to east as Pleistocene-age (1.8 million to 8,000 years) alluvial fan deposits, Cretaceous-age (~100 million years) monzogranite, and Cretaceous-age micropegamatite and granodiorite (Morton and Gray, 1995). These are similar to rocks that are mapped in the vicinity of Lake Mathews (a reservoir at the terminus of the Colorado River Aqueduct) located about 5 miles southeast of the Site. According to Kennedy/Jenks review of the boring logs from the Lake Mathews site (Ransom, 1933a and 1933b), weathering and fracturing in the igneous rocks occur within the upper 50 feet below ground surface (bgs). The maximum depth of noticeably weathered material at Lake Mathews extended to 130 feet bgs.

Three major northwest-southeast trending faults traverse the area: the San Jacinto Fault (located approximately 25 miles northeast of the Site) and the Chino Fault and Whittier Fault Zone (located approximately 9 miles west-southwest of the Site).

2.3.2 Regional Hydrogeology

The Site lies in igneous bedrock hills surrounded to the north and west by old alluvial fan deposits. The Site is not mapped as being within any designated ground water basin. Ground water flows from the Site across the northwest boundary (to the Northwest Area) along Golden West Lane and across the southwestern boundary (near MW-5A) into Temescal Basin. The City of Norco draws 60 percent of its water from five deep wells, four within the Temescal Basin and one lying north of the Santa Ana River within the Chino Basin. All five wells are located several miles away from the Site, and none are located downgradient (west/southwest) of the Site.

The City of Norco purchases 27 million gallons per month of treated water from the Chino Basin Desalter Authority. Therefore, the City of Norco does not obtain its drinking water from the Northwest Area. According to Environmental Data Resources (EDR) of Southport, Connecticut (a contractor retained to provide a listing of water supply wells within a 2-mile radius of the Site), the nearest active ground water production well (FRDS Well #3310037008, District Number 14), is operated by the City of Corona, and is located approximately 2 miles south-southwest of the Site.

Based on the results of the private well survey conducted by ENVIRON, four private wells are located in the Northwest Area. Two of these wells are abandoned and not used. One well, located on Hillside Road, is used for drinking water supply. DTSC collected a ground water sample from this well; VOCs, perchlorate, and NDMA were not detected in the well. The last well, located southwest of the intersection of Third Street and Hillside Avenue. is not used for drinking water supply, and after detection of TCE in the well water by DTSC, the resident was asked to immediately cease using the well. Currently, certain of these wells are being evaluated further in accordance with the approved RI Work Plan, dated March 18, 2005.

2.3.3 Geology of the Northwest Area

The Northwest Area consists of alluvial fan deposits and granitic outcrops that, based on the investigations conducted to date, can be described in reasonable detail to the total depth explored, approximately 27 feet. The alluvium/colluvium is composed primarily of silty sand that ranges in size from fine- to coarse-grained, and contains small percentages of decomposed granitic gravel. It varies in thickness from approximately 18 feet in the northeast portions of the Northwest Area to approximately 10 feet in the areas immediately north of the Site boundary.

According to boring logs from wells placed immediately north of the Site boundary, shallow decomposed granitic bedrock (DG) underlies the alluvial/colluvial unit. This unit is described as moderate yellowish brown coarse sand and non-plastic fines with granitic structure and feldspars that are decomposing into clay. The DG is highly weathered and due to the degree of weathering, appears to be hydraulically similar to a porous medium.

According to the seismic refraction survey conducted by Zeiser-Kling at the Site, competent granitic bedrock underlies the DG. The DG transitions to competent bedrock with increasing depth, as has been evidenced through drilling refusal. At the present time, little is known about the competent bedrock unit in the Northwest Area.

The present understanding of the geologic structure of the Northwest Area is based in part on observations made during subsurface investigations, as described above, and on geologic units presented in the United States Geological Survey, Geologic Map of the Corona North 7.5' Quadrangle (Morton and Gray, 1995, see Figure 3). This map shows Very Old Alluvium ($Qvof^{a}$) described as arenaceous, or consisting wholly or in part of sand-sized fragments, present to the north of 2271 Hillside Avenue and approximately west of Boring ESG-56. In addition, this same unit reportedly is present in a narrow tongue from at least the Site boundary, to the north along Golden West Lane, across Third Street. In this portion of the Northwest Area, the Very Old Alluvium appears to be flanked to the west by Cretaceous Age Monzogranite bedrock (Kcg), as evidenced by outcrops to the immediate west of 2310 Golden West Lane, and to the east by Cretaceous Age Micropegmatite and Granodiorite bedrock (Kmpc), as evidenced by outcrops and hilly terrain. Thus, the narrow alluvium tongue leads from the Site to the north along Golden West Lane, in the general direction of slope.

2.3.4 Hydrogeology of the Northwest Area

There are two distinct drainage areas for the developed portion of the Site. The majority of the Site (approximately 80 percent) lies within a westerly sloping drainage basin. The remaining portions of the Site, including the Northwest Area, lie on westward or northward draining slopes. Ground water is believed to be present in the alluvium, colluvium, DG, and, fractures of the competent bedrock beneath the Northwest Area. Based on results of previous investigations at the Northwest Area, ground water historically was encountered at depths of 15 to 20 feet bgs. However, record rains in

2004/2005 caused water levels to rise substantially. During the April and May 2005 quarterly round of ground water sampling, depth to ground water in the off-site Northwest Area generally was encountered at depths between 4 and 7 feet bgs. As previously stated, shallow ground water level and its potential effect on the presumptive remedies are not considered in this RAW. During gauging of off-site wells in June 2005, it was noted that water levels had declined compared to values measures in late April and early May of 2005. Ground water gauging data for all wells, including wells in the Northwest Area (Wells MW-14, MW-15 and MW-19 through MW-24) is presented in Table 1.

Based on the recent ground water elevation measurements, the general direction of ground water flow at the Northwest Area is toward the north-northwest. Localized ground water flow likely is influenced by the different physical characteristics of geologic units found beneath the Northwest Area. Ground water in the alluvium tongue present along Golden West Lane may focus flow to the north away from the Site.

Detailed hydrogeologic studies are planned for the Northwest Area, some of which are presently being implemented, and will be conducted as part of the remedial investigations planned for the Site and surrounding area. These studies will allow for a greater understanding of the parameters governing subsurface controls on contaminant transport, including the significance of fracture flow in bedrock, thereby allowing for development of a comprehensive remedial approach.

2.4 Meteorology

Meteorological information was obtained from the University of California, Riverside weather station (California Irrigation Management Information System Station #44; approximately 10 miles east of the Site) for the 10-year period from October 1993 to October 2003. Rainfall totals for 2004 and 2005 were obtained from the California Department of Water Resources (CDWR), Lake Elsinore precipitation station (ELS).

Average daily maximum temperatures ranged from the low 60s to mid 70s during the winter months, and from the low 80s to high 90s during summer months. Average annual precipitation was approximately 9.4 inches per year, with a maximum rainfall 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 range from approximately 2.5 to 6 miles per hour, and show minimal seasonal variations. According to CDWR, ELS recorded approximately 15.2 inches of rainfall during the calendar year 2004. CDWR also reports that between January and April 2005, ELS recorded approximately 21.4 inches of rain.

2.5 Regional Radon Information

In January 2002, ENVIRON obtained a regulatory database report for the Site from EDR (EDR, 2002). According to the EDR report, the Site is in an USEPA Radon Zone 2 (i.e., based on a number of factors the USEPA estimates that the average indoor radon activity for a residential property in Riverside County is likely to be between 2 and 4 picoCuries per liter [pCi/L]).

2.6 Data Quality and Validation

The data presented in this RAW have been subjected to EPA Level III and Level IV data validation by Laboratory Data Consultants, Inc. (LDC) of Carlsbad, California. The data validation procedures were based on EPA's National Functional Guidelines for data validation. The Quality Control (QC) information reviewed by LDC included, at a minimum, chain-of-custody forms, holding times, reporting limits, matrix spike/matrix spike duplicate (MS/MSD) analyses, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) analyses, and blanks. The results of the data validation review, which are on file at the Irvine, California office of ENVIRON, indicate the data are useable. Several relatively minor QC issues were noted; thus, the data provided in the data summary tables have been flagged (U, J, UJ) accordingly. The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J indicates an estimated value.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

2.7 Relevant Subsurface Investigations

This section summarizes selected environmental subsurface investigations conducted to assess potential migration of contaminants from the Site to the Northwest Area. Soil boring and monitoring well locations at the Northwest Area are shown on Figures 2A and 2B. Table 2

provides a summary of VOC concentrations found in soil gas at the Northwest Area. A summary of selected soil gas analytical results for recent sampling events are presented on Figure 3.

Investigations at the Northwest Area have included soil, surface runoff, ground water, and soil gas sampling, as well as indoor air sampling at three residences along Golden West Lane. The scope of work has been performed in several phases and has included (1) shallow and surface soil/sediment sampling; (2) storm water runoff sampling, (3) ground water monitoring well installation, development, and sampling; (4) nested vapor probe installation and sampling, (5) grab ground water sampling, (6) indoor air sampling, and (7) active soil gas sampling. The following bullet lists present a synopsis of field sampling activities for the Northwest Area.

- On February 24 and 25, and March 1 and 4, 2004, 18 soil boring locations (ESB-30 through ESB-43) were advanced to sample surface soil and shallow soil at the soil/bedrock interface along the Site northwestern boundary and in the Northwest Area.

- Two on-site storm water runoff "sumps" were installed on February 26, 2004; one each in proximity to soil boring locations ESB-33 and ESB-34, as directed by DTSC. The sumps were designated as ESB-33A and ESB-34A. The sumps were monitored for the presence of water after each rainfall event. On March 2, 2004, sump ESB-34A contained sufficient water for a portion of the sampling requested by DTSC. On April 19, 2004 one sample from ESB-33A was collected for metals analysis. On October 21, 2004 surface runoff water samples were collected from both sumps, ESB-33A and ESB-34A.

- Two ground water monitoring wells were installed on March 3 and 4, 2004 at locations ESB-33 (MW-15) and ESB-34 (MW-14). The wells were sampled first on March 12 and 16, 2004, after which time they were included in the quarterly ground water monitoring program. They have since been sampled on April 6, July 21, October 11, 2004, January 24, 2005, and May 2, 2005.

- On March 16 and 17, 2004 active soil gas samples were collected at 8 locations (ESB-30 through ESB-37) along the Site boundary. Soil gas samples were collected and analyzed from depths of approximately 5 feet bgs, and at one location, ESB-34, a soil gas sample also was collected at approximately 12 feet bgs.

- On May 11 and 12, 2004, active soil gas sampling locations ESG-5 through ESG-14 were advanced along Golden West Lane. Target sampling depths were 5 feet and 12 feet bgs. Drilling refusal prevented reaching total intended depth at some locations.

- On June 14 through 17, 2004 additional soil gas sampling was conducted in the Northwest Area along Golden West Lane. The scope of work consisted of advancing 6 soil gas borings (ESG-18 through ESG-23), and 18 soil gas points (ESG-24, ESG-25, ESG-27 through ESG-30, ESG-32 through ESG-36, and ESG-38 through ESG-44) in proximity to selected residences on Golden West Lane. Target sampling depths were 5 feet and 12 feet bgs. Continuous coring for lithologic purposes was conducted at the following boring locations: ESG-18, ESG-23, ESG-25, ESG-27, ESG-28, ESG-29, ESG-37 and ESG-41.

- In September and October 2004, ENVIRON conducted permanent vapor probe installation on Golden West Lane in the Northwest Area. In addition, at the request of the DTSC, soil gas sampling was performed at the City of Norco High School football field, and at two residences (2301 and 2313 Hillside Avenue) located further west of the Northwest Area. Active soil gas samples were collected on September 21 and October 1, 2004 at the two residences on Hillside Avenue (Borings ESG-45 and ESG-46), and on September 28, 2004 at four locations on the city of Norco High School football field (Borings ESG-47 through ESG-50). Continuous coring for lithologic purposes was performed at two boring locations, ESG-46 and ESG-47. Active soil gas samples were collected at approximately 5 feet and generally at 15 feet bgs. On September 27, 2004, five permanent dual-nested soil vapor probes, designated as VW-1 through VW-5, were installed near selected residences on Golden West Lane. During drilling, ground water was encountered in Borings VW-1, VW-3, and VW-4. Prior to vapor well installation, grab ground water samples were collected from Borings VW-1 and VW-3. No samples were collected from VW-4 due to insufficient water. Soil gas sampling from the vapor probes was conducted on October 12, 2004. In addition, active soil gas sampling was conducted at boring location (ESG-51) located in the front yard of residence 2270 Golden West Lane. A permanent vapor probe was not installed at this location.

- On October 11 through 12, 2004, indoor air quality (IAQ) sampling activities were conducted at three residences; 2270, 2281 and 2297 Golden West Lane. Following receipt and evaluation of the analytical results for the IAQ sampling, an HVAC system test was performed on November 5, 2004 in the 2281 Golden West Lane residence. This test was conducted to assess whether operation of the HVAC system, with the

introduction of outside air, could be successful in controlling VOC soil gas concentrations within the residence. The test results proved positive in mitigating VOC concentrations in the home. As a result, a new HVAC system was installed on November 20 through 22, 2004. Confirmation 24-hour IAQ samples collected on December 1 and 2, 2004, provided evidence that HVAC modifications were successful in mitigating VOC soil gas concentrations. The last confirmation 24-hour IAQ sampling was conducted on May 25 and 26, 2005.

- In December 2004 and January 2005, 15 borings (ESG-52 through ESG-66) were advanced at the Northwest Area. Grab ground water samples were obtained at all but one location (ESG-57). Soil vapor probes were installed at 5 feet below ground surface (bgs) at all locations, and at 14.5 feet bgs at boring ESG-57. The results of the investigation indicated the presence of VOCs in ground water along Third Street, and in proximity to the intersection of Third Street and Hillside Avenue. The vapor probes first were sampled on May 3, 2005. Results indicated the presence of VOCs in soil gas along portions of Third Street, near the intersection of Third Street and Hillside Avenue.

- In January 2005, monitoring Wells MW-19 and MW-20 were installed along Golden West Lane. Total depth of the wells ranged from 20 to 25 feet bgs with screens set from 15 feet to 20 or 25 feet bgs. These wells were incorporated into the quarterly monitoring program and have been sampled twice since installation.

At the present time, ENVIRON is in the process of implementing additional investigations at the Northwest Area that will supplement the work described above. These tasks are fully described in the approved Remedial Investigation Work Plan, dated March 18, 2005.

3.0 NATURE, SOURCE, AND EXTENT OF CONTAMINANTS

3.1 Type, Source, and Location of Contaminants

TCE has been the main VOC detected in ground water samples collected from the Northwest Area. The highest TCE concentrations (≥10,000 micrograms per liter [µg/l]) were detected at the southern end of Golden West Lane in Well MW-14 and Boring VW-3 (Figures 2A and 2B). TCE also has been detected at concentrations ≥1,000 µg/l in ground water samples collected from borings ESG-54, ESG-61 through ESG-64, VW-1, and wells MW-15, MW-19 and MW-20. Tetrachloroethylene (PCE), 1,2-dichloroethane (1,2-DCA), *cis*-1,2-dichloroethene (*cis*-1,2-DCE), chloroform, carbon tetrachloride, naphthalene, trichlorofluoromethane (TCFM), benzene, and toluene are other VOCs detected in certain ground water samples at the Northwest Area. However, in all cases, these chemicals have been present at much lower concentrations when compared to concentrations of TCE.

Other compounds detected in ground water collected at the Northwest Area include N-Nitrosodimethylamine (NDMA), perchlorate, and volatile fuel hydrocarbons (VHF). However, since VOCs are the only chemicals with the ability to partition from ground water to soil gas, the Presumptive RAW focuses on mitigating the potential for intrusion of VOCs into indoor air within residences at the southern terminus of Golden West Lane. Consistent with the RAO, ground water is not considered as part of this RAW.

3.2 Extent of Soil Vapor Contamination

TCE found in soil gas is believed to originate from TCE-impacted ground water through vapor partitioning. Generally, soil gas concentrations are highest in areas where ground water TCE concentrations are most pronounced. This is true at the southern terminus of Golden West Lane where the highest concentrations of TCE in ground water have been detected. As depicted on Figure 2, shallow soil gas VOC concentrations decline steeply along Golden West Lane with increasing distance from the Site. The highest soil gas concentrations are detected at the southern terminus of Golden West Lane. Previously, in October of 2004, ENVIRON conducted IAQ sampling at the three residences located in proximity to the highest detected soil gas concentrations. The results of the IAQ sampling indicated vapor intrusion in only one home, which was mitigated through installation of a new HVAC system. In April of 2005, ENVIRON repeated the IAQ sampling in the three homes. Sampling results indicated the absence of vapor intrusion in all three homes (the HVAC system in the one home proved effective in mitigating

vapor intrusion). Therefore, with the exception of one home, the presence of VOCs in soil gas at the southern terminus of Golden West Lane, does not appear to be a significant vapor intrusion pathway. Nevertheless, DTSC asked Wyle to prepare a RAW to mitigate the potential for migration of VOCs from soil gas into residences in this area. Consequently, this presumptive RAW was prepared, as an IRM, to address the potential for migration of VOCs from soil gas into residences located at the southern terminus of Golden West Lane.

3.3 Health Effects of Contaminants

Previous investigations identified the presence of VOC concentrations in soil gas that may pose a potential concern should subsurface vapor enter the indoor air of homes at the southern terminus of Golden West Lane. Possible health effects associated with inhalation of VOCs, specifically TCE, PCE, *cis*-1,2-DCE, and benzene, may include cancer, liver and kidney damage, respiratory impairment, and damage to the central nervous system.

3.4 Targets Potentially Affected by the Site

Based on the current land use of the Northwest Area, populations that could potentially be exposed to VOCs in soil gas are residents of the Northwest Area.

3.5 Additional Site Investigations

Detailed hydrogeologic studies are planned for the Northwest Area, some of which are being implemented, and will be conducted as part of Remedial Investigations planned for the Site and surrounding area. These studies will allow for a greater understanding of the parameters governing subsurface controls on contaminant transport, including the significance of fracture flow in bedrock, thereby allowing for development of a comprehensive remedial approach. These ongoing investigations are described in the approved RI Work Plan dated March 18, 2005 and in the RI Work Plan Addendum, submitted to DTSC on March 15, 2005, for which Wyle is awaiting DTSC approval.

4.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

The initial step in the identification and screening of general response actions and technologies is to formulate RAOs. RAOs are media-specific (i.e., soil gas) objectives designed to protect human health and the environment from releases and exposures to hazardous substances. RAOs incorporate information on contaminants of concern, potential exposure pathways, and chemical/media-specific cleanup goals.

RAOs reflect a preference for permanent solutions, incorporating approaches, where feasible and appropriate, which will reliably reduce toxicity, mobility, or volume of contaminants. This section also includes brief discussion of Applicable or Relevant and Appropriate Requirements (ARARs).

4.1 Removal Action Objectives/Goals

For purposes of the Presumptive RAW, ENVIRON, at the direction of DTSC, developed an RAO to remove TCE-impacted soil gas originating from shallow ground water at the southern terminus of Golden West Lane in the Northwest Area. This removal action is thought appropriate by DTSC until additional investigations at the Northwest Area are complete. As an IRM, the RAO is protective of human health and the environment. The RAO for the Presumptive RAW is as follows:

- To mitigate VOC-impacted soil gas and reduce the potential for indoor air intrusion to residences at the southern terminus of Golden West Lane in the Northwest Area.

RAOs should also, "to the extent practicable considering the exigencies of the situation," be consistent with ARARs (40 CFR Part 300, Paragraph 300.415 (j)). As defined under CERCLA, ARARs are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limits set forth under federal or state law that specifically address problems or situations present at CERCLA sites. Generally, ARARs are major considerations in setting cleanup goals, selecting a remedy, and determining how to implement that remedy at a CERCLA site. As previously stated, the remedial action proposed in the Presumptive RAW is specific to the removal of VOCs from soil gas beneath a selected portion of

the Northwest Area. Based on ENVIRON's review of available ARARS, none are directly solely for soil gas removal. Therefore, ARARs are not considered in the Presumptive RAW.

4.2 Statutory Limits on Removal Action

Sections 25323.1 and 25356.1(h) of the California Health and Safety Code (H&SC) state that a site is exempted from the requirement for a remedial action plan if DTSC approves a non-time-critical removal action at a site and the estimated cost of the removal action is less than $1,000,000. The removal action alternatives for the Northwest Area are estimated to cost less than this limit and therefore this RAW has been prepared.

5.0 ENGINEERING EVALUATION/COST ANALYSIS

The purpose of this section is to identify presumptive remedial technologies applicable to the Northwest Area; to develop and formulate alternatives based on these selected technologies; and to evaluate relevant information concerning each of the removal action alternatives. Additional remedial investigations and remedial actions, if required, will be addressed as data from on-going investigations becomes available and as a clear understanding of contaminant distribution and migration at the Northwest Area is developed. This section presents a summary and screening evaluation of technologies that may be applicable to attain the RAO at the Northwest Area.

Based on discussions and correspondence with DTSC, as well as a review of available information and data evaluations conducted to support the RAW, key features to be considered in developing remediation alternatives for soil gas in the Northwest Area are as follows:

- Ground water has been impacted by the release of VOCs (primarily TCE), emanating from the Site.

- Current concentrations of TCE in soil gas range from below laboratory reporting limits (RLs) of up to 180 µg/l. The historic maximum concentration of TCE in soil gas is 910 µg/l and it was detected at vapor well VW-1.

- Other VOC contaminants found in soil gas, at significantly lower concentrations and detection frequencies, include PCE, 1,2-DCA, cis-1,2-DCE, chloroform, carbon tetrachloride, naphthalene, TCFM, benzene, and toluene.

- IAQ sampling at three residences indicated vapor intrusion into only one residence. Indoor air was mitigated through installation and operation of a new HVAC system.

Based on this information, three presumptive remedies, plus the ”no action” alternative, were initially evaluated for mitigation of VOCs in soil gas beneath and in the immediate vicinity of selected homes at the southern terminus of Golden West Lane at the Northwest Area. These alternatives are discussed in the sections that follow.

5.1 Presumptive Removal Action Alternatives

Four presumptive remedial alternatives were identified for removal of VOCs from soil. These alternatives are listed below.

- No Action
- Soil Vapor Extraction
- *Ex Situ* Thermal Desorption
- *Ex Situ* Incineration

VOCs in soil gas at the Northwest Area are thought to be present in the interstitial pores and generally not adsorbed to soil particles. Thermal desorption and incineration consist of soil treatment, and do not specifically address soil gas. Since the source of VOC contaminants is recognized to be ground water, soil-specific remedial technologies would not be effective in addressing the RAO. Therefore of the three remediation technologies listed above, only SVE is appropriate to meet the RAO. Additionally, SVE is the preferred presumptive technology of the USEPA (1993a, 1996a). Therefore, RA-3 and RA-4 are eliminated from further consideration.

5.1.1 RA-1 – No Action

Remedial Alternative 1 (RA-1) is the No Action Alternative. In this alternative, it is assumed that no removal action occurs at the Northwest Area. In certain cases, low risk VOC sites are ready for closure when the source has been removed or remediated, the site characterization is complete, no sensitive receptors have been or are likely to be affected, and the risks posed have been evaluated. Typically the DTSC will not consider the No Action Alternative for VOC-impacted sites unless steps have been taken to remove VOCs from soil and ground water source areas to the extent that it is cost effective. In this case, feasible removal actions have not yet been taken to address the VOC-impacted ground water at the Northwest Area. Thus, it is unlikely that RA-1 will be acceptable for VOC-impacted soil gas at the Northwest Area.

5.1.2 RA-2 – Soil Vapor Extraction

Remedial Alternative 2 (RA-2) consists of physically removing volatile contaminants from vadose zone soils by inducing air flow through the soil matrix, and *Ex-Situ* treatment of extracted vapors. Vapor wells are used as extraction wells for removal of vadose zone soil vapors. Extracted vapors are treated by granular activated carbon (GAC) and discharged to the atmosphere under a South Coast Air Quality Management District (SCAQMD) permit. As required, the spent GAC is transported to an off-site facility for regeneration by thermal desorption during which VOCs are destroyed. RA-2 is the USEPA preferred presumptive remedial alternative for sites with VOCs in soils and in soil gas (1993a, 1996a).

5.2 Evaluation Criteria

The Presumptive RAW presents an evaluation of RA-1 and RA-2 on the basis of three screening criteria: effectiveness, implementability, and cost. Use of the three screening criteria is consistent with DTSC guidance (1998)

5.2.1 Effectiveness

This criterion examines the ability of RA-1 and RA-2 to meet the RAO. In the effectiveness evaluation, the following factors are considered:

- Overall protection of human health and the environment
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume through active treatment
- Short-term effectiveness

5.2.2 Implementability

Implementability is assessed by considering the technical and administrative feasibility of RA-1 and RA-2, as well as the availability of needed goods and services. Other considerations include the ability to construct and operate remedial facilities, ease of undertaking additional remedial actions, ability to monitor remedial effectiveness, and ability to obtain needed approvals and permits.

5.2.3 Cost

This criterion evaluates the estimated capital costs of RA-1 and RA-2, as well as annual operation and maintenance (O&M) and periodic costs, if appropriate. The cost for the Presumptive RAW is developed for 12 months, therefore, no discounting of costs will be necessary.

5.3 Analysis of Alternatives

5.3.1 RA-1 – No Action

This alternative is included to provide a baseline for evaluating the other alternatives. In this alternative, it is assumed that no removal action occurs at the Northwest Area.

5.3.1.1 RA-1: Effectiveness

Typically, assessment of overall protection of human health and the environment is based largely on the degree of certainty that an alternative can meet the established site RAO, meet the short- or long-term effectiveness criteria, or reduce toxicity, mobility, or volume of VOCs. As discussed in Section 4.1, the RAO for the Northwest Area is to:

- To mitigate VOC-impacted soil gas and reduce the potential for indoor air intrusion to residences at the southern terminus of Golden West Lane in the Northwest Area.

RA-1 does not include any active removal steps; therefore, the VOC-impacted soil gas will continue to be present in the Northwest Area. Therefore, RA-1 does not address the RAO, meet the short- or long-term effectiveness criteria, reduce toxicity, mobility or volume of VOCs, and is not protective of human health or the environment.

5.3.1.2 RA-1: Implementability

Because there is no action under RA-1, the criterion of technical implementability does not apply. The criterion of administrative implementability is not met

because feasible removal actions have not yet been taken to address the VOC-impacted ground water at the Northwest Area.

5.3.1.3 RA-1: Cost

There are no costs associated with RA-1.

5.3.2 RA-2 – Soil Vapor Extraction

5.3.2.1 RA-2: Effectiveness

RA-2 will involve the active removal of soil gas at the Northwest Area; therefore, it will address the RAO of reducing the concentration of VOCs in soil gas at the Northwest Area. This remediation alternative will accomplish the reduction of VOC concentrations in soil gas and therefore reduce the potential for indoor air intrusion. Therefore, RA-2 will affect the toxicity and mobility of VOCs in soil gas, and during operation, will be effective immediately. RA-2 will be protective of human health and the environment. However, this alternative will not adequately address the long-term effectiveness criterion, since it does not address the source of VOCs, ground water.

5.3.2.2 RA-2: Implementability

RA-2 requires the installation of soil vapor extraction wells to actively remove soil vapor from the subsurface and the installation of permanent soil vapor probes to monitor the effectiveness of RA-2 at the southern terminus of Golden West Lane in the Northwest Area. In addition, piping will be installed to connect the wells to the treatment unit. Vapor extraction wells, probes, and piping will be installed on private property. Residents may experience inconvenience during well and piping installation, and to a lesser extent during routine maintenance and vapor sampling.

The treatment unit, including GAC vessels for *ex-situ* treatment of extracted soil vapor will be located on Wyle property. The unit will be operated under an SCAQMD permit. All equipment needed for this alternative is commercially available, and the permits are available with standard applications and set fees. This alternative assumes that depth to ground water will drop to more than 10 feet

bgs prior to implementation. Recent ground water measurements suggest that water levels are declining in the North West Area (Table 1).

5.3.2.3 RA-4: Cost

The total estimated cost associated with implementation of RA-2 is approximately $550,000. This cost assumes that the soil vapor extraction system will operate for 12 months. This cost also includes the installation of up to 9 additional vapor extraction wells and 6 additional permanent nested vapor probes at the Northwest Area.

6.0 COMPARATIVE ANALYSIS

Two of four removal action alternatives described in Section 5.0 are subjected to comparative evaluation in this section (RA-1 and RA-2). As part of the comparative analysis, these alternatives are also rated relative to each other. Rating points are then assigned based on each alternative's ability to meet the evaluation criteria.

6.1 Effectiveness

Up to 4 rating points are assigned under the effectiveness criterion. One point is assigned for satisfying each of the following factors: protection of human health and the environment; long-term effectiveness; reducing toxicity, mobility and volume; and short-term effectiveness.

RA-1, No Action: This alternative, rated the lowest in effectiveness, is presented as a baseline case and includes only remedial actions that have already been implemented at the Northwest Area. This alternative does not address RAOs or meet the short-term effectiveness criterion. Furthermore, because no additional work is conducted under this alternative, there would be no protocol on evaluating the reduction of VOCs in soil gas or long-term effectiveness. Therefore, no points were awarded to RA-1 under the effectiveness criterion.

RA-2, Soil Vapor Extraction: RA-2 addresses the RAO by the removal of VOCs from soil gas beneath and in the immediate vicinity of selected homes. RA-2 does not provide long-term effectiveness and permanence. However, given the treatment processes involved under RA-2, it is anticipated that once implemented and operational, RA-2 will immediately reduce the toxicity and mobility of VOCs in soil gas, thereby protecting human health and the environment. As a result, RA-2 was assigned three of four points because it meets three subcriteria under effectiveness.

6.2 Implementability

Up to 3 rating points are assigned under this criterion. One point is assigned for satisfying each of the following factors: ease of technical/administrative feasibility; availability of goods and services; and, ease of construction/operation of remedial facilities.

RA-1, No Action: This alternative is easily technically implementable, as it requires no action. However, it is not administratively implementable because feasible removal actions have not yet been taken to address the VOC-impacted ground water at the Northwest Area. Additionally, the effectiveness of the alternative cannot be monitored because no action takes place. One rating point was assigned to RA-1.

RA-2, Soil Vapor Extraction: RA-2 requires installation of 9 soil vapor extraction wells, the installation of additional permanent nested soil vapor points, as well as trenching for piping, and the construction of an extraction and treatment system. Furthermore, well permits, as well as permits for discharge of treated vapors will need to be obtained. All equipment needed for this alternative is commercially available, and the permits are available with standard applications and set fees. However, given the residential nature of the Northwest Area, installation of wells and piping, and placement and operation of the equipment may be an inconvenience to the residents and may present a challenge. Therefore, two rating points are assigned to RA-2.

6.3 Cost

Up to three rating points were assigned under this criterion. Three points are assigned if the cost is less than $300,000 to implement the alternative; two points are assigned if the cost to implement the alternative is between $300,001 and $600,000; one point assigned if the cost to implement the alternative is between $600,001 and $800,000; and no points assigned if the cost to implement the alternative exceeds $800,001. A cost summary of the remedial action alternatives is provided in Table 3. A detailed cost breakdown for both RA-2 is provided in Appendix A.

RA-1, No Action: There are no costs associated with implementation of RA-1. Three points were assigned.

RA-2, Soil Vapor Extraction: The total estimated cost associated with implementation of RA-2 is approximately $550,000. This cost assumes the installation of up to nine vapor

extraction wells and six permanent nested vapor probes at the Northwest Area. Furthermore, this cost includes the operation and maintenance of two SVE and treatment systems at the Northwest Area. Two points were assigned.

6.4 Rating Summary and Recommended Alternative

As shown in Table 4, the sum of the ratings shows that RA-2, Soil Vapor Extraction as the highest rated alternative with 7 points, with RA-1, the No Action Alternative receiving 4 points.

The rating summary considers RA-2, Soil Vapor Extraction, to provide the most time- and cost-sensitive response to reducing the concentration of VOCs in soil gas beneath and in the immediate vicinity of selected residential homes in the Northwest Area.

7.0 IMPLEMENTATION PLAN

This section presents the implementation plan for the recommended removal action alternative, RA-2, Soil Vapor Extraction, to address the VOC-impacted soil gas beneath and immediate proximity to selected residences at the southern terminus of Golden West Lane in the Northwest Area (see Figures 2A and 2B). It is anticipated that RA-2 will be implemented over a 12-month time period until additional data is gathered from on-going investigations to support additional IRMs or permanent remedial actions are conducted as part of the DTSC Consent Order. The implementation schedule for this presumptive RAW is provided on Figure 6. All field activities will follow the Health and Safety Plan (HASP) for the Site, included in Appendix B. A Transportation Plan, included as Appendix C, provides procedures for transportation and off-site disposal of impacted soils encountered during remedial action implementation.

7.1 Documentation

ENVIRON personnel working at the Northwest Area will document field activities conducted during implementation of the Presumptive RAW. 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. Additional details are provided in the Quality Assurance Project Plan (QAPP) presented in Appendix D and Attachments D.1 through D.7.

7.2 Utility Clearance

Prior to initiating field work, all boring and excavation locations (proposed SVE wells, permanent vapor probes, and trenching, see Figure 5) will be cleared for the presence of underground pipes and utilities. In addition, Underground Services Alert (USA) will be notified and will mark utilities at the Northwest Area.

7.3 Soil Vapor Extraction

Because SVE is a proven technology for mitigation of VOCs in soil and soil gas, because this remedial action is an IRM until a more permanent solution is developed, and because it is Wyle's

intent (per DTSC instruction) to implement the SVE remedy in an expeditious manner, the implementation plan does not include a pilot test. ENVIRON used both professional judgment and previous field experience, as well as existing soil gas data in designing the proposed SVE system. Assumptions made during SVE design include a radius of influence (ROI) of 30 feet. Specific design parameters will be discussed further in the O&M Plan to be prepared under separate cover per the schedule presented in Figure 6.

During the startup of the SVE system at the Northwest Area, the system will be monitored and, if necessary, modified (e.g., number and location of wells, applied vacuum) to address Site-specific conditions. Mitigation of soil gas in these areas will address only VOCs in soil gas only. Based on the current VOC concentrations in ground water at the Northwest Area, it is not expected that SVE will provide a permanent solution to VOCs in ground water or soil gas during its estimated 12 month operation. However, at the request of DTSC, and consistent with the RAO, it will provide mitigation for the potential migration of VOCs to indoor air at the locations of highest known soil gas concentrations, and can be operated longer than 12 months, if necessary

To facilitate application of SVE to the designated areas, one SVE system, consisting of nine SVE extraction wells, connecting piping, and one extraction/treatment units will be used to remove and treat VOCs in soil gas. The system will be monitored using the five existing nested vapor probes, along with six new nested vapor probes that will be installed during system construction activities. A generalized Process Flow Diagram (PFD) is presented in Figure 7.

7.3.1 System Design, Technical Specification Preparation, Permitting, and Equipment Procurement

ENVIRON has extensive experience in applying SVE technology to sites impacted with VOCs under the supervision of various regulatory agencies, including USEPA (Stringfellow in Glen Avon, California), Santa Ana RWQCB (various industrial sites), and the Los Angeles RWQCB (various industrial sites).

Based on ENVIRON's knowledge of Site conditions and the concentrations of VOCs in soil gas, the SVE extraction/treatment unit will be equipped with vacuum blowers with 40 or 50 horsepower motors capable of producing vacuums of up to 25 inches of mercury (in. Hg) and vapor flow rates of up to 500 standard cubic feet per minute (scfm). The SVE treatment system will be connected to nine proposed extraction wells as shown on Figure 5. The extraction wells will be screened from 5 to 10 feet bgs, to mitigate shallow soil gas, avoid short-circuiting to the atmosphere, and minimize the potential for shallow ground water levels to hinder the performance of the proposed SVE system.

The SVE extraction/treatment unit will be skid- or trailer-mounted and installed on Wyle property in proximity to the Northwest Area (Figure 5). The selected manufacturer will provide SVE treatment units that comply with designed specifications mentioned above. Detailed design specifications will be provided in the operation and maintenance (O&M) plan for the SVE system.

The skid-mounted extraction/treatment unit will be equipped with a heat exchanger for humidity control and to increase efficiency of the carbon adsorption. The skid-mounted extraction unit will be connected to a treatment system consisting of two 1,000-pound vapor-phase GAC vessels installed in series to treat the extracted soil vapors. The treated soil vapors will be discharged to the atmosphere under SCAQMD permit. Condensate water that may be generated will be collected, stored in a holding tank and transported to one of the treatment compounds at the Site for treatment and discharge under the existing NPDES permit. The condensate holding tank will be equipped with level alarms to shut down the extraction unit when high alarm condition is triggered. Once a week, or as often as necessary the condensate water will be transported to one of the compounds for treatment and discharge. A vacuum truck will be used for condensate water transportation. See Figure 7 for view of a generalized PFD.

During this task necessary permits will be obtained to install and operate the SVE system (i.e., SCAQMD and encroachment permits). It is anticipated that the SCAQMD will require weekly monitoring of the influent and effluent vapor streams using a photoionization detector (PID) and monthly sampling and laboratory analysis of the effluent vapor stream for VOCs by USEPA Method TO-14A/TO-15 (or equivalent).

The discharge limits for the condensate water will be in accordance with the existing RWQCB NPDES permit. In addition, this task will include the selection of vendors and installation and maintenance subcontractors.

7.3.2 Soil Vapor Extraction Wells and Permanent Vapor Probes

ENVIRON plans to install nine SVE wells (screened from 5 to 10 feet bgs) for extraction of soil vapors, and six additional permanent vapor probes for monitoring of soil gas, at the Northwest Area. Figure 5 shows the intended locations of these SVE wells, piping, and permanent vapor probes. Appendix D, Attachments D.2, D.3, D.4, and D.5, provide protocols for the drilling and backfilling of soil borings, soil vapor extraction well

installations, permanent vapor probe installations, and vapor probe sampling. Appendix D, Figures D-4 and D-5, provide diagrams depicting typical vapor extraction well construction and typical nested vapor probe construction.

7.3.3 System Installation and Start-up

Following the receipt of the appropriate permits, the SVE system will be installed. An installation contractor will be retained to conduct the trenching and connections, and to install the equipment, the SVE well heads, and participate in the start-up activities.

The piping between the wells and the SVE system will be installed in trenches that are approximately 3 feet below ground surface and will consist of standard 2-inch diameter, Schedule 40 polyvinyl chloride (PVC). Soil removed from the trenches will be field screened using a PID, and assuming innocuous field-screening results, such soil will be placed back into the trenches once the piping has been laid. Trenches on public right-of-way will be backfilled with 2-sack slurry and finished to match the existing grade. If field-screening results indicate the potential presence of VOCs in soils, such soil will be segregated, stockpiled on the Wyle property in a secure area, and tested for the presence of VOCs using USEPA Method 8260B. If VOCs are not detected, the segregated soil will be either reused during SVE system installation or spread on the Wyle property. If VOCs are detected, the segregated soil will be transported to an off-site disposal facility following the Transportation Plan, included as Appendix C. ENVIRON will minimize the trenching activities by installing above ground piping on the Wyle property. All trenching activities will be monitored for dust and if appropriate dust mitigation will be implemented as specified in Appendix D.

An electrical contractor will be hired to perform the electrical connections. The skid-mounted extraction unit and treatment system (GAC vessels), will be installed on a concrete pad. When the system installation is completed, equipment will be checked for proper operation, and piping and fittings will be checked for leaks by low pressure testing. An initial assessment of the system's effectiveness and efficiency will be conducted during the start-up period, which may continue for approximately one month. Additionally, prior to start-up of the system, one round of IAQ sampling will be performed at the three residences on Golden West Lane, simultaneously with sampling of the vapor probes (see Figure 6 for schedule). All samples will be analyzed for VOCs by USEPA Method TO-14A/TO-15.

During this initial period of operation, the mechanical components of the system will be monitored to assess whether the system is operating properly and to ensure compliance with discharge limits specified in the SCAQMD permit. If necessary, corrective measures, such as the addition of GAC vessels for treatment of extracted vapors, will be implemented. Information gathered during the start-up period will be used to modify system operations. The monitoring data will be used to evaluate chemical recovery rates and the efficiency of the SVE system. During startup activities, it is expected that up to 10 vapor samples will be collected from the influent ports of each extraction unit. The vapor samples will be analyzed for VOCs by USEPA Method TO-14A/TO-15.

Historically, water levels in the Northwest Area near the southern terminus of Golden West Lane were on the order of 12 to 15 feet bgs. Due to the recent record rainfalls, water levels have risen, and reached maximum elevations (4 to 5 feet bgs) in April 2005. Water levels have declined steadily since that time (see Table 1). The rise in ground water levels were discussed extensively during the May 20, 2005 meeting with DTSC and all parties recognized that water levels must decline if SVE operation is to proceed. Therefore, depending on the rate of continued decline in ground water, it is possible that shallow ground water levels may delay or impede the operation of the proposed SVE system. As discussed with DTSC during the May 20, 2005 meeting, water levels will need to drop, to approximately 12 feet bgs at the locations of SVE wells, before the SVE system can become operational. This will be discussed further in the O&M Plan to be prepared under separate cover per the schedule presented in Figure 6.

7.3.4 System Operation and Maintenance Program

It is intended that the systems will operate on a 24-hour basis; however, the system design will include built-in alarms and shutdown mechanisms (details to be provided in the O&M plan) should the system malfunction. The extraction system will be equipped with telemetry to enable ENVIRON to be informed of system operations while not at the Site, including system shutdowns. ENVIRON personnel or the subcontractor will respond to the shutdown by visiting the Site, inspecting/repairing the equipment as necessary, and restarting the system.

The O&M Plan will contain information on contact telephone numbers, equipment specifications and manuals, startup/shutdown procedures, monitoring/sampling procedure forms, permits, and as built-drawings. This plan will be developed while DTSC is

performing its CEQA analysis and the RAW is undergoing public review. The O&M plan will be provided to DTSC for its review/approval prior to installing the SVE system.

The Site will be inspected weekly to make adjustments and/or repairs, as needed, and monitor the system including recording operating parameters, and collecting system performance/compliance air samples. On a weekly basis, ENVIRON will collect vapor samples from the influent and effluent ports of each extraction unit and monitor the samples using a PID. On a bi-weekly basis, vapor samples will be collected from the influent port of each extraction unit to evaluate the performance of the systems. On a monthly basis, vapor samples will be collected from the effluent port of the each extraction unit to comply with the SCAQMD permit restrictions. The collected samples will be to California state-certified laboratory for analysis, under standard chain of custody protocols. The vapor samples will be analyzed for VOCs by USEPA Method TO-14A/TO-15.

All soil vapor activities will follow procedures to be established in the O&M Plan and those presented in the Quality Assurance Project Plan (QAPP, included as Appendix D).

7.3.5 Performance Evaluation and Reporting

On a monthly basis, ENVIRON will collect vapor samples from the monitoring probes and analyze for VOCs by USEPA Method TO-14A/TO-15. During the first three months of operation, ENVIRON will submit monthly reports to describe the status of the SVE system, a summary of operating conditions, and the results of the vapor probe sampling. Thereafter, reports will be submitted on a quarterly basis. Information in these reports will include:

- Hours of operation during the reporting period;
- Flow rates and vacuum;
- Influent and effluent concentration of VOCs in the extracted vapors;
- Summary of non-routine repairs or modifications, if any;
- Date and time of sampling;
- Mass removal rates and total mass removed;
- A table summarizing the laboratory results, and
- Laboratory results and chain-of-custody documents.

As part of the performance evaluation, modifications will be made to enhance the SVE system performance.

8.0 LIMITATIONS

This Presumptive RAW has been prepared exclusively for use by Wyle Laboratories, Inc. and DTSC and may not be relied upon by any other person or entity without ENVIRON's express written permission. The remedial approach presented in this Presumptive RAW was based upon conversations and correspondence with DTSC and ENVIRON's professional judgment based on the information available to us at the time of preparation, and is true and correct to the best of ENVIRON's knowledge as of the date of this Presumptive RAW. Nevertheless, this Presumptive RAW is accurate and complete only to the extent that information provided to ENVIRON was itself accurate and complete.

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TABLES

F I G U R E S

A P P E N D I X A

Detailed Cost Breakdown of Removal Action Alternatives

A P P E N D I X B

Health and Safety Plan

A P P E N D I X C

Transportation Plan

A P P E N D I X D

Quality Assurance Project Plan