Department of Toxic Substances Control

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
1001 I Street, 25th Floor
P.O. Box 806
Sacramento, California 95812-0806

Gray Davis
Governor

MEMORANDUM

TO: Theresa McGarry
Department of Toxic Substances Control
Office of Military Facilities
Northern California Operations Branch
8800 Cal Center Drive
Sacramento, California 95826

From: Patty Wong-Yim, Ph.D.
Staff Toxicologist
and
Michael J. Wade, Ph.D., DABT
Senior Toxicologist
Human and Ecological Risk Division (HERD)

DATE: August 5, 2003

SUBJECT: Ethylbenzene: Human Health Risk Assessment for Department of Defense Housing Facility, Novato, Marin County California. Document dated June 8, 2001.

PCA: 18040 Site Code: 200529-18

BACKGROUND

In response to your verbal request on July 25, 2003, HERD has evaluated the potential risks related to vapor emission and soil contact with ethylbenzene in soil, soil gas and ground water in the Sale Area at Department of Defense (DOD) housing facility. This parcel is slated for transfer to the City of Novato. The Site borders the former Hamilton Army Airfield Property in Marin County adjacent to the City of Novato. In June 2001, the Navy's contractor (Battelle) prepared a risk assessment for soil and ground water contamination at the Department of Defense Housing Facility originating from an

underground fuel tank associated with a gas station (now demolished) which previously existed on the Navy property. The contamination had been previously treated by source removal (excavation). A soil vapor extraction system was operated from 1998 to 1999. Some areas of the site have been treated by biosparging since September 2002, but this only extends to part of the Sale Area. Soil gas is monitored monthly and groundwater is generally monitored quarterly for contaminant concentrations. The Navy's risk assessment identified benzene and methyl-tert-butyl ether (MTBE) as primary drivers of carcinogenic risk at the site. At the time the risk assessment was performed by the Navy, ethylbenzene was not classified by USEPA as a carcinogen. However, recently, based on results from a new rodent carcinogenicity bioassay performed by the National Toxicology Program (NTP), USEPA's National Center for Environmental Assessment (NCEA) has determined that ethyl-benzene is carcinogenic and calculated inhalation and oral cancer slope factors of 3.85E-3 $(mg/kg\text{-}day)^{-1}$ for ethylbenzene (USEPA, 2002a). These values are cited in the most recent compendium of Preliminary Remedial Goals (PRGs) issued by USEPA Region 9 (USEPA, 2002b).

Previous Activity on this Issue

In a memo from Michael Schum dated July 6, 2001, HERD reviewed the Navy's June 2001 risk assessment for contamination originating from gasoline leaking from a former underground storage tank. HERD generally accepted the Navy's conclusions from that risk assessment. In February of 2003, HERD provided comments to OMF on the Internal Draft Phase IVC FOST for Exchange Parcel 1.

HERD EVALUATION

Toxicity Criteria and Exposure Parameters

HERD estimated ethylbenzene related risks for the residential and industrial scenarios according to parameters utilized in the Navy's risk assessment (Battelle, 2001). HERD also recalculated the risks from the other VOCs present as risk drivers (benzene and MTBE). The excavation scenario estimated in the Navy's document was not included in our calculations because the Navy's results indicated that the hazard associated with excavation was unacceptable without special land use controls. Therefore, given that protective measures would be needed to limit exposure to benzene and MTBE in the case of excavation into contaminated areas, we did not evaluate this exposure scenario for ethylbenzene since protective measures would mitigate that risk also.

Exposure Pathways

HERD evaluated potential human health risks from direct contact to ethylbenzene in

impacted soil at the Sale Area, inhalation exposure to indoor air due to vapor intrusion, and inhalation exposure to outdoor air due to ethylbenzene released from soil and groundwater. HERD evaluated the risks using the current inhalation and oral cancer slope factors (CSFi and CSFo) adopted by the USEPA Region 9 (USEPA, 2002b). Detailed chemical risks calculated for each pathway are summarized in Attachment 1.

Indoor Air Pathway: Indoor air risks for the residential and industrial worker scenarios are estimated by the DTSC spreadsheet version of the USEPA Johnson and Ettinger vapor intrusion model (USEPA, 2000), using the current CSFi for ethylbenzene (USEPA, 2002b). Soil gas concentration of ethylbenzene at soil gas location SG-16 collected in Fall 2000 (42.5 ppbv, Appendix H, Battelle, 2001) is used as the input concentration in the indoor air model. Printouts of the indoor air model results are attached to this memorandum for reference (Attachment 2).

Outdoor Air Pathway: Predicted outdoor air concentrations of ethylbenzene at the Sale Area (Table 3-7 and Table 3-11, Battelle, 2001) are used as exposure point concentrations (EPCs) in the outdoor air risks calculation. A unit risk factor (URF) of 1.1E-6 $(\mu g/m^3)^{-1}$ for ethylbenzene is derived from the current CSFi (USEPA, 2002b). Equation 3-1 from the Navy's risk assessment (page 3-1, Battelle, 2001) is used in deriving outdoor air risks for ethylbenzene.

Soil Pathway: Risks from direct contact with impacted soil at the Sale Area are determined using the 95% UCL concentration of ethylbenzene in soil (Table 3-11, Battelle, 2001) as an EPC. Risk equation 3-12 in the Navy's risk assessment (Page 3-12, Battelle, 2001), and the current CSFo for ethylbenzene (USEPA, 2002b) are also used in this calculation.

Table 1. Exposure Point Concentrations in Sale Area and Toxicity Criteria

Contaminant	95% UCL[a] concentration in soil (mg/kg)	Maximum Concentration in groundwater (mg/L)	Concentration in soil gas at SG-16 (ppbv)	Inhalation cancer slope factor $(mg/kg\text{-}day)^{-1}$	Oral cancer slope factor $(mg/kg\text{-}day)^{-1}$
Ethyl-benzene	3.906	0.9	42.5	3.85E-3	3.85E-3
Benzene	2.248	1.6	759.3	1E-1[b]	5.5E-2
MTBE	3.576	35	2866	9.0E-4	1.8E-3

[a] 95 percent upper confident limit of the mean (95% UCL)
[b] The Cal EPA CSFi for benzene is used

Table 2. Cancer Risks of VOCs at the Sale Area

Contaminant	Residential Risk	Industrial Risk
Ethylbenzene	8E-7	3E-7
Benzene	2.7E-5	1.6E-5
MTBE	7E-7	4E-7
All contaminants (total risk)	2.8E-5	1.6E-5

DISCUSSION AND CONCLUSION

After completion of the risk assessment for the fuel related contamination at the DOD Facility in Novato, Region 9 USEPA identified ethylbenzene as a carcinogen and listed a cancer slope factor for it. HERD calculated the carcinogenic risk from ethylbenzene present in the Sale Area at the DOD Housing Facility that is slated for transfer to the City of Novato. HERD also recalculated the risks from the other VOCs present as risk drivers (benzene and MTBE). Our calculations estimated that the total industrial risk from all VOCs in the Sale Area is about 2.8E-5 for a residential exposure scenario and 1.6E-5 for an industrial exposure scenario compared to the values of 1.5E-5 and 8.3E-6 respectively, identified in the 2001 Battelle document. The risks estimated by HERD exceed the point of departure of 1×10^{-6} listed in the National Contingency Plan (NCP), but are within the 1×10^{-6} to 1×10^{-4} risk management range cited in the NCP. HERD understands that the Sale Area will be developed for commercial/ industrial use. Several health protective assumptions were utilized in both the HERD and Battelle calculations which tend to overestimate risk, including use of maximum soil gas and groundwater concentrations and use of a health protective model for estimating concentrations of contaminants in outdoor air. Additionally the models used to estimate indoor and outdoor air concentrations assumed a non-depleting source, whereas in fact the source is finite and active remediation is ongoing in some of the contaminated areas. HERD expects that soil, ground water and soil gas concentrations of site related VOCs will decrease over time with a resultant decrease in site related risk.

cc: Michael Schum, Ph.D.
Staff Toxicologist, HERD

Attachments

REFERENCES

Battelle, Environmental Restoration Department, (2001). Final Revised Risk Assessment for Former UST Site 957/970 Department of Defense Housing Facility Novato, California.

USEPA National Center for Environmental Assessment, (2002a). CASRN 100-41-4 Risk Assessment Issue Paper titled: Derivation of an Inhalation Unit Risk for Ethylbenzene

US EPA Region XI Preliminary Remediation Goals, (2002b). Memorandum from Stanford Smucker, Ph.D., Regional Toxicologist. (http://www.epa.gov/region09/waste/sfund/prg/index.htm).

USEPA Office of Emergency and Remedial Response, (2000). User's Guide For The Johnson And Ettinger (1991) Model For Subsurface Vapor Intrusion Into Buildings (Revised). (http://www.epa.gov/oerrpage/superfund/programs/risk/airmodel/johnson_ettinger.htm)

ATTACHMENT 1

Table 1. Chemical Risks of Individual Exposure Pathways for a Hypothetical Residential Receptor in the Sale Area

Contaminant	Direct contact of soil	Outdoor air from groundwater	Outdoor Air from Soil	Indoor Air
Ethylbenzene	1.30E7	2.32E-7	3.71E-7	3.70E-8
Benzene	1.05E-6	7.23E-6	5.22E-6	1.30E-5
MTBE	5.34E-8	1.32E-7	3.13E-8	4.80E-7
All contaminants (total risk)	1.23E-6	7.59E-6	5.62E-6	1.35E-5

Table 2. Chemical Risks of Individual Exposure Pathways for a Future Industrial Receptor in the Sale Area

Contaminant	Direct contact of soil	Outdoor air from groundwater	Outdoor air from soil	Indoor air
Ethylbenzene	2.66E-8	1.09E-7	1.740E-7	2.20E-8
Benzene	2.19E-7	4.30E-6	3.11E-6	7.90E-6
MTBE	1.11E-8	7.84E-8	1.86E-8	3.00E-7
All contaminants (total risk)	2.57E-7	4.49E-6	3.30E-6	8.22E-6

Theresa McGarry
Attachment 2
Page 1
08/05/03

Table 1. Indoor Air Model Results of Ethylbenzene for a Hypothetical Residential Receptor in the Sale Area

DATA ENTRY SHEET

DTSC/HERD 12/1/01

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (µg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414			4.25E-02	Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	91.44	15			3.03E-08

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)
1.4	0.48	0.1

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
7.50E-02	7.80E-06	7.88E-03	25	8,501	409.34	617.20	0.0E+00	2.0E+00	106.17

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
76.44	0.380	#N/A	#N/A	#N/A	3.03E-08	3,844	1.91E+02	5.63E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	10,098	4.36E-03	1.84E-01	1.77E-04	1.30E-02	76.44

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.91E+02	0.10	2.90E+01	1.30E-02	3.84E+02	7.95E+37	4.34E-04	8.29E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.7E-08	7.8E-05

MESSAGE SUMMARY BELOW:

END

Table 2. Indoor Air Model Results of Ethylbenzene for a Future Industrial Worker Receptor in the Sale Area

DATA ENTRY SHEET

DTSC/HERD 12/1/01

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414			4.25E-02	Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	91.44	15			3.03E-08

MORE ↓

ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
1.4	0.48	0.1

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	25	25	250

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (°C)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Molecular weight, MW (g/mol)
7.50E-02	7.80E-06	7.88E-03	25	8,501	409.34	617.20	0.0E+00	2.0E+00	106.17

END

INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
76.44	0.380	#N/A	#N/A	#N/A	3.03E-08	3,844	1.91E+02	5.63E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
9.24E+05	4.16E-04	15	10,098	4.36E-03	1.84E-01	1.77E-04	1.30E-02	76.44

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)
15	1.91E+02	0.10	2.90E+01	1.30E-02	3.84E+02	7.95E+37	4.34E-04	8.29E-02

Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-06	1.0E+00

END

RESULTS SHEET

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-08	5.6E-05

MESSAGE SUMMARY BELOW:

END

Department of Toxic Substances Control

Edwin F. Lowry, Director
8800 Cal Center Drive
Sacramento, California 95826-3200

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Gray Davis
Governor

April 22, 2003

Mr. Jim McAlister
United States Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

APPROVAL OF THE HUMAN HEALTH RISK ASSESSMENT OF VOLATILE ORGANIC COMPOUNDS (VOCS) IN SOIL GAS NEAR HAMILTON ARMY AIRFIELD, LANDFILL 26, DATED DECEMBER 2002, NOVATO CALIFORNIA

Dear Mr. McAlister:

The Department of Toxic Substances Control (DTSC) has reviewed the Human Health Risk Assessment (HHRA), and subsequent corrected pages, submitted and dated January 13, 2003 and concurs with its findings. Please find enclosed specific comments from DTSC's risk assessor regarding the report that should be made part of the HHRA public record.

The Army prepared the risk assessment to evaluate potential human health risks from various volatile organic compounds (VOCs) detected in soil gas within Hamilton Meadows residential development. In addition, methane has been detected within the residential area. The VOCs and methane may have migrated from the Army's landfill to the offsite residential area. Since the primary concern with methane is flammability, the HHRA focused on risks from VOCs.

Results of the HHRA support the conclusion that there appears to be no current health risks from potentially migrating VOCs offsite, however, DTSC understands that there is elevated methane in localized areas within Hamilton Meadows. The Army has installed a landfill gas migration trench in between the landfill and Hamilton Meadows to stop landfill gas migration and will continue its monitoring for methane impacts. Further, Shea Homes, residential developer, is currently working with the California Integrated Waste Management Board and the local enforcement agency (County of Marin) to establish appropriate protective measures to address potential buildup of explosive gases in structures.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.
Printed on Recycled Paper

DTSC believes that the Army should continue to monitor the soil vapor concentrations both in and around the Landfill as well as on the Hamilton Meadows property.
Thank you for the opportunity to review the HHRA. If you have any questions, please contact me at (916) 255-3664.

Sincerely,

Theresa McGarry

Theresa McGarry.
Project Manager
Base Closure Unit
Office of Military Facilities

Enclosure

cc: Mr. Brian Bateman
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

Mr. Jim Davies
Davies Associates
5 Amalifi Place
San Rafael, California 94901-4308

Mr. Thom Gamble
Shea Homes
Shea Center Drive
Livermore, California 94551

Ms. Laura Herse
Shea Homes
100 Metro Drive, Suite 260
San Jose, California 95110

Mr. Mark Janofsky
Marin County Environmental Health Services
Community Development Agency
3501 Civic Center Drive, Room 236
San Rafael, California 94903

cc: Mr. Richard Seraydarian
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105-4308

Mr. James Ponton
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Mr. Gino Yekta
California Integrated Waste Management Board
Remediation, Closure, Technical Services
1001 I Street
Sacramento, California 95814

Mr. Michael Wochnic
California Integrated Waste Management Board
Remediation, Closure, Technical Services
1001 I Street
Sacramento, California 95814

Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Department of Toxic Substances Control

Edwin F. Lowry, Director
2878 Camino Del Rio South, Suite 402
San Diego, California 92108

Gray Davis
Governor

MEMORANDUM

TO: Theresa McGarry
Office of Military Facilities
8800 Cal Center Drive
Sacramento, CA 95826-3746

FROM: Michael Schum, Ph.D.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: March 5, 2003

SUBJECT: Hamilton Army Airfield, Landfill 26, Novato
Review of Final Human Health Risk Assessment
PCA: 14740 Site: 201268-47

Background

Per your technical services request, the Human and Ecological Risk Division (HERD) has reviewed a revised human health risk assessment prepared by the Army Corps of Engineers to evaluate potential risks in the Hamilton Meadows Subdivision adjacent to Landfill 26.

Document Reviewed

"Final Report Human Health Risk Assessment of Volatile Organic Compounds in Soil Gas near Hamilton Army Airfield, Landfill 26, Novato, California," prepared for the U. S. Army Corps of Engineers by CH2MHILL, dated December 2002.

General Comments

The revisions made to the Draft Final risk assessment, dated October 2002, are acceptable to HERD and have incorporated all our recommended changes.

Changes in Toxicity Criteria. The USEPA has recently reviewed and updated its risk assessment criteria for 1,3-butadiene. The revised value is approximately six-fold lower than the value used to calculate risks in the Final HRA for the Hamilton Meadows. HERD does not recommend that the Final HRA be revised again. However, the following information should be included in the public record and made available for public review with the HRA.

The Final HRA noted that three locations had predicted indoor air risks that slightly exceeded a 1×10^{-6} de minimis risk level. At two of these locations, approximately 80% of the risk was attributable to isolated occurrences of 1,3-butadiene in shallow soil gas. Using the USEPA's more recent cancer potency toxicity criteria for 1,3-butadiene, the risks at these two locations are predicted to be less than 1×10^{-6} using highly conservative exposure assumptions. This update should be considered in the following sections of the Final HRA: pgs. ES-2, ES-4, 7-2, 8-3, 8-4, 8-5, Table 7-2, Appendix K.

The following summarizes the toxicity criteria for 1,3-butadiene.

1,3-Butadiene. The USEPA has completed an extensive review of the toxicity of 1,3-butadiene and posted new criteria on the Integrated Risk Information System (IRIS) data base. USEPA's current process for making changes, additions or deletions of toxicity criteria in IRIS involves preparation of external review documents by the USEPA National Center for Environmental Assessment (NCEA), external peer review, external public comment period review and evaluation by the USEPA Science Advisory Board (SAB). The revised butadiene toxicity criteria has undergone this required review, and revised criteria were posted on IRIS on 11/5/2002. The USEPA recommends an inhalation noncancer RfC of 2 ug/m^3 based on an NTP inhalation study in mice (1993). The cancer inhalation unit risk has been revised to 3×10^{-5} per ug/m3 (equivalent to a cancer potency slope of 0.11 $(mg/kg\text{-}d)^{-1}$), based on more recent epidemiological results (Delzell 1995). OEHHA developed an inhalation unit risk of 1.7×10^{-4} in the Toxic Air Contaminant (TAC) listing document in 1992 (equivalent to a cancer potency slope of 0.6 $(mg/kg\text{-}d)^{-1}$). OEHHA has not proposed a noncancer inhalation toxicity criteria (chronic REL). Since butadiene is a gas at room temperature, no oral criteria were proposed for IRIS. Risk assessments prepared for DTSC are required to use OEHHA criteria when available. However, HERD believes that the more recent, revised USEPA criteria for 1,3-butadiene provides a more realistic estimate of cancer risk, and should be considered by DTSC staff for risk management purposes on a site-specific basis.

Summary

The Final Human Health Risk Assessment predicted maximum calculated lifetime excess cancer risk slightly in excess of one in one million at three locations, HERD believes that the very conservative assumptions used in the indoor air fate and transport model lead to predicted indoor air concentrations which are not likely to be exceeded for long term chronic exposures. In addition, recent updates by the USEPA to the cancer potency of 1,3-butadine will reduce the predicted risks at two of these three locations to less than one in one million. The maximum estimated risk at one location is predicted not to exceed two in one million. Furthermore, we note though that the soil gas concentrations used to estimate risk are very patchy in space and time and there does not appear to be a clear concentration gradient from Landfill 26 south across

the Hamilton Meadows Subdivision. The data is not sufficient to rule out potential landfill gas migration and alternate sources have not been identified. Even though the estimated health risks are quite low and very conservative model and exposure assumptions were used to calculate risks, HERD believes it is prudent to continue to monitor the soil vapor concentrations both in and around Landfill 26 as well as on the Hamilton Meadows property

The comments we have provided are meant to be constructive and we hope they are useful. If you have any questions please call me at (619) 278-3743 or the Human and Ecological Risk Division at (916) 255-6640.

Reviewed by: Michael Wade, Ph.D.
Senior Toxicologist

Department of Toxic Substances Control

Edwin F. Lowry, Director
400 P Street, 4th Floor, P.O. Box 806
Sacramento, California 95812-0806

Winston H. Hickox
Secretary for
Environmental
Protection

Gray Davis
Governor

January 22, 2001

Mr. Thomas L. Macchiarella, Jr.
Naval Facilities Engineering Command
- Southwest Division
1220 Pacific Highway
San Diego, California 92132-5190

APPROVAL OF NO FURTHER ACTION FOR FORMER DRY-CLEANING AND LAUNDRY SITE (NAVY PARCEL 4), DEPARTMENT OF DEFENSE HOUSING FACILITY, FORMER HAMILTON AIR FORCE BASE, NOVATO, CALIFORNIA

Dear Mr. Macchiarella:

The Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB), (collectively, the State), have determined that the subject parcel shown on the enclosed map does not require response actions with regard to hazardous substances and petroleum compounds.

DTSC, as the lead State regulatory agency, has determined that the parcel shown in the enclosed map, does not require response actions with regard to hazardous substances and is suitable for unrestricted use. Please be advised that should this parcel be considered for the proposed acquisition and/or construction of school properties utilizing state funding, a separate environmental review process in compliance with the California Education Code 17210 et. seq, will need to be conducted and approved by DTSC.

This determination is made pursuant to the California Health and Safety Code, Division 20, Charter 6.8 and is based on pertinent information included in the documents listed in Enclosure 1. The RWQCB has also determined that the underground storage tanks have been properly closed and there is no further action necessary for the subject parcel (see RWQCB Letters dated November 8, 2000 and November 21, 2000). However, should additional information be provided regarding a release or threatened release of hazardous substances or petroleum products, further investigation and/or remediation may be required. If our review of the final Finding of Suitability to Transfer

(FOST), reveals no concerns, this letter, along with our FOST comment letter, will support the Navy's transfer of the subject parcel.

To complete the State's Site Mitigation Process, the parcel listed above will be included in the basewide Remedial Action Plan and subsequent DTSC Certification.

If you have any questions, please fee free to contact Ms. Theresa McGarry, Project Manager, at (916) 255-3664.

Sincerely,

Anthony J. Landis, P.E.
Chief
Northern California Operations
Office of Military Facilities

Enclosures

cc: Mr. Jim Davies
Harding Lawson Associates
90 Digital Drive
Novato, California 94949

Mr. Ray Seid
United States Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. John Hill
Base Closure Specialist
Naval Facilities Engineering Command
- Southwest Division
1220 Pacific Highway
San Diego, California 92132-5190

Mr. James D. Ponton
California Regional Water Quality Control Board
1515 Clay Street
Oakland, California 94612

Enclosure 1

DOCUMENTS REVIEWED FOR APPROVAL OF NO FURTHER ACTION
NAVY DRY-CLEANING AND LAUNDRY FACILITY (NAVY PARCEL #4)

DEPARTMENT OF DEFENSE HOUSING FACILITY
HAMILTON AIR FORCE BASE
NOVATO, CALIFORNIA

1. RWQCB Case Closure Letter for Underground Storage Tanks 21-9202 (Bldg.. 827-1 and -2) dated November 8, 2000

2. RWQCB No Further Action Letter for Bldg. 827, UST 21-9S9001 (B827-3 and 827-4) dated November 21, 2000

3. DTSC Memorandum, Remedial Investigation and Corrective Measures Study (RI/CMS) and Site Closure Report for the Underground Storage Tank at Building 827, Department of Defense Housing Facility, Novato, dated September 27, 2000

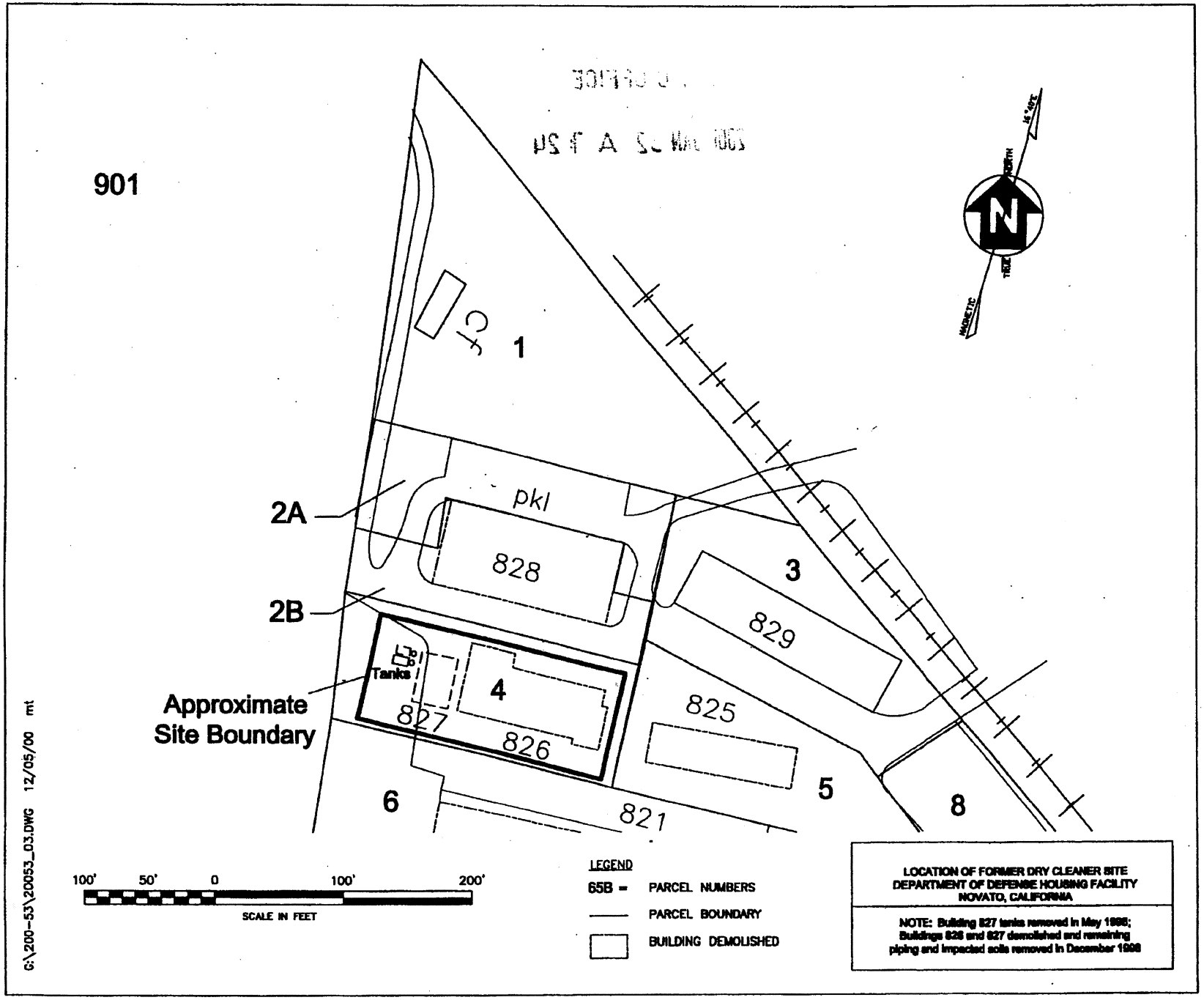
4. Final Remedial Investigation and Corrective Measures Study for the Underground Storage Tank Site at Building 827, Department of Defense Housing Facility, Novato, California Vols. I & II October, 1999

5. AGS Site Closure Report for Underground Storage Tank Site at Building 827, Department of Defense Housing Facility, Novato, California, January, 2000

6. Navy's Final response to RWQCB comments, Final RI/CMS Report and site Closure Report, September 25, 2000

7. Final Phase 1 Supplemental Environmental Baseline Survey, Department of Defense Housing Facility, Novato, California, April 21, 1997

8. Field Summary Report, Storm Drain Clean out and Sediment Removal, Department of Defense Housing Facility, Novato, California, July 1997


901
1
2A
2B
pkl
828
3
829
Tanks
4
827
826
825
Approximate
Site Boundary
6
821
5
8
NORTH
TRUE
MAGNETIC
100'
50'
0
100'
200'
SCALE IN FEET
LEGEND
65B = PARCEL NUMBERS
PARCEL BOUNDARY
BUILDING DEMOLISHED
LOCATION OF FORMER DRY CLEANER SITE
DEPARTMENT OF DEFENSE HOUSING FACILITY
NOVATO, CALIFORNIA
NOTE: Building 827 tanks removed in May 1998;
Buildings 826 and 827 demolished and remaining
piping and impacted soils removed in December 1998
G:\200-53\20053_03.DWG 12/05/00 mt

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

December 4, 1997

Theresa McGarry

Mr. Raymond Leclerc
RPM, DODHF Novato
Office of Military Facilities
Department of Toxic Substances Control
10151 Croydon Way, Suite 3
Sacramento, CA 95827-2106

Dear Mr. Leclerc:

We have received the Navy's July 30, 1997 and August 20, 1997 letters requesting the State's concurrence on "no further action" determinations on DOD Housing Facility parcels located in Novato, California. Based on information contained in the Phase I Supplemental Environmental Baseline Survey; the July 1997 Field Summary Report on Storm Drain Cleanout and Sediment Removal, as amended by information submitted October 8, 1997; and the August 4, 1997 EBS Followup Sampling Addendum, and based on recommendations made by the November 17, 1997 letter from the Regional Water Quality Control Board, San Francisco Bay Region, we recommend the State consider the following status of the parcels:

PARCELS RECOMMENDED FOR NO FURTHER ACTION CONCURRENCE:

Parcels #8, 9, 12, 16, 54, 64, and 104.

PARCELS WHERE FURTHER ACTIONS MAY BE NECESSARY DUE TO PETROLEUM CONTAMINATION:

Parcels #15, 28, and 29.

PARCELS WHERE FURTHER ACTIONS MAY BE NECESSARY DUE TO THE PRESENCE OF LEAD-BASED PAINT:

Parcels #21 and 22.

We appreciate this opportunity to offer our input to the Navy's request. Should you have questions, you may contact me at (415) 744-2394.

Printed on Recycled Paper

Mr. Leclerc
December 4, 1997
Page 2

Sincerely,

Raymond Seid

RAYMOND SEID
Remedial Project Manager
Federal Facilities Cleanup Branch (SFD-8-3)

cc: Susan Gladstone, SF Bay RWQCB, Oakland
Theresa McGarry, Reuse Specialist, DTSC, Sacramento
Larry Lind, BEC, Navy EFA West, San Bruno

California Regional Water Quality Control Board

San Francisco Bay Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov
1515 Clay Street, Suite 1400, Oakland, California 94612
Phone (510) 622-2300 • FAX (510) 622-2460

Gray Davis
Governor

Date: APR 1 6 2003
File No. 2159.5008 (JDP)

Mr. Thomas L. Macchiarella
Naval Facilities Engineering Command
- Southwest Division
1220 Pacific Highway
San Diego, California 95132-5190

SUBJECT: RWQCB Staff Approval of Report Titled "Draft Summary Report for Hydraulic Lift and Oil Water Separator Removal from Building 970, Department of Defense Housing Facility, Novato, California, dated July 2000

Dear Mr. Macchiarella, Jr.:

Provided below is a brief history supporting the RWQCB staff's approval of the draft "Summary Report for Hydraulic Lift and Oil Water Separator Removal from Building 970, Department of Defense Housing Facility, Novato, California," (Draft Removal Report) as required by Task 3 and Task 4 of Order No. 00-064. Please note that RWQCB staff has coordinated this approval with Project Manager Ms. Theresa McGarry with the Department of Toxic Substances Control.

As you know, Task 3 and Task 4 of Site Cleanup Requirements (SCR) Order No. 00-064 (the Order), required the creation of a interim remedial action work plan (Work Plan) for soil followed by implementation and documentation of the remedial action, respectively, at the Building 970 former Naval Exchange (NEX) gas station site.

The Work Plan task built upon earlier interim remedial actions performed at the site (i.e., air-sparging the aquifer coupled with SVE) and required evaluation of remedial action alternatives for hydrocarbon-impacted soil of significant concentration near of the former NEX underground storage tanks (USTs), ancillary piping, and hydraulic lifts, as appropriate. Significant hydrocarbon concentrations were subsequently defined as 100 parts per million (ppm) for gasoline and 1,000 ppm for extractable range hydrocarbons.

As required by Order, on March 31, 2000, the Navy completed a report titled *"Final Work Plan for Hydraulic Lift and Oil/Water Separator Removal form Building 970 NEX."* Since the NEX was closed in the early 1990s and three USTs, ancillary piping and pump islands were removed

in the mid-1990s, the removal action described in the Work Plan focused those site features which remained at the time. The Work Plan primarily focused on the removal of three hydraulic lifts and control lines for the hydraulic lifts.

Following regulatory approval of the Work Plan, field activities were initiated in April 2000 to remove and sample soils surrounding the hydraulic lifts. During the removal activities, additional subsurface features were discovered that were not described in the Work Plan. In addition to the known hydraulic lifts, contractors working for the Navy discovered and removed two oil/water separator units and associated influent and effluent piping, floor drains leading to one oil water separator, four buried sub-slab drums that acted as collection tanks associated with an oil water separator, sanitary sewer laterals, and a waste oil line associated with a former waste oil tank.

During removal activities, petroleum impacted soil was encountered near both oil water separator units, two of the buried sub-slab drums, and beneath and around the foundations in the northern and northwestern portions of Building 970. Over-excavation activities were performed to the extent practicable to removal affected soils encountered during removal activities. Complete removal of the affected soil was constrained by the potential to undermine building foundations. Verification soil samples were collected to confirm the absence of impacted soils or to define the degree and extent of impacted soils left in place (i.e., building footings). All excavated soil resulting from the removal actions was disposed of at a California state-certified disposal facility.

Since the receipt and review of the Draft Summary Report, two major, related documents have been produced for the NEX site. These include the:

- *"Final Revised Risk Assessment for Former UST Site 957/970, at the Department of Defense Housing Facility, Novato, California,"* (the Final RA), dated June 2001; and,
- *"Final Corrective Action Plan (CAP) for Former Underground Storage Tank Site 957/970 at the Department of Defense Housing Facility, Novato, California,"* (the final CAP), dated March 2002.

The Final RA presents the results of a risk assessment that was conducted to determine health risks to potential future human receptors caused by the presence of residual fuel hydrocarbons in soil and groundwater at the site. The results of the risk assessment pertaining to an excavation worker at the NEX site indicate that precautionary measures (i.e., reducing VOC emission rates during excavation activities) should be taken when working at the site.

The Final CAP, as described in Sections 6.2.1.3 and 7.2.3, specifies institutional controls (ICs) as a component of the selected corrective action (i.e., bio-sparging of MTBE plume coupled with monitored natural attenuation) for the NEX site. The ICs will be established as described in the

final CAP to manage site soils impacted by residual petroleum pollution (i.e., beneath building footing, etc.) to ensure that if these soils are disturbed, they will be managed properly and safely as to not adversely affect site workers and the environment.

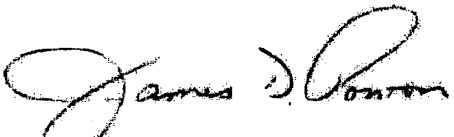
Although the draft Summary Report concluded (and documented through sampling), that remaining soil volumes (which were left in place for structural safety) be removed and properly disposed of at the time of building demolition, RWQCB staff deem onsite management of residual hydrocarbon-impacted soils an acceptable alternative to offsite disposal provided that onsite management does not increase environmental risk or change the input conditions (i.e., depth of contamination, etc.) used in the Final RA.

It is Staff's opinion that the remedial action objectives for soil are therefore considered to have been achieved by the operation of the interim remedial corrective action and hydraulic lift removal activities. Given the results of the final RA coupled with three years of quarterly groundwater monitoring, no further corrective action for soils is required to satisfy Task 3 of Order No. 00-064 other than the implementation and enforcement of the ICs that are outlined in the Final CAP.

On a final note, although the completion of the interim removal action described above was reported in a July 2000 Draft Summary Report (as required by Task 4, Order No. 00-064), the Draft Summary Report has never been finalized. Furthermore, several minor edits to the Draft Summary Report as described in an October 10, 2000 RWQCB staff comment letter are still pending and require action.

Please make the changes and as summarized in the Department of Navy's December 14, 2000 responses to RWQCB staff comments on the draft Removal Report. The Department of Navy is requested to finalize (i.e., make the final edits) to the draft Removal Report by June 2, 2003.

Sincerely,



James D. Ponton, R.G. 6106
Associate Engineering Geologist
San Francisco Bay - Regional Water Quality
Control Board

cc: Theresa McGarry
Department of Toxic Substances Control, Office of Military Facilities
8800 Cal Center Drive
Sacramento, CA 95826