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Marketing – Northwest Region
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April 3, 1996

Ms. Amy Leech
Alameda County Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

Re: Former Chevron Station # 9-5607, 5269 Crow Canyon Road, Castro Valley, CA
Attached Corrective Action Work Plan (Weiss, 4/1/96)

Dear Ms. Leech:

Please find attached a work plan dated, April 1, 1996, which was prepared by Chevron's consultant, Weiss Associates (Weiss). The work plan proposes Risk-Based Corrective Action (RBCA) analysis and describes the field and analytical procedures that will be implemented as part of a Tier 2 assessment.

The scope of the work plan was designed to address those site specific issues that were discussed at our January 29, 1996 meeting. The results obtained will be used to determine site specific remedial action target levels and will assist in the development of an appropriate corrective action plan.

Once approved, copies of the work plan will be provided to the Forest Creek Townhomes Homeowner's Association. At the same time, Chevron will express its, and your agency's, willingness to meet with them to answer any questions or concerns that they may have regarding Chevron's proposed environmental activities.

If you have any questions or comments, I can be reached at (510) 842-8695.

Sincerely,

Brett L. Hunter

Brett L. Hunter
Environmental Engineer
Site Assessment and Remediation

Attachment

cc: Kevin Graves, San Francisco Bay RWQCB, Oakland, CA
Ravi Arulanantham, San Francisco Bay RWQCB, Oakland, CA
Kevin Hinckley, 5269 Crow Canyon Road, Castro Valley, CA 94546
Bette Owen, Chevron Products Company, San Ramon, CA (w/o attachment)

Weiss Associates Environmental and Geologic Services

5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: 510-450-6000

April 1, 1996

Amy Leech
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

RE: **Proposed Corrective Action Work Plan**
Former Chevron Service Station #9-5607
5269 Crow Canyon Road
Castro Valley, California
WA Job #4-1129-70

Dear Ms. Leech:

On behalf of Chevron USA Products Company (Chevron), Weiss Associates (WA) has prepared this workplan for site specific data collection and Risk-Based Corrective Action (RBCA) analysis as a response to the RBCA strategy discussion between Chevron and yourself on October 20, 1995. The scope of work includes collecting site-specific soil vapor, soil and ground water samples to support a detailed analysis of the potential risk to human heath associated with petroleum hydrocarbons in the subsurface. The analysis will be prepared using the framework and guidance of the American Society for Testing and Materials (ASTM) RBCA process[1]. The ASTM RBCA analysis will include a Tier 1 summary and detailed Tier 2 report. **The Tier 2 assessment will be based on site-specific soil sample results and contaminant concentrations in soil vapor, soil and ground water.** The application of soil vapor data to the Tier 2 assessment will have two objectives:

1. The soil vapor data will be used in the Tier 2 models as a more direct evaluation of the inhalation pathways of concern. This will eliminate assumptions about contaminant transport from soil and groundwater to vadose zone soil vapor. Ground water (and possibly soil) site specific target levels will be developed from this portion of the analysis.

2. The measured soil vapor concentrations will be compared with soil vapor concentrations predicted by the soil and ground water vapor transport models. This will

[1] American Society For Testing and Materials, January 29, 1996. *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites,* ASTM E 1739-95.

help in assessing whether the results of the soil and ground water vapor transport models are representative of conditions at this site.

The site specific data will be collected during two discrete sampling events in the spring and summer of 1996.

BACKGROUND INFORMATION

Setting

Service Station Location: Former Chevron service station #9-5607 is located at the southeast corner of Waterford Place and Crow Canyon Road in Castro Valley, California (Figure 1).

Receptor Locations: The potential receptors are residents of the Forest Creek Townhomes building located on the southwest corner of Waterford Place and Crow Canyon Road in Castro Valley, California (Figure 1).

Local Geology: Sediments beneath the site are unconsolidated sequences of clay, silty clay, silty sand and sandy clay. Shale and sandstone bedrock was noted at depths greater than 18 feet below ground surface[2].

Previous RBCA Screening

Tier 1 RBCA: The results of an initial Tier 1 RBCA risk screening were presented by Brett Hunter of Chevron in his letter to Amy Leech, dated November 30, 1995. Two ground water exposure pathways were considered:

1) Ground water volatilization to outdoor air, and;

2) Groundwater vapor intrusion to buildings.

The vapor source was assumed to be ground water in the vicinity of wells C-9 and C-12. The potential receptors were residents at the Forest Creek Townhomes building. Chevron compared benzene ground water concentrations to the Tier 1 look-up-table concentrations associated with a 10^{-4} to 10^{-6} range of potentially increased cancer risk.

Benzene concentrations in ground water from wells C-9 and C-12 were below the concentrations in the Tier 1 look-up-table for volatilization to outdoor air (for 10^{-6} risk). However, the benzene

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[2] Chevron USA Products Company, October 27, 1995. *Interoffice Memorandum From Sheldon N. Nelson to Brett Hunter Regarding the Status of Subsurface Hydrocarbons at Former Chevron Service Station 9-5607, 5269 Crow Canyon Road, Castro Valley, California.* p1.

concentration in ground water from well C-9 was above the Tier 1 look-up table value for vapor intrusion to buildings (for 10^{-6} risk).

In response to the exceedence of the Tier 1 look-up table value, Chevron recommended collecting site specific soil vapor measurements in the vicinity of the Forest Creek Townhomes building and performing a more extensive Tier 2 RBCA risk assessment for this exposure pathway. This will allow a site specific target level (SSTL) for benzene in ground water to be developed.

PROPOSED SCOPE OF WORK

This scope of work includes collecting site-specific soil vapor analysis data, sampling the soil and ground water for benzene, testing soil cores for density, porosity and organic carbon content and performing a Tier 1 and Tier 2 RBCA. Prior to collecting these data, WA will:

1. Obtain a drilling permit from Zone 7 Water Agency,
2. Locate all underground utility lines in the vicinity of the drilling activities, and;
3. Prepare a site specific health and safety plan.

The site-specific data will be collected in late May and mid July of 1996. Two sampling events will help to determine whether seasonal variations have an effect on site-specific data. A detailed description of site-specific data collection and the RBCA analysis is presented below.

Soil Vapor Survey

The objective of the soil vapor survey (SVS) is to:

1. Use the soil vapor sample results in developing Tier 2 SSTLs for ground water (and possibly soil), and;
2. Compare the soil vapor concentrations to those predicted by soil and ground water vapor transport models.

Vadose zone soil vapor samples will be collected by driving a Geoprobe sampler to a predetermined depth and collecting the vapor samples in Summa canisters. Summa canister sample containers were chosen due to their consistently superior performance in preventing losses of constituents of concern. The vapor samples will be collected at eight bore hole locations surrounding the receptor building as follows:

- three vapor samples will be collected from ~~one~~ three bore hole at 3 and 8 feet below the ground surface and 3 feet above ground water to provide a benzene gradient profile, and;

- one vapor sample will be collected from each of the remaining 7 bore holes at 3 feet below ground surface.

Proposed bore hole locations are depicted in Figure 1 and the vapor sample collection protocol is included as attachment A.

Vapor samples will be sent to Air Toxics Ltd. of Folsom, California and analyzed for benzene by EPA method TO-14.

Soil and Ground Water Samples

Soil and ground water samples will be collected from the eight bore hole locations mentioned above. The Geoprobe will be driven to 5 and 10 feet below ground surface for collection of soil samples and to the surface of the water table for collection of soil and ground water samples. Soil and ground water samples will be refrigerated and transported to Sequoia Analytical of Redwood City, California for BTEX analysis by EPA method 8020.

Collection of Hydrocarbon Degradation Parameters

All soil vapor samples will be analyzed for oxygen, carbon dioxide, and methane to assess whether hydrocarbon degradation is occurring. Air Toxics Ltd. of Folsom, California, will analyze for the above gasses by ASTM Method D 3416.

Collection of Site Specific Modeling Parameters

WA will collect one continuous core soil sample to determine soil density, porosity and fraction of organic carbon. WA will later apply these site-specific parameters to the Tier 2 RBCA vapor transport models. Woodward Clyde will analyze the soil samples for density and porosity by American Society for Testing and Materials Methods D2850 and D4612 respectively. Sequoia Analytical will analyze the soil boring for fraction of organic carbon by the Watley Black Method.

RBCA Analysis

WA will perform a RBCA analysis using the site-specific data collected. The RBCA analysis will include a Tier 1 summary and detailed Tier 2 report. The objective of the RBCA analysis is to establish site specific target levels below which no significant human health risk would be associated with petroleum hydrocarbons in the subsurface, using the framework established by the American Society for Testing and Materials (ASTM) RBCA guidance.

The ASTM RBCA framework is a tiered decision-making process whereby site contaminant levels, as determined during an initial site assessment, are compared to conservatively-derived risk-

based screening level (RBSL) targets for contaminants in each environmental media. In the RBCA process, Tier 1 - *Site Classification and Non-Site-Specific-Screening Level Corrective Action Goals* - sites are classified by the urgency of need for initial corrective action, and then site-specific contaminant concentrations are compared to target Tier 1 RBSLs. The ASTM guidance provides example RBSL look-up tables intended as a guide for state and local enforcement agencies; the RBSLs in the look-up tables are not intended to be stand-alone cleanup standards. Site-specific contaminant concentrations below the RBSLs represent human health risks less than the target levels, and human health risk may reasonably be assumed to be insignificant if site-specific concentrations are below these target risk levels.

If the Tier 1 RBSLs are exceeded, the RBCA process provides several alternatives for subsequent action. These options include a Tier 2 application of Tier 1 RBSLs at an alternative point of exposure, a Tier 2 analysis including development of site-specific target levels (SSTLs), the provision of institutional or engineering mechanisms to limit or reduce exposures, or remediation to Tier 1 RBSLs. A Tier 3 evaluation is also available for large or complex sites involving more sophisticated fate and transport issues or extensive data acquisition and analysis. Similar to the Tier 1 RBSLs, the Tier 2 SSTLs represent contaminant concentrations, below which associated human health risks may reasonably be assumed to be insignificant.

Report Preparation

WA will prepare a report presenting the site specific data and RBCA analysis results. The report will include a site map showing structures, paved surfaces, and sampling locations; analytic results; previous soil and ground water analytical results; a Tier 1 RBCA summary; a detailed Tier 2 RBCA report; a summary of interpretations and conclusions based on the RBCA analysis; and laboratory analytic reports and chain-of-custody forms.

More specifically, the Tier 2 report will include:

1. Groundwater fate and transport results for three locations (upgradient, middle and downgradient of the receptor area),
2. Hydrocarbon vapor transport results for the three above mentioned locations,
3. A determination of health risk levels and SSTLs from the vapor transport models,
4. A summary of these results,
5. An evaluation of the vapor transport models using the soil vapor data to re-determine ground water (and possibly soil) SSTLs, and;
6. A summary of interpretations and conclusions comparing the results of the vapor transport models.

SCHEDULE

WA will proceed with obtaining the necessary permits and conduct the field work after receiving written approval for this scope of work. WA anticipates completing the field work by the end of July 1996 and submitting the report by the end of August 1996.

WA trusts this workplan satisfies your request. Please call if you have any questions or comments.

Sincerely,
Weiss Associates

Tim Utterback EIT
Staff Engineer

Carolyn J. Atwood
Senior Project Engineer

cc: Brett Hunter, Chevron USA Products Company, P.O. Box 5004, San Ramon, CA 94583-0804
Kevin Graves, Regional Water Quality Control Board - San Francisco Bay, 2101 Webster Street, Suite 500, Oakland, California 94612

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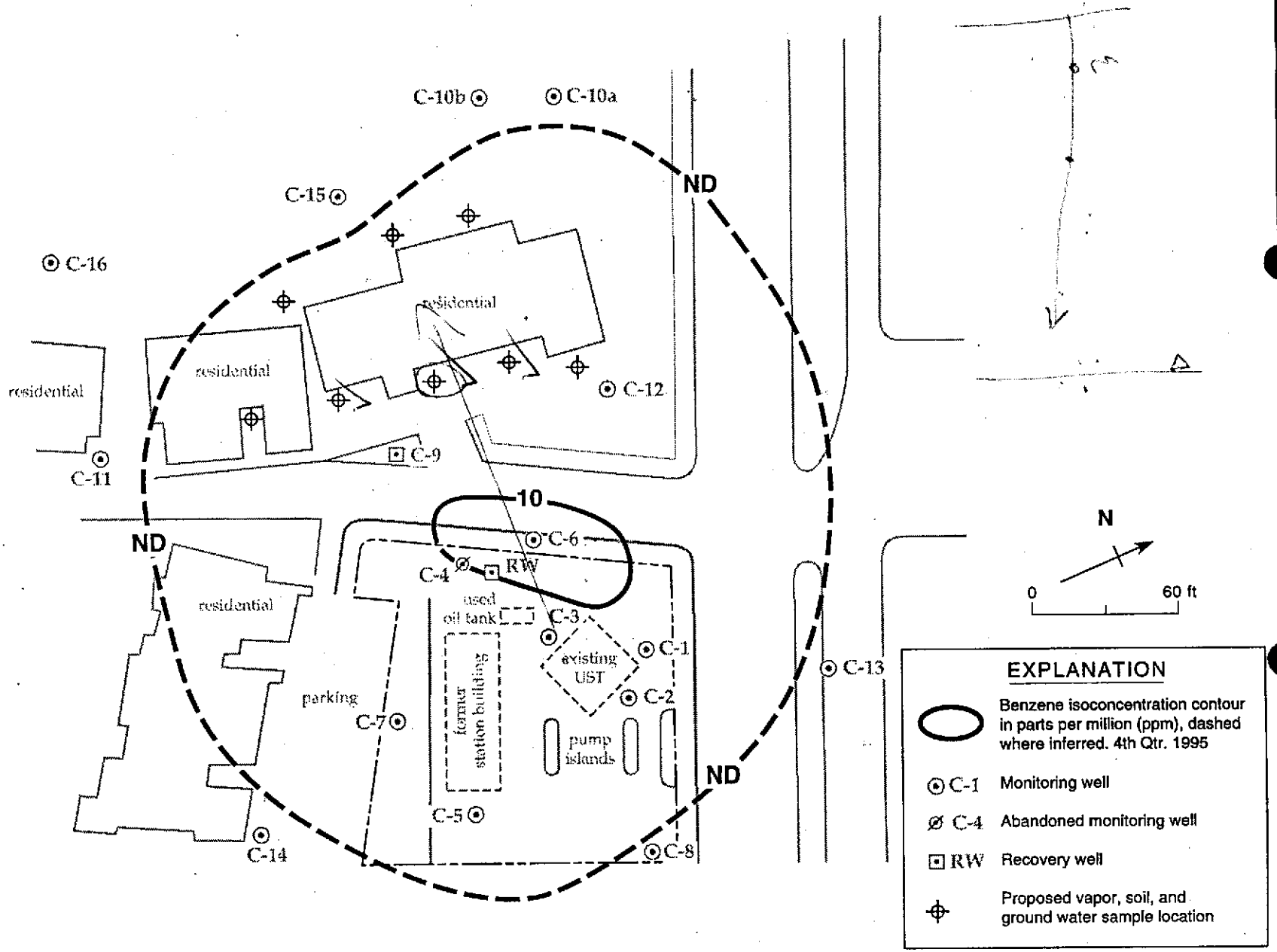

Figure 1. Proposed Vapor, Soil, and Ground Water Sample Locations - Chevron Station 9-5607, 5269 Crow Canyon Road, Castro Valley, California

03/29/96

ATTACHMENT A

VAPOR SAMPLE COLLECTION PROTOCOL

VAPOR SAMPLE COLLECTION PROTOCOL

I. Probe Placement

A) A clean soil gas probe is removed from the "clean" storage tube.

B) The soil gas probe is placed in the jaws of a hydraulic pusher/puller mechanism.

C) A sampling drive point is inserted into the bottom of the probe.

D) The hydraulic pushing mechanism is used to push the probe into the ground.

E) If the pusher mechanism will not push the probe into the ground to a sufficient depth for sampling, a hydraulic hammer is used to pound the probe into the ground.

II. Soil Gas Sample Extraction

A) An adapter is attached to the top of the soil gas probe.

B) A vacuum pump is attached to the adapter via polyethylene tubing.

C) The vacuum pump is turned on and used to purge the sampling equipment with soil gas.

D) Approximately three probe volumes are purged before a sample is collected. Since the flow rate is dependent on resistance to flow, the evacuation time is adjusted to ensure the proper volume is extracted.

E) The probe purge flow rate is monitored using a rotometer at the vacuum pump and the flow rate is maintained between 5 and 10 liters per minute.

III. Soil Gas Sample Collection

A) With the vacuum pump running, a stainless steel hypodermic syringe needle attached by Teflon tubing to a SUMMA canister is inserted through the silicone rubber, which acts as a seal, and down into the metal tubing of the sample probe. This technique eliminates the possibility of exposing the sample stream to any part of the adapter and associated tubing. Soil gas samples only contact clean decontaminated surfaces and never contact potentially sorbing materials (i.e., tubing, hose, pump diaphragm). Clean stainless steel hypodermic syringe needles and Teflon sample tubing are used for each sample.

B) The syringe needle and Teflon sample tubing are purged with soil gas. The vacuum pump is shut off by closing the pump inlet valve and shutting the power switch off (in that order to prevent backflow). Then, without removing the syringe needle from the adapter, a soil gas sample is collected slowly (0.2 liters per minute) using a SUMMA canister. The SUMMA canister vacuum will be sufficient to fill the canister.

C) The syringe needle is removed from the adapter and the syringe needle and Teflon sample tubing is set aside for later decontamination.

D) If necessary, a second SUMMA canister sample is collected using the same procedure.

IV. Deactivation of Sampling Apparatus

A) The vacuum pump is turned off and unhooked from the adapter.

B) The adapter is removed and stored.

C) Using the hydraulic puller mechanism, the probe is removed from the ground.

D) The probe is stored in the "dirty" probe tube.

E) The probe hole is backfilled and sealed with Portland cement.

V. Logbook and U.S. EPA Field Sheet Notations for Sampling

A) Time (military notation)

B) Sample number

C) Location (approximate description - i.e., street names)

D) Sampling depth

E) Purge flow rate and time before sampling

F) Probe number

G) Observations (i.e., ground conditions, concrete, asphalt, soil appearance, surface water, odors, vegetation, etc.)

H) Backfill procedure and materials, if used

VI. Other Record Keeping

A) Chain of Custody data sheets are filled out for the SUMMA canisters.

B) Sample location is marked on the site map.

The following are QA/QC procedures for the soil vapor survey:

I. Sampling Equipment

1. Each SUMMA canister is cleaned by Air Toxics LTD before use using a combination of dilution, heat and high vacuum. They are usually cleaned in batches, with one in ten samples certified by filling them with ultra high purity air, which is subsequently analyzed using GC/MS. If target analyte concentrations are below 0.2 ppbv, the "batch" of canisters is considered clean.

2. A clean syringe needle, Teflon sample tubing and SUMMA canister is used to collect each soil gas sample to prevent cross-contamination.

II. Laboratory Analysis

1. Duplicate samples are analyzed at a frequency of at least 10% by Air Toxics LTD.

2. Laboratory spikes are analyzed at a frequency of at least 10% by Air Toxics LTD.

3. Lab blanks are analyzed at a frequency of at least 10% by Air Toxics LTD.

4. For TO-14 analyses Air Toxics LTD will provide surrogates with every sample.