

HAZMAT

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DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737



June 16, 1994

Mr. Ignacio Dayrit
City of Emeryville Redevelopment Agency
Department of Economic Development & Housing
2200 Powell Street, 12th Floor, Suite 1200
Emeryville, California 94608-1806

Dear Mr. Dayrit:

ADDENDUM TO SOIL AND CONCRETE RELOCATION SAMPLING PLAN, 53RD AND HOLLIS STREETS, PG&E/EMERYVILLE SITE, EMERYVILLE

The Department of Toxic Substances Control (Department) has reviewed the addendum to the soil and concrete relocation sampling plan for the PG&E/Emeryville site submitted by Erler & Kalinowski, Inc. on behalf of the Redevelopment Agency. The responses to numbered comments 1 through 6 have been adequately addressed as well as the response to Dust Control Measures.

The Department evaluated the assumptions and model used to determine the potential fate and transport of total petroleum hydrocarbons (TPH) outlined in item 3. The Department agrees that the model demonstrates for the specific type of petroleum hydrocarbon present at the PG&E/Emeryville Site that soils containing a concentration up to 400 mg/kg of TPH would not present a threat to groundwater at the Shellmound I, II, and III properties.

Item 4, Comparison of Arsenic Concentrations in Soil, was reviewed by the Department's Office of Scientific Affairs. Comments to the analysis are included as an enclosure.

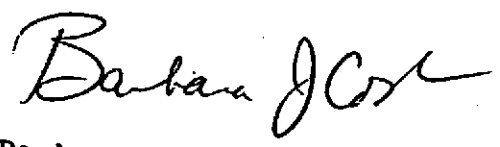
The Department also urges you to discuss the Shellmound I, II and III sites with Mr. Ron Gerber of your office. During a June 3, 1994 meeting, it was agreed that soils containing greater than 5 mg/kg of arsenic would not be left uncovered on the Shellmound properties. Also, during pipeline installation, soils containing greater than 5 mg/kg arsenic would be excavated and replaced with clean material.



Mr. Ignacio Dayrit
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If you have any comments regarding this letter, please
contact Lynn Nakashima at (510) 540-3839.

Sincerely,



Barbara J. Cook, P.E., Chief
Site Mitigation Branch

Enclosure

Erler & Kalinowski, Inc.

Consulting Engineers and Scientists

16 June 1994

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Mr. Ignacio Dayrit
City of Emeryville Redevelopment Agency
Department of Economic Development & Housing
2200 Powell Street, 12th Floor, Suite 1200
Emeryville, California 94608-1806

Subject: Response to DTSC Comments on Soil and Concrete
Relocation Sampling Plan, The City of Emeryville
53rd & Hollis Streets
Emeryville, California

Dear Mr. Dayrit:

At your request, Erler & Kalinowski, Inc. ("EKI") is pleased to submit this response to comments regarding the risk analysis for arsenic in the Addendum to the Soil and Concrete Relocation Sampling Plan ("Addendum to the Sampling Plan") for materials relocation from the property located at 53rd and Hollis Streets, Emeryville, California ("City of Emeryville/PG&E Property"), dated 6 May 1994. Comments on the Addendum to the Sampling Plan were made by the Office of Scientific Affairs, Department of Toxic Substances Control ("DTSC").

Pursuant to comments by DTSC, hypothetical lifetime incremental cancer risks for construction workers and residents due to exposure to arsenic in soil were recalculated using arsenic concentrations that represent the 95 percent upper confidence limit of average measured arsenic concentrations. The construction worker exposure scenario was augmented to include potential exposures through ingestion and dermal absorption of soil. Similar calculations also were prepared for an intermittent trespasser and off-site residents. Results of these calculations (Table 5, Revised) indicate that the maximum estimated lifetime incremental cancer risk for exposure to arsenic-containing soils is 1.5E-6 for the construction worker scenario, assuming no special worker protective measures and the maximum soil handling duration of three months. Estimated risks to trespassers and off-site residents were lower.

Responses to specific DTSC comments are presented and discussed below. Also included is an erratum to the Soil and Concrete Relocation Sampling Plan (EKI, April 1994).

Comment No. 1: Page 12, Section 4.0, second paragraph and Page 13, Section 5.0, first paragraph: There are two arithmetic mean values given for arsenic at the Emeryville/PG&E site: 14.1 mg/kg and 41 mg/kg. What is the difference in the basis for these two values? Does 14.1 mg/kg represent the mean of all soil samples taken at the Emeryville/PG&E site, while 41 mg/kg is the mean of only those soil samples taken from the top three feet of soil at the property? Please clarify.

Response:

An arithmetic mean of 41 mg/kg corresponds to the average concentration of arsenic in 19 soil samples collected from the top three feet of soil at the City of Emeryville/PG&E property. See the summary presented in the *Soil and Concrete Relocation Sampling Plan* (EKI, April 1994).

EKI calculated a second arithmetic mean for those soils proposed to be relocated. Only soils with arsenic concentrations less than the soluble threshold concentration limit ("STLC") are proposed for relocation to the Shellmound properties. Of the soil samples in the upper three feet with arsenic concentrations less than the STLC, the average arsenic concentration is 14.1 mg/kg. In other words, all soil samples with an arsenic concentration greater than the STLC were excluded when calculating the average arsenic concentration for soils to be relocated to the Shellmound properties. This procedure was used to simulate the impact of soil classification before soils are relocated to the Shellmound properties.

Comment No. 2: Page 13, Section 5.0, second paragraph: Is the justification for using the 41 mg/kg value that this concentration represents the average for that portion of the soil that would actually be excavated and relocated? Please clarify.

Response:

As discussed above, an arsenic concentration of 14.1 mg/kg represents the average concentration of arsenic in soils proposed for relocation to Shellmound. During excavation activities on the City of Emeryville/PG&E property, however, construction workers may be exposed to soils that contain an average arsenic concentration of 41 mg/kg because they will be working with all of the soil at the site, not just the soil that will be relocated.

Comment No. 3: Page 13, Section 5.0, second paragraph: If the data from which the mean value has been calculated were from random sampling, the 95 percent upper confidence limit

on the arithmetic mean should be calculated and used in the intake calculations (U.S. EPA Supplemental Guidance to Risk Assessment Guidance for Superfund: Calculating the Concentration Term, Publication 9285.7-08, May 1992). If the data used for calculating the mean value were from a purposive sampling plan, then the maximum value measured should be used in the intake estimation.

Response:

The initial risk calculations focused on dust inhalation using the procedure of Cowherd et al. (EPA, 1985), which utilizes a "bulk" contaminant concentration in fugitive dusts. In the Addendum to the Sampling Plan, the arithmetic mean arsenic concentration was assumed to be representative of "bulk" contaminant concentrations in soil.

In response to DTSC Comment No. 3, the estimated incremental cancer risk for exposure to arsenic in soil was recalculated using the upper 95 percent confidence limits on the arithmetic mean for the construction worker and residential scenarios. The mean and 95 percent upper confidence limit for arsenic in soils collected from the upper 3 feet at the City of Emeryville/PG&E property are 41 mg/kg and 103 mg/kg, respectively. An arsenic concentration of 103 mg/kg was used for the recalculation of the incremental cancer risk for the construction worker. The mean and 95 percent upper confidence limit for arsenic in soils to be relocated to the Shellmound properties are 14 mg/kg and 24.5 mg/kg, respectively. An arsenic concentration of 24.5 mg/kg was used for the recalculation of the incremental cancer risk for the off-site residential and intermittent trespasser exposure scenarios. The results of these calculations are included in Table 5, Revised.

Comment No. 4: Page 13, Section 5.0, third paragraph: The construction scenario should include incidental ingestion of and dermal contact to arsenic-contaminated soils. The default soil ingestion rate for construction workers is 480 mg soil/kg body weight (U.S. EPA Supplemental Guidance to Risk Assessment Guidance for Superfund: Standard Default Exposure Factors, Attachment B, OSWER Directive 9285.-03, March 1991), and the dermal absorption fraction from soil for arsenic is 0.03 (DTSC Preliminary Endangerment Assessment Manual, January 1994).

Response:

The calculation of estimated incremental cancer risk for exposure of a construction worker to arsenic in soil was augmented to include exposure via the pathways of soil ingestion and dermal absorption. For both the ingestion and dermal absorption calculations, a cancer potency factor of

1.75 (mg/kg-day)⁻¹ for ingestion of arsenic was obtained from IRIS, because a California cancer potency factor is still pending. (EKI personal communication with David Siegel, California Office of Environmental Health Hazard Assessment, 6 June 1994.) For dermal absorption, DTSC guidance recommends using the cancer potency factor for ingestion (DTSC, January 1994).

A soil ingestion rate of 480 mg/day was used for construction worker exposure (U.S. EPA, March 1991). The estimated incremental cancer risks for construction workers due to ingestion of arsenic-containing soil are 3.5E-7 and 1.0E-6 for one and three month exposure durations, respectively (Table 5, Revised).

The estimated incremental cancer risk for dermal absorption of arsenic-containing soils was calculated assuming an exposed skin surface area for forearms, hands, and head of 3200 sq. cm (U.S. EPA, July 1989), a soil adherence factor of 1.0 mg/sq. cm (DTSC, January 1994), and a dermal absorption fraction of 0.03 for arsenic (DTSC, January 1994). The estimated incremental cancer risks for construction workers due to dermal absorption of arsenic-containing soil are 6.9E-8 and 2.1E-7 for one and three month exposure durations, respectively (Table 5, Revised).

The total estimated lifetime incremental cancer risks for the construction worker due to inhalation, ingestion, and dermal absorption of arsenic-containing soil are 5.2E-7 and 1.5E-6 for one and three month exposure durations, respectively (Table 5, Revised).

Comment No. 5: Page 14, Section 5.2, second paragraph: It is appropriate to consider the inhalation pathway as the only potential exposure pathway for off-site residents, and the conservative assumptions used in the calculations are sufficiently protective. However, for the sake of completeness, a trespasser scenario should also be considered for the three to five-year time frame. In this scenario, intermittent dermal contact, incidental ingestion, and inhalation would be considered as potential routes of exposure to soils.

Response:

A trespasser scenario was evaluated for calculation of the incremental risk associated with inhalation, dermal contact, and ingestion of arsenic in soil while it is stockpiled or uncovered on the Shellmound properties. For this scenario it was assumed that a trespasser resides on the Shellmound properties one day per month for five years. Police from the City of Emeryville say that they patrol the area several

times a day and transients are asked to leave vacant sites. (EKI personal communication with City of Emeryville Police Department, 10 June 1994.) This exposure time is very conservative because the City of Emeryville police have indicated that they will not allow a trespasser to repeatedly stay at a vacant site, especially over a five year period. (Id.)

For the trespasser exposure scenario, an arsenic concentration of 24.5 mg/kg, representing the 95 percent upper confidence limit for soils proposed for relocation to the Shellmound properties, was used. Residential default parameters for the soil concentration for inhalation and an ingestion rate of 0.05 mg/cu. m and 100 mg/day, respectively, were assumed for the trespasser exposure scenario (DTSC, January 1994). A soil contact rate of 3200 mg/day was calculated from an assumed exposed skin surface area of 3200 sq. cm (U.S. EPA, July 1989) and an adherence factor of 1 mg/sq. cm (DTSC, January 1994). Exposed skin surface area for a trespasser presumes soil contact with the head, forearms, and hands. The estimated incremental lifetime cancer risks for a trespasser due to inhalation, ingestion, and dermal absorption of arsenic-containing soil over five years are 9.9E-9, 1.4E-7, and 1.4E-7, respectively (Table 5, Revised). The total estimated lifetime incremental cancer risk for a trespasser assuming regular presence on-site over five years is 2.9E-7 (Table 5, Revised).

Erratum to the Soil and Concrete Relocation Sampling Plan:
Section 2.1 of the Soil and Concrete Relocation Sampling Plan (EKI, April 1994), which reads as follows:

2.1 Site Description

The Site consists of a 4.54 acre parcel located at the northwest corner of the intersection of Hollis Street and 53rd Street in the City of Emeryville, Alameda County, California (Figures 1 and 2). The Site is listed with the Alameda County Assessor as Parcel No. 49-1041-28.

should be changed to include Parcel No. 491041-29 at the southwest corner of the intersection of Hollis Street and 53rd Street, Emeryville, California. Section 2.1 of the Soil and Concrete Relocation Sampling Plan (EKI, April 1994) is hereby changed to read as follows:

2.1 Site Description (Revised)

The Site consists of two parcels totaling 5.25 acres, located at the northwest and southwest

Mr. Dayrit
16 June 1994
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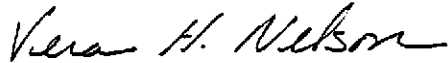
**Erler &
Kalinowski, Inc.**

corners of the intersection of Hollis Street and
53rd Street in the City of Emeryville, Alameda
County, California (Figures 1 and 2). The Site is
listed with the Alameda County Assessor as Parcel
Numbers 49-1041-28 and 49-1041-29.

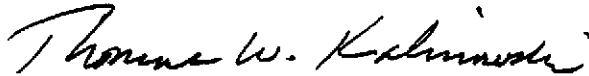
We hope that we have adequately addressed concerns of DTSC
regarding the materials relocation from the City of
Emeryville/PG&E Property to the Shellmound Properties. If
you have any questions regarding this letter, please do not
hesitate to call.

Very truly yours,

ERLER & KALINOWSKI, INC.



Vera H. Nelson, C.E. 47418
Project Manager



Thomas W. Kalinowski, Sc.D.
Vice President

cc: Carolyn Owen, Chiron Corporation

REFERENCES

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TABLE 5 (Revised)

ESTIMATED RISK ASSOCIATED WITH ARSENIC IN SOIL

Soil and Concrete Relocation Sampling Plan
 City of Emeryville/PG&E Property and Shellmound Properties, Emeryville, California
 (EKI 930028.00)

Assumed Conditions (a)	Inhalation		Ingestion		Dermal Absorption		Total Estimated Incremental Cancer Risk for Exposure to Arsenic in Soil (h)
	Assumed Dust Inhalation Conc. (mg/cu m) (b)	Estimated Incremental Cancer Risk for Inhalation of Arsenic in Soil (c)	Assumed Soil Ingestion Conc. (mg/day) (d)	Estimated Incremental Cancer Risk for Ingestion of Arsenic in Soil (e)	Assumed Soil Contact Rate (mg/day) (f)	Estimated Incremental Cancer Risk for Absorption of Arsenic in Soil (g)	
<u>Construction Exposure</u>							
1 month	1.00	9.9E-08	480	3.5E-07	3200	6.9E-08	5.2E-07
3 months	1.00	3.0E-07	480	1.0E-06	3200	2.1E-07	1.5E-06
<u>Residential Exposure</u>							
3 years	0.05	1.8E-07	-	0 (i)	-	0 (i)	1.8E-07
6 years	0.05	3.0E-07	-	0	-	0	3.0E-07
<u>Trespasser Exposure</u>							
5 years	0.05	9.9E-09	100	1.4E-07	3200	1.4E-07	2.9E-07

Notes:

- (a) Construction Exposure assumes 8 hr/day, 5 day/wk exposure for the duration specified. Residential Exposure assumes 24 hr/day, 7 day/wk exposure for the duration specified. Trespasser Exposure assumes 1 day/month exposure for the duration specified. (Police from the City of Emeryville have indicated that they patrol the area several times a day and transients are asked to leave vacant sites.) Construction workers are assumed to be exposed to soils containing an arsenic concentration of 103 mg/kg, the upper 95% confidence level for arsenic concentrations measured in the upper 3 feet at PG&E/City of Emeryville Property. Residents and transients are assumed to be exposed to soils containing an arsenic concentration of 24.5 mg/kg, the upper 95% confidence level for soils being relocated to the Shellmound properties.
- (b) A default residential exposure value of 0.05 mg/cu m respirable dust is recommended by DTSC (January 1994). For excavation activities, the respirable dust concentration may be higher than 0.05 mg/cu m. As a worst case estimate, a continuous airborne average dust concentration of 1 mg/cu m is assumed for construction activities.
- (c) Lifetime incremental cancer risks are calculated for a 70 kg human with a 70 year lifetime. For inhalation exposure, a breathing rate of 20 cu m/day is assumed (DTSC, July 1992). An inhalation cancer potency factor (CPF) for arsenic of $12 \text{ (mg/kg-day)}^{-1}$ was obtained from Standards and Criteria Work Group memorandum, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, dated 18 June 1992.
- (d) A soil ingestion rate of 480 mg/day is estimated for construction activities and is based on estimates for yard work (U.S. EPA, March 1991). A soil ingestion rate of 100 mg/day is assumed for a trespasser, obtained from estimated residential exposure rates (DTSC, January 1994).
- (e) A cancer potency factor for ingestion of arsenic of $1.75 \text{ (mg/kg-day)}^{-1}$ was obtained from IRIS because a California cancer potency factor for ingestion of arsenic is still pending.
- (f) An assumed soil contact rate of 3200 mg/day was calculated from an assumed exposed skin surface area of 3200 sq. cm (U.S. EPA, 1989) and an adherence factor of 1 mg/sq. cm (DTSC, January 1994). Exposed skin surface area for a construction worker or trespasser assumes contact with head, forearms, and hands.
- (g) For absorption of arsenic through dermal contact, an arsenic absorption fraction of 0.03 and a cancer potency factor for ingestion (see (e)) are assumed (DTSC, January 1994).
- (h) Total estimated incremental cancer risk for exposure to arsenic in soil is calculated as the sum of the inhalation, ingestion, and dermal absorption risks.
- (i) The residential exposure scenario assumes the risks for ingestion and dermal absorption exposures are zero because there will be no residents on the Shellmound properties.