CONVERSE CONSULTANTS
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July 26, 1995

Mr. Luis Lodrigueza
Hazardous Waste Specialist
Orange County Health Care Agency
2009 E. Edinger Avenue
Santa Ana, California 92705

Subject: **Corrective Action Plan (CAP)**

Site Location: Fullerton Business Park North
1551 East Orangethorpe Avenue
Fullerton, California
OCHCA Case # 94IC29
Converse Project No. 94-42871-05

Dear Mr. Lodrigueza:

Converse Consultants Orange County (Converse), on behalf of Red Eagle Properties, is pleased to submit this Corrective Action Plan (CAP) describing a remedial approach to reduce the concentrations of tetrachloroethene (PCE) in the soil under the former clarifier and existing building. For site vicinity, see Figure 1.

This remedial approach is based on data presented in the Converse Summary Report of Additional Site Characterization, dated May 18, 1995.

Background

Two onsite clarifiers were discovered during a previous Preliminary Site Assessment of the subject property in 1992. The clarifiers were located in the northeast section of the property, on the south east side of the existing warehouse. The clarifiers were removed in September 1994. Chemical analyses of a soil sample collected from below the southern-most clarifier revealed elevated Total Recovery Petroleum Hydrocarbons (TRPH) and Tetrachloroethene (PCE) concentrations. No detectable soil contamination was reported from the soil sample collected from below the northern-most clarifier (Converse, 1994).

Converse sampled soil to a depth of 40 feet bgs at a total of 11 locations, and to a depth of 115 feet bgs at two additional locations. Groundwater was encountered at about 114 feet bgs. Based on the results of soil sample chemical analyses, the higher reported PCE concentrations (greater than 180 ppb) in samples analyzed from the site appear to be within the top 35 feet of soil, with the highest concentrations reported in samples from near the middle to base of a silty sand located at about 20 to 25 or 30 feet bgs, and the top of the clays and silts that directly underlie the silty sand. It is believed that the silts and clays located at about 25 or 30 to 35 feet bgs have acted as a partial barrier to the downward migration of the bulk of the contamination, and may have contributed to some minor lateral migration along the tops of these units (Converse, 1995).

The highest reported PCE concentrations in borings BH-14 and BH-15 (previously drilled and sampled to 115 feet bgs at the site) occurred consistently at about 60 feet bgs in soil directly above an approximately 10- to 15-foot thick, low permeability clay. Approximately 50 feet of soil with non-detectable PCE-concentrations were identified beneath the low permeability clay and above the groundwater table. Based on these data, we have concluded that groundwater beneath the site was NOT impacted by a release of PCE from the former clarifier, and the base of the PCE-impacted soil defined at about 60 feet bgs (Converse, 1995).

The lateral extent of PCE-impacted soil has not been defined to a non-detectable level. However, it has been determined that soil above 40 feet bgs, with relatively high PCE concentrations (in excess of 1,000 μg/kg) is confined to an area within 25 feet of the former clarifier, and soil with PCE concentrations greater than about 50 μg/kg has been defined to an area within approximately 50 feet of the former clarifier (Converse, 1995).

The estimated area of impact is approximately 1,200 square feet. The maximum PCE concentration was detected in the soil sample collected from below the former clarifier at a concentration of 27,000 parts per billion (or 27 ppm). Converse understands that the proposed work is necessary to develop an effective methodology to remediate the identified subsurface Tetrachloroethene (PCE) soil contamination located in the area of the former clarifier on the subject property.

At this time, and based on the results obtained to date, Converse recommends proceeding with a Corrective Action Plan to mitigate the PCE effected soils to regulatory acceptable concentrations. Leaving the PCE soil contamination in-place at the reported concentrations is not an alternative since it has been concluded that future occupants of the building could be exposed to PCE vapors.

This expedited remedial approach is presented at the request of Red Eagle Properties so that the new owner can secure financing for the building.

Remedial Options - Feasibility Evaluation

Converse understands that there are various methods to remediate the PCE soil contamination. Some common remedial options include excavation, leave in-place, in-situ bioremediation, and soil venting (soil vapor extraction system).

Excavation of the PCE contaminated soil would not be practical since the contaminated soils extend to depth of 25 to 35 feet below ground surface and is in an area of vehicle access for other businesses in the area. The soil contamination also extends to the west of the former clarifier under the building foundation. For this reason, all of the PCE contaminated soil could not be excavated (without jeopardizing the structural integrity of the existing building) and severely disrupting vehicle traffic in the area.

Leaving the PCE soil contamination in-place is not an alternative since it has been concluded that the excess lifetime cancer risk (ELCR) for occupants of the building is greater than the acceptable risk (OCHCA letter dated December 14, 1994).

Biodegradation is also not a viable alternative since the ability to biodegrade highly-chlorinated compounds (such as PCE) is a very complex process and PCE is resistant to aerobic biodegradation.

Based on the data collected to date, the proximity of the PCE soil contamination to the existing building, and the viability of other remedial alternatives, Converse believes that a cost effective approach to remediate the subsurface soils will be via a soil vapor extraction system (SVES). The extracted vapors will be passed through vapor phase, granular activated carbon (GAC) to comply with the emission regulations established by South Coast Air Quality Management District (SCAQMD).

PCE has a high vapor pressure (14 mm hg) and is very volatile. The subsurface soils, in the area of high soil contamination, consist of fine grained silty sands and clayey to sandy silts (with fine sand). The subsurface conditions and contaminant type are favorable for soil vapor extraction.

Generally, a 1 day vapor extraction test, or bench scale test would usually be conducted to collect data to estimate optimal blower size and to develop a cost effective vapor treatment method. But, at this site, with limited impacted area and relatively low PCE concentrations (less than 7 ppm) in the soil sample locations investigated (excluding the soil sample collected from below the former clarifier), Converse believes that a positive displacement blower and GAC will be sufficient to reduce the PCE soil concentrations to regulatory acceptable concentrations. Converse has estimated that 3 months of treatment system operation will be sufficient to reduce the PCE soil contamination to regulatory accepted concentrations.

Approach

Converse proposes to install two 4-inch diameter vapor extraction wells, with a hollow stem auger, at the locations presented on Figure 2. The wells will have a screened interval from approximately 10 feet to 39 feet bgs. The wells will serve as extraction locations and/or air infiltration locations.

Vapor Extraction Well Installation

A permit for the installation of the vapor extraction wells will be obtained from the Orange County Health Care Agency (OCHCA). OCHCA will be notified a minimum of 48 hours prior to drilling.

Converse will properly mark each well location in the field in accordance with Underground Service Alert (USA) requirements. USA will be notified a minimum of 48 hours prior to the field investigation.

The wells will be drilled to approximately 40 feet bgs based on the relatively high PCE concentrations reported at depths of 40 feet or less. The wells will be located in the vicinity of former borings BH-5 (and BH-5A) and BH-8, since the highest PCE concentrations were reported in samples from these two boreholes.

No soil samples will be collected for chemical analyses, since this area has already been characterized. The wells will be logged from the soil samples to confirm descriptions from the drilling of borings BH-5 (and BH-5A) and BH-8. Soil will be logged using the United Soil Classification System (USCS) by a Converse geologist working under the direct supervision of a State of California Registered Geologist.

Soil cuttings will be containerized in DOT approved, 55-gallon drums. The drums will be properly labelled, and stored onsite. Chemical analyses results from the borings BH-5 (and BH-5A) and BH-8 will be used to characterize the soil for disposal/recycling purposes. The soil should be transported offsite to a licensed disposal or recycling facility within 90 days of generation. All manifests will be signed by Red Eagle Properties.

Following drilling, the borings will be converted to vapor extraction wells. The wells will be constructed using 30 feet of 0.02-inch slotted, 4-inch diameter, Schedule 40 PVC casing, installed from 10 to 40 feet bgs. The wells will be completed from 10 feet bgs to the surface with 4-inch diameter blank, Schedule 40 PVC casing. The annulus surrounding the casing will be filled with No. 3 Monterey sand from 40 to 7 feet bgs. The remainder of the annulus will be sealed with bentonite. The wells will be completed at the surface with a 12-inch diameter, traffic rated, flush mounted will box set in concrete.

Soil Vapor Extraction System

The proposed vapor extraction system will include a 200 scfm positive displacement blower and 2-1,000 lb granular activated carbon vessels (in series). The remedial equipment has a current permit to operate, as issued by SCAQMD.

Initially, the system will extract vapors from the well (VE-1) located in the area of highest detected PCE concentrations. The well will be initially packed off at a depth of 20 feet bgs to maintain an air flow field in the area of highest detected PCE soil contamination. Converse will monitor the extraction vacuum at well VE-1, the effected vacuum at the other well location, and the influent and effluent vapor concentration for the GAC system. The initial data will serve to estimate the effective radius of influence and the air flow field for the extraction well and applicability of the GAC treatment method.

After evaluation of the initial extraction well radius of influence data, if necessary, Converse will install an additional extraction well to effect the area of PCE soil contamination.

Scope of Services

In accordance with our understanding of the project and our contract with Red Eagle Properties, Converse will perform the following scope of services:

- Prepare of a site specific Health and Safety Plan to be implemented during on-site activities.
- Obtain well permits from OCHCA.
- Install two-4 inch diameter vapor extraction wells to a total depth of 40 feet bgs.
- Install and operate a soil vapor extraction and treatment system for a period up to three months after startup.
- Collect necessary data (i.e. influent and effluent vapor concentrations for the GAC, vacuum readings at the extraction well and the air infiltration wells) to estimate the effectiveness of the system, and monitor compliance with the SCAQMD permit requirements.
- Prepare summary reports to document the effectiveness of the system. A initial progress report will be submitted 4 to 6 weeks after system startup and a second report will be submitted at the end of the three month period.

If the influent vapor concentration from the extraction well field decrease significantly, and asymptotically approach zero, Converse will shut down the system for one week. The system will be restarted and influent vapor concentrations will be monitored. If there is no restart spike, Converse will request closure. If a restart spike is observed, then the system operation will continue.

The remedial objectives for the site include the reduction the previously identified PCE soil contamination to regulatory acceptable concentrations. Based on our recent discussions, closure can only be granted after compliance soil samples have been collected and analyzed. If the analytical results reveal a reduction of PCE contamination (at the previously sampled locations), and the remaining PCE concentrations do not pose an unacceptable Excessive Lifetime Cancer Risk to occupants of the building, then Converse assumes closure can be granted.

At the end of the three month remedial system operation period, if the vapor extraction system monitoring data reveals a significant reduction of PCE vapors to the treatment system, Converse will conduct the following tasks:

- Conduct compliance sampling at an estimated 3 locations. The sampling locations, depths and number of samples to be analyzed will be presented in our second summary report.

If closure is granted, based on the compliance sample analytical results, Converse will conduct the following services:

- Abandon the 2 vapor extraction wells in accordance with OCHCA guidelines.

- Prepare a closure report describing our findings during the remedial activities and the compliance sampling. Converse will include descriptions of field methods used, and a summary of the results.

If you have any questions or comments relative to this Corrective Active Plan, please contact Henry Ames at (714) 453-2880.

Sincerely,

CONVERSE CONSULTANTS ORANGE COUNTY

Henry B. Ames
Senior Geologist

Gary S. Salzman
President

HBA/GSS:vy

Encl: Figure 1 - Vicinity Map
Figure 2 - Site Plan

Dist: Mr. Carl Ross - Red Eagle Properties
Mr. Mark Boen - Red Eagle Properties
Mr. Augustine Anijielo - Santa Ana Regional Water Quality Control Board

Reference: U.S.G.S Topographic Map, 7.5 Minute Series, Anaheim, California Quadrangle, Dated 1965, (Photorevised 1981).

0 2000 4000

SCALE IN FEET

VICINITY MAP

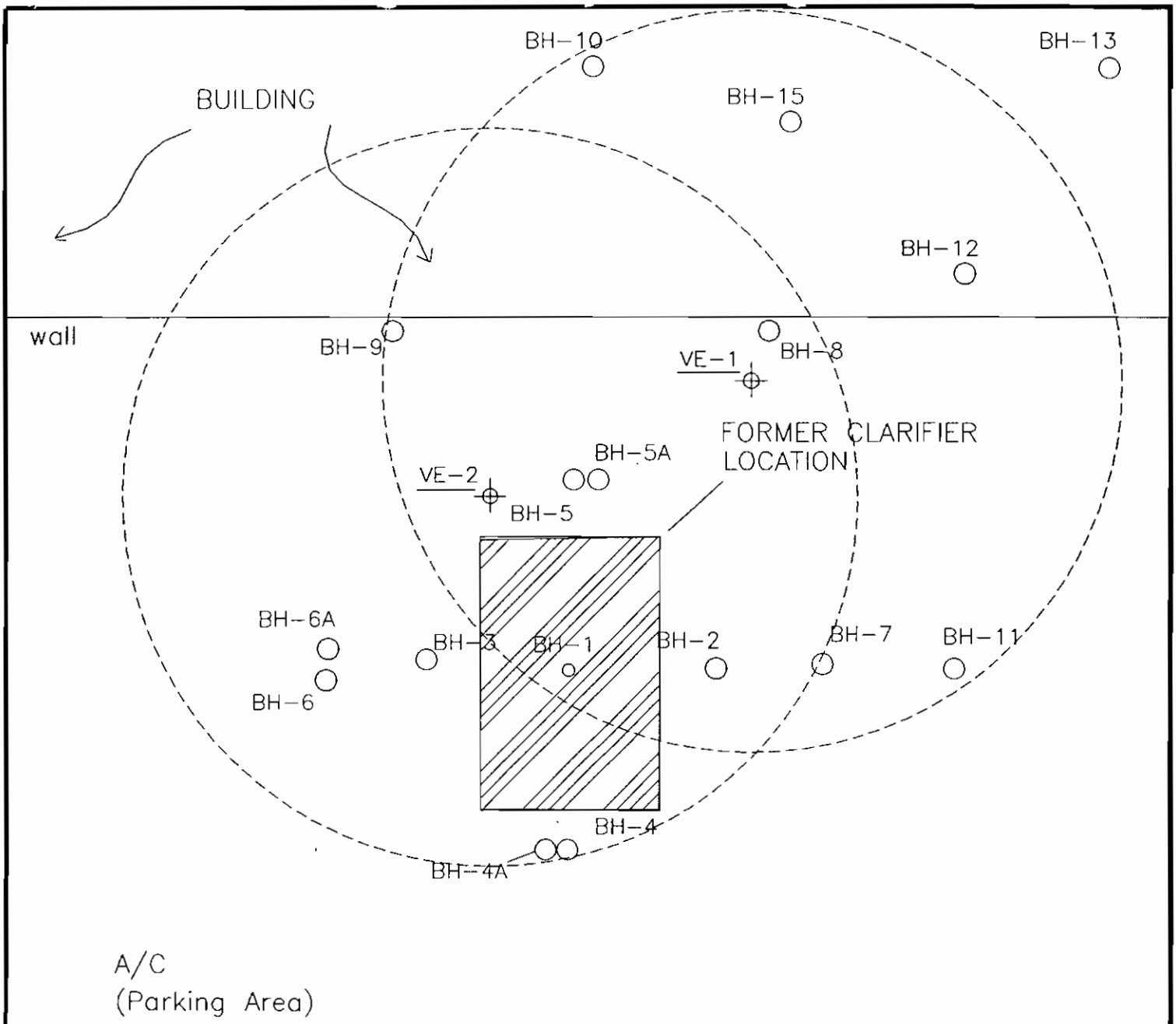
SITE CHARACTERIZATION
1551 East Orangethorpe Avenue
Fullerton, California

Project No.
94-42871-05

Converse Consultants Orange County

Geotechnical Engineering and Applied Sciences

Figure No.
1



LEGEND

VE-2 Approximate location of proposed vapor extraction well

Anticipated radius of influence (20 feet)

BH-14

NOTE:
This figure is part of Converse Consultants Orange County Corrective Action Plan dated JULY 21, 1995

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SITE LAYOUT MAP

Fullerton Business Park North
1551 East Orangethorpe Avenue
Fullerton, California

DATE: 7/20/95	PROJECT NO: 94-42871-05	FIGURE NO: 2
SCALE: 1" = 8'	CHECKED BY: HBA	