Chevron U.S.A. Products Company
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December 31, 1992

Dr. Ravi Arulananthum
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

Re: Risk Assessment
Former Chevron Service Station No. 9-3864
5101 Telegraph Avenue, Oakland, California

Dear Dr. Arulananthum :

Enclosed is the risk-based analysis work plan and report dated December 29, 1992. Both the work plan and report were prepared by Geraghty & Miller, Inc. in Raleigh, North Carolina with input from their office in Richmond, California.

Briefly, a risk-based analysis was performed at the above referenced site to determine if the constituents at the site pose a threat or concern to human health. The constituents of concern were benzene, toluene, ethylbenzene, xylenes, "total petroleum hydrocarbons", and lead (soil only). The risk-based analysis was based on developing health-based remediation goals (HBGs) derived from several scenarios. Each scenario involved one or more of the following : the exposure of a construction worker, adult, and/or child via ingestion, dermal absorption, and/or inhalation. The risk-based analysis also included site characterization, constituent characterization, toxicity assessment, exposure assessment, and uncertainties. The analysis used methods designed to be consistent with risk assessment guidelines established by Regional Water Quality Control Board-San Francisco Bay Region and the U.S. Environmental Protection Agency. (Refer to the report for a complete explanation on the methodologies, etc.)

From the risk-based analysis, it indicated that remediation is not necessary because the HBGs for all the constituents of concern in soil were greater than the maximum detected soil concentrations. In addition the risk based analysis indicated that exposure to groundwater does not pose a threat to human health. Furthermore, the risk-based analysis indicated that the migration of the concerned constituents would not reach the bay.

Based on the information from the risk-based analysis, Chevron believes that no further remediation of the soil and groundwater is necessary and the site is developable for both industrial, commercial, and residential use provided that zoning and other applicable requirements permit. Chevron proposes groundwater monitoring and sampling of the site on a quarterly basis for a year followed by annual monitoring and sampling.

An immediate written response from your office on the above mentioned issues will be greatly appreciated.

If you have any questions or comments, please feel free to call me at (510) 842-8752.

Sincerely,

Chevron U.S.A. Products Co.

Kenneth Kan
Site Assessment and Remediation Engineer

LKAN/MacFile 9-3864R11

Enclosures

cc: Mr. Richard Hiett
RWQCB-San Francisco Bay Area
2101 Webster Street, Suite 500
Oakland, CA 94612

Ms. Susan Hugo
Alameda County Health Care Services
80 Swan Way, Room 200
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Ms. Bette Owen
Chevron U.S.A. Products Co.

compounds, there are no toxicity values specific to TPH. Therefore, a surrogate compound will be used to calculate potential risks due to exposure to TPH. The toxic endpoints and toxicity values for the constituents of concern will be presented.

Exposure Assessment

The potential for exposure to constituents detected in soils and ground water beneath the site will be evaluated using currently available site-specific information. The potential for oral, dermal, and inhalation exposure to particulates and volatile components from the subsurface soils during hypothetical future on-site construction activities and residential land use will be presented. Exposure parameters used to define the hypothetically exposed constuction worker and residents (body weight, exposure duration, exposure frequency, etc.) will be selected using USEPA guidance, site-specific information, and professional judgement. Table 1 (attached) presents the selected exposure parameters for evaluation of the health-based soil remediation goals.

Exposure to constituents detected in ground water at the site will be evaluated using a hypothetical future residential scenario in which on-site adult and child residents are exposed to ground-water contaminants which volatilize from beneath the site and infiltrate into the home. The hypothetical future on-site resident scenario will be evaluated using default exposure parameters (body weight, breathing rate, residence time, etc.) provided in USEPA guidance and indoor air concentrations calculated using transport modeling. Table 1 (attached) presents the selected exposure parameters for evaluation of the health-based ground water remediation goals.

Ground-Water Vapor Infiltration Model

The potential air concentrations within the home due to migration from ground water beneath the site will be calculated using a model in which contaminants in the ground water volatilize, diffuse to the soil surface and into the home through the foundation. A soil porosity of 0.4 will be used in evaluating this migration potential for the relevant constituents. This value (the mid-range value for silt [Freeze and Cherry, 1979]) was selected based upon boring logs for the installation of the on-site monitoring wells. Conservative (protective) assumptions will be used to demonstrate whether hypothetical future residential use of this site would present significant human health risk to the residents (see Table 1).

Development of Remediation Goals

Site-specific remediation goals for soil and ground water will be calculated using the hypothetical future exposure scenarios described previously. These remediation goals will be calculated using conservative exposure assumptions and based on a target cancer risk of 10^{-6} for each carcinogen and a target hazard quotient of 1 for each non-carcinogen. Comparison of site-related concentrations with these health-based remediation goals will serve as a means of demonstrating whether the site is suitable for future development.

In performing this analysis, assumptions will be made according to guidance from USEPA and the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, and according to professional judgement. These assumptions and the major uncertainties involved with this risk-based analysis will be presented in the report.

Respectfully submitted,

GERAGHTY & MILLER, INC.

Amy D Jones

Amy D. Jones
Staff Scientist and Task Manager

Shawn Leslie Sager

Shawn L. Sager, Ph.D.
Principal Scientist and Project Manager

Shawn Leslie Sager for

Gary W. Keyes, P.E.
Principal Engineer and Project Officer

ACRONYMS

BTEX	Benzene, toluene, ethylbenzene, and xylenes.
RWQCB	Regional Water Quality Control Board.
TPH	Total petroleum hydrocarbons.
USEPA	U. S. Environmental Protection Agency.

REFERENCES

Bear, J., 1972. Dynamics of Fluids in Porous Media. American Elsevier, New York.

Blaine Technical Services, Inc., 1991. Multiple Event Sampling Report 911010-C-1. Chevron Service Station No. 93864, 5101 Telegraph Avenue, Oakland, California. September 11.

Freeze, R. Allan and John A. Cherry, 1979. Groundwater. Prentice-Hall, Inc., Englewood Cliffs, NJ. 604 pp.

Sager, S.L., L.J. Lawton, M.K. Jones, 1992. Evaluation of Exposure to Lead in Soil Considering Decreasing Background Lead Concentrations. An Abstract in The Toxicologist.

Sierra Analytical, 1992. Quarterly Ground Water Sampling Report. Former Chevron Asphalt Plants Terminal #1001067, 1520 Powell Street, Emeryville, California. SES Project #1-191-04. April 20.

U.S. Environmental Protection Agency (USEPA), 1991c. Users Guide for Lead: A PC Software Application of the Uptake/Biokinetic Model, Version 5.0 Environmental Criteria and Assessment Office, Cincinnati, OH.

Table 1. Summary of Exposure Parameters Used in the Calculation of Health-Based Remediation Goals, Former Chevron Service Station #9-3864, 5101 Telegraph Avenue, Oakland, California.

Scenario	Body Weight (kg)	Exposure Frequency (days/year)	Exposure Period (years)	Ingestion Rate (mg/day)	Exposed Skin Surface Area (cm^2)	Inhalation Rate (m^3/day)
SOIL						
Construction Worker	70	72 *	84 *	480	2,940	20
Adult Resident	70	350	30	100	3,160	20
Child Resident (aged 0 to 6 years)	15	350	6	200	3,652	20
GROUND WATER						
Adult Resident	70	350	30	NA	NA	20
Child Resident (aged 0 to 6 years)	15	350	6	NA	NA	20

* For the construction worker, an exposure time of 72 days (12 weeks × 6 days/week) and an exposure period of 84 days (12 weeks × 7 days/week) were used.

NA Not applicable; exposure parameter was not used for this evaluation.