

ENVIRON

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To: Susan Hugo Fax: 510-337-9335

Ravi Arulanantham 510-622-2460

Ron Gerber 510-658-8095

From: Sara Dubowsky Extension: 2517

Time Transmitted: 6:35pm Operator: sdd

Comments/Special Instructions:

FYI: Copies of the final report will be FedExed to you on

① Soil management Monday.

- soil can be used anywhere in the area unless stained, discolored, strong odor.

strong odor

PLEASE CALL IMMEDIATELY IF THE FAX YOU RECEIVE IS INCOMPLETE OR ILLEGIBLE

6001 Shellmound St., Suite 700 • Emeryville, California 94608-1954 • USA

Voice: 510.655.7400 • Fax: 510.655.9517

ENVIRON

October 12, 1999

Ms. Susan Hugo
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6700

Mr. Ravi Arulanantham
Staff Toxicologist
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

**Re: Final Human Health Risk Assessment Report
Proposed Emeryville Village Center
Emeryville, California
(ENVIRON Project No. 03-7277A)**

Dear Ms. Hugo and Mr. Arulanantham:

ENVIRON is pleased to submit the enclosed copy of the Final Human Health Risk Assessment (HHRA) report for the proposed Emeryville Village Center (the "Site") for your records. As discussed in our meeting on August 12, 1999 at the Regional Water Quality Control Board, we have incorporated some additional language in the Executive Summary concerning the site history and included evidence that the Site has not impacted off-site ground water. Some editorial changes have also been made to the risk management plan (RMP) guidelines to clarify previously ambiguous language. Redlined copies of all changes made to the draft report are provided in Attachment A for your convenience.

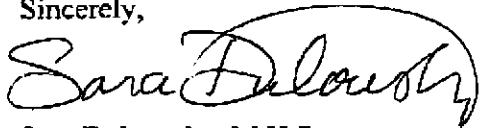
Based on the findings of this final report and our discussions of March 29th and August 12th, it is ENVIRON's understanding that no further cleanup of the Site is required at this time and development of the Site is warranted provided that the following operating and institutional conditions are met to assure that water quality, public health, and the environment are protected from existing and potential residual risks:

- Prior to construction, submittal of an acceptable RMP(s) describing the specific methods and procedures for managing the Site before, during, and following site construction.
- Prior to occupancy, a deed restriction must be recorded for the Site that requires the property owner to: 1) comply with the RMP; 2) contact the ACDEH and Regional Board if the land uses changes; and 3) prohibit the use of groundwater for domestic purposes.

Provided that these conditions are met, it is our understanding that the ACDEH and Regional Board will acknowledge that the proposed residential development of the Site is satisfactory and closure letters for each individual parcel will follow shortly.

Please do not hesitate to contact us if you have any questions or comments. Thank you for your attention in this matter.

Sincerely,



Sara Dubowsky, M.H.S.
Associate



Anne Gates, M.S., P.E.
Manager

Enclosures

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Cc: Ron Gerber, Emeryville Redevelopment Agency

EXECUTIVE SUMMARY

At the request of the Emeryville Redevelopment Agency (ERA), ENVIRON conducted a human health risk assessment (HHRA) to determine the potential risks to future on-site residents from residual chemicals detected in soil, ground water and soil gas at the proposed Emeryville Village Center in Emeryville, California ("Site"). Formerly at this location were several industrial and commercial properties including the Standard Brands Paint Store, New Century Beverage Company, Emeryville Fire Station, and Kentucky Fried Chicken (formerly an ARCO station).—Current plans call for the construction of urban townhouses at the Site, which is situated between 45th Street and Park Avenue on San Pablo Avenue. This proposed development will consist of 112 urban residential townhouses constructed over private 2-car garages, landscaped outdoor communal areas, four retail buildings, and an outdoor parking area. Since the development plans specify slab-on-grade construction without private yards, no exposures via dermal contact or ingestion of soil or ground water are anticipated at the Site. Furthermore, a deed restriction recorded against the property will prohibit future development of single family homes with backyards and will prevent the use of ground water for domestic, industrial, or irrigation purposes. Accordingly, inhalation of volatile organic compounds (VOCs) was the only pathway quantified in this assessment.

This HHRA was conducted by developing site-specific target levels (SSTLs) for all VOCs detected in soil, ground water, or soil gas at the Site. To determine the levels of VOCs to which a future resident may be exposed, ENVIRON relied on the results of multiple environmental site investigations conducted across the Site. These investigations occurred between 1993 and 1999 and resulted in the sampling of over 140 locations on-site. In particular, the results of these evaluations indicated the presence of residual volatile petroleums from several on-site underground storage tanks (USTs) as well as residual chlorinated solvents from solvent usage areas and chemical storage facilities. —Based on these results data collected in this and previous investigations, SSTLs were developed for a total of 28 VOCs using standard risk assessment techniques and regulatory assumptions recommended by the United States Environmental Protection Agency (USEPA) and the California Environmental Protection Agency's (Cal/EPA's) Department of Toxic Substances Control (DTSC). SSTLs represent the

concentrations of individual chemicals that could be present in a given exposure medium and pose a *de minimis* risk to future on-site populations. In this evaluation, maximum concentrations of the 28 VOCs detected in the soil and ground water, as well as maximum concentrations of mineral spirits and n-hexane predicted in indoor air from soil gas measurements were compared with media-specific (i.e., soil, ground water, and indoor air) SSTLs to identify any potential areas of concern at the Site. Off-site populations are not included in this assessment as concentrations of volatiles from Site soils are expected to be higher on-site and samples from downgradient monitoring wells indicate that the concentrations of VOCs have not substantially impacted off-site ground water (i.e., levels of chlorinated VOCs were below state and federal Maximum Contaminant Levels (MCLs)).

The potentially exposed populations evaluated in this HHRA include adult and children on-site residents. Exposures to future commercial and construction workers were not addressed quantitatively in this assessment since previous risk assessments by McLaren/Hart (1997b) and Weiss (1996a) indicated a *de minimis* risk to these populations.

In developing residential SSTLs, the USEPA-approved model VLEACH was used to estimate the potential flux of VOCs from soil and ground water into indoor air. This analysis indicated the potential for a significant flux of mineral spirits from the soil and ground water into indoor air. Since there was high uncertainty in the parameters used to predict the volatility of mineral spirits as a mixture, ENVIRON collected soil gas measurements at the Site to more accurately characterize the flux of the volatile components of mineral spirits. Measurements of n-hexane were also collected since this compound is one of the more toxic components of TPH mixtures. To be protective of future residential populations, ENVIRON conservatively assumed an upwards steady-state flux from the ground water and an "all comes up" flux from the soil column even though the results of the soil gas sampling plan indicated that the flux is likely downwards, away from the ground surface. Conservative assumptions were used in all modeling for this evaluation, thereby likely overestimating the movement of VOCs from the soil and ground water into indoor air.

When available, Cal/EPA or USEPA-approved toxicity values were used in this assessment in order to characterize the potential for the estimated exposures to result in carcinogenic and noncarcinogenic health effects. For evaluation of the potential health risks

from total petroleum hydrocarbons (TPH), ENVIRON derived toxicity criteria following the guidelines established by the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG).

Based on a comparison of the site data to the SSTLs, we concluded that none of the chemicals would pose a significant risk to future on-site residents of the proposed Emeryville Village Center. The maximum concentrations of each chemical ever detected in soil and ground water were below the health-based SSTLs calculated for soil and ground water. The maximum concentrations of mineral spirits and n-hexane predicted in indoor air from soil and ground water were also below the health based SSTLs calculated for indoor air. Furthermore, the maximum lifetime incremental cancer risk, assuming cumulative exposure to the maximum concentrations ever detected in the soil, ground water and soil gas was estimated to be 7×10^{-6} . Similarly, the maximum noncancer Hazard Index (HI), assuming cumulative exposure to the maximum concentrations of each chemical detected in the soil, ground water and soil gas was estimated to be 0.8. Since the maximum lifetime cumulative cancer risk is less than the target level of 1×10^{-5} and the maximum cumulative noncancer HI is less than the target level of 1, given the conservative assumptions used in this evaluation as well as the comparison to maximum concentrations, no adverse health effects are expected in the future residential population at the proposed Emeryville Village Center.

~~Based on the results of this quantitative HHRA,~~ In summary, we conclude that the residual levels of chemicals present in the soil and/or ground water can be effectively managed through the development and implementation of a risk management plan and that additional site investigation and/or remediation is not warranted. This conclusion is based on the following:

- The Site has been adequately characterized.
- Downgradient monitoring wells indicate that the levels of chlorinated VOCs are below federal or state MCLs, suggesting that the Site has had little to no impact on ground water.
- There is no anticipated impact from the Site to drinking water aquifers since local groundwater is shallow and not used as a source of drinking water.
- The results of this quantitative HERA indicate that the Site will have no impact on human health. -

~~The risk management plan guidelines presented in this report provide the basic framework for managing the residual chemicals during the actual construction of the Site, and for identifying any key term management measures to be implemented after development of the site is complete.~~

8.4.3 Soil Management Protocols

Clean ~~imported~~ soil should be used for the top 3 feet of the landscaped outdoor communal areas. Existing Site soil could be used anywhere else on the Site without testing unless the soil is visibly contaminated (e.g., stained, discolored, shiny, or oily) or has a noticeable solvent-like or hydrocarbon odor.

If soil that is visibly contaminated (e.g., stained, discolored, shiny, or oily) or has a noticeable solvent-like or hydrocarbon odor is encountered, the ACHCS and RWQCB should be notified and provided with analytical test results, per the approved RMP, as described below. ~~A~~ Where required by the approved RMP, a sample of the visibly contaminated or odorous soil ("source soil") should be collected and analyzed for the following:

- TPH-gasoline (purgeables) by EPA Method 8015m;
- TPH-diesel and TPH-motor oil (extractables) by EPA Method 8015M;
- Aromatic VOCs with acetone by EPA Method 8020; and
- Halogenated VOCs by EPA Method 8010.

This set of analyses will be used to identify which VOCs and/or petroleums are present in the visibly contaminated or odorous soil. ~~The soil may then be excavated until~~ The RMP should identify specific sampling protocols (such as, but not limited to field screening samples and/or fixed base laboratory analyses) and frequencies for visibly stained or odorous soil.

~~All visibly contaminated and odorous soil is removed; or~~

~~The excavation reaches the top of the ground water table, approximately 10 to 20 feet bgs.~~

~~Confirmation samples should be collected from the excavation and analyzed for the VOCs identified in the source soil.~~ Analytical results should be compared with the

risk-based SSTLs. ~~Excavation should continue until soil sampling indicates that these goals are met or the top of the ground water table is reached.~~

~~Excavated soil should be (1) disposed off site at an appropriate, permitted facility in accordance with all applicable laws and regulations or (2) left on site. If soil is to be left on site, then one soil sample should be collected per 20 cubic yards of stockpiled soil if the volume of the stockpiled soil is less than 200 cubic yards; otherwise, one soil sample should be collected per 50 cubic yards of stockpiled soil. Soil samples should be analyzed for the VOCs identified in the source soil. The analytical results should be compared with the risk-based SSTLs.~~

If VOC concentrations in samples of ~~stockpiled~~ soil are below the risk-based SSTLs, the ~~stockpiled~~ soil may remain in place or if already excavated, may be used anywhere on the Site, except in the landscaped outdoor communal areas.

If the analytical results of soil samples are above the SSTLs, soil shall be excavated until soil sampling indicates that soil concentrations are below the SSTLs or the top of the ground water table or property boundary is reached. For excavated soil with ~~If VOC concentrations in samples of stockpiled soil are above risk-based SSTLs,~~ then the following actions ~~to~~ may be taken ~~may~~ including (but ~~are~~ not limited to) the following:

- The stockpiled soil could be disposed off-site at an appropriate, permitted facility; or
- Soil could be treated on-site to levels below SSTLs with agency approval; or
- Hypothetical risks to future populations could be recalculated to reflect the actual concentrations of VOCs and/or petroleum present in these soils.

If the estimated cumulative incremental cancer risk to future Site occupants is less than 10^{-5} and the non-cancer hazard index is less than 1, then the ~~stockpiled~~ soil could be used anywhere on-site, except in the landscaped outdoor communal areas. Otherwise, the ~~stockpiled~~ soil should be disposed off-site at an appropriate, permitted facility.

The assumptions and methodology used to calculate the risk-based SSTLs were presented in the previous section of this report and address future residents, both adults and children. The proposed risk-based SSTLs are intended to serve as a guide during Site development. If concentrations of VOCs measured in soil samples collected during Site preparation and grading are significantly different from previous data or if circumstances change such that assumptions used to calculate the risk-based SSTLs are no longer valid, risk-based SSTLs may be recalculated to reflect more accurately the distribution and concentration of VOCs in soil at the Site.