Letter Health Consultation

Evaluation of Post-Remediation Soil Samples

THOMPSON-HAYWARD FACILITY

NEW ORLEANS, LOUISIANA

MARCH 3, 2008

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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LETTER HEALTH CONSULTATION

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NEW ORLEANS, LOUISIANA

Prepared By:

Louisiana Department of Health and Hospitals
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry

STATE OF LOUISIANA
DEPARTMENT OF HEALTH AND HOSPITALS

Bobby Jindal
GOVERNOR

Alan Levine
SECRETARY

Tom Harris, Administrator
Environmental Technology Division
Louisiana Department of Environmental Quality
602 N. Fifth Street
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Dear Mr. Harris,

The Louisiana Department of Health and Hospitals/Office of Public Health/Section of Environmental Epidemiology and Toxicology (DHH/OPH/SEET) has evaluated post-remediation soil samples collected from the Thompson-Hayward site in New Orleans, Louisiana. The following letter provides the results of SEET's assessment of two sets of confirmatory sampling data.

Background and Statement of Issues

The Thompson-Hayward facility is located at 7700 Earhart Boulevard in a residential/light industrial district of New Orleans (see Figure A-1). The facility was originally involved in the formulation of pesticide products, then in the bagging of soda ash and warehousing and distribution of dry cleaning fluids, commercial pest control products, and other industrial chemicals. Since 1988, the site has been unoccupied [1, 2].

In 1987, contaminants related to dry-cleaning processes were detected in municipal storm sewers flowing from the Thompson-Hayward site. Pesticide and dry cleaning contaminants were also detected in on-site soils. The subsequent remediation processes included closure of on-site storm drains, excavation and off-site disposal of contaminated soils, and demolition of a warehouse and aboveground storage tanks. Remedial activities were completed in August 2007, and the excavations have been filled with clean soil and seeded with grass. A conveyance notification recorded in the Orleans Parish conveyance records notes that onsite residual contaminant concentrations are greater than those defined for residential use. Future property owners are required to either continue to use the site in an industrial capacity or must reevaluate the onsite media before converting the property for residential use [1]

During the most recent excavation event, contaminated soil was removed from four major areas at the site. Soil samples were collected from each excavated area before the areas were filled and seeded. On behalf of T.H. Agriculture & Nutrition, L.L.C. and Elementis Chemicals, Inc., Shaw

Environmental Inc. collected 109 samples of the soil remaining after excavation (referred to as "residual soil") from January 11, 2007-May 10, 2007 to confirm attainment of the remedial objectives. The Louisiana Department of Environmental Quality (LDEQ) collected an additional 11 soil samples on June 21, 2007. The soil samples were analyzed for a total of 185 contaminants, including metals, pesticides, semivolatile organic compounds, and volatile organic compounds. At the request of LDEQ, SEET has reviewed both the Shaw Environmental Inc. and LDEQ confirmatory sets to determine whether any contaminants remaining samples collected from the excavated areas (residual contaminants) pose potential human health hazards.

Discussion

SEET screened the contaminants detected at the site for potential human health risks using health-based comparison values, as described in Appendix B. Contaminants that exceeded these comparison value were identified as contaminants of concern (COCs). Occupational doses and lifetime cancer risks were estimated for the COCs (see Tables B-1 through B-3). Residential risks were not considered because residential use of the site is currently prohibited and the site is fenced to restrict access.

None of the occupational doses estimated for COCs detected in either sampling event at the site were high enough to pose a noncancer health risk to onsite workers. None of the doses estimated for contaminants detected during the LDEQ confirmatory sampling event pose an increased lifetime cancer risk to onsite workers. Two contaminants, aldrin and tetrachloroethene, were found in soil samples from the Shaw Environmental Inc. confirmatory sampling event at levels that pose a potential lifetime cancer risk increase for individuals working at the site. The aldrin and tetrachloroethene concentrations in question are listed in Tables B-4 and B-5.

Aldrin is a man-made insecticide. From the 1950s until 1970, aldrin was used to protect crops such as corn and cotton. In 1972, after two years of being banned from use by the US Department of Agriculture, aldrin was approved for use in termite control. In 1987, the manufacturer of aldrin voluntarily canceled the registration for use in controlling termites. Exposure to aldrin is limited because it is no longer produced or used for pest control and because aldrin in the environment is degraded quickly to dieldrin by sunlight and bacteria. If aldrin enters the human body, it rapidly breaks down into dieldrin, which can be stored in fat for years [3].

Tetrachloroethene, also known as tetrachloroethylene, is a chemical used in dry cleaning processes, metal degreasing, and as starting material in producing other chemicals. It easily evaporates into air, where it stays until it breaks down into other contaminants or until washed down into soil or water bodies by rain. Once in the environment, tetrachloroethene can bind to the soil without degrading [4].

The concentrations of aldrin estimated to cause an increased lifetime cancer risk through occupational oral and/or dermal exposures were detected at depths of 5 to 9.5 feet in Area 1. The four concentrations of tetrachloroethene estimated to cause an increased lifetime cancer risk through occupational oral exposures were detected at depths of 4 to 9.5 feet in Areas 1 and 2; three of these samples were located in Area 2, Grid 5. Both Area 1 and Area 2 have been filled with clean soil and covered with grass; as long as the fill and cover remain undisturbed, no

pathways of exposure exist between workers and these subsurface contaminants. Aldrin and tetrachloroethene therefore pose no public health hazard to on-site workers. Even if construction and excavation were to open an exposure pathway to these contaminants, it is unlikely that individuals would work long enough in the sampling locations under question to increase their lifetime cancer risk.

Conclusion
Aldrin and tetrachloroethene were detected at the Thompson Hayward site in concentrations that could pose an increased lifetime cancer risk with long-term exposure. However, the excavated areas at the site have been filled with clean soil and covered over with grass, the onsite water lines no longer flow into the municipal water lines, and workers are unlikely to be exposed to the specific sampling locations for a prolonged period of time. The residual contaminants at the Thompson Hayward site therefore pose no public health hazard.

Recommendations
If future land use at the Thompson Hayward site necessitates workers operating in excavated Areas 1 and 2 for prolonged periods over years, or if the land use changes from industrial to residential, the soils in these areas should be reevaluated.

SEET will be glad to assess any additional data. If there are questions regarding this assessment, please contact me at (504) 219-4577.

Sincerely,

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References

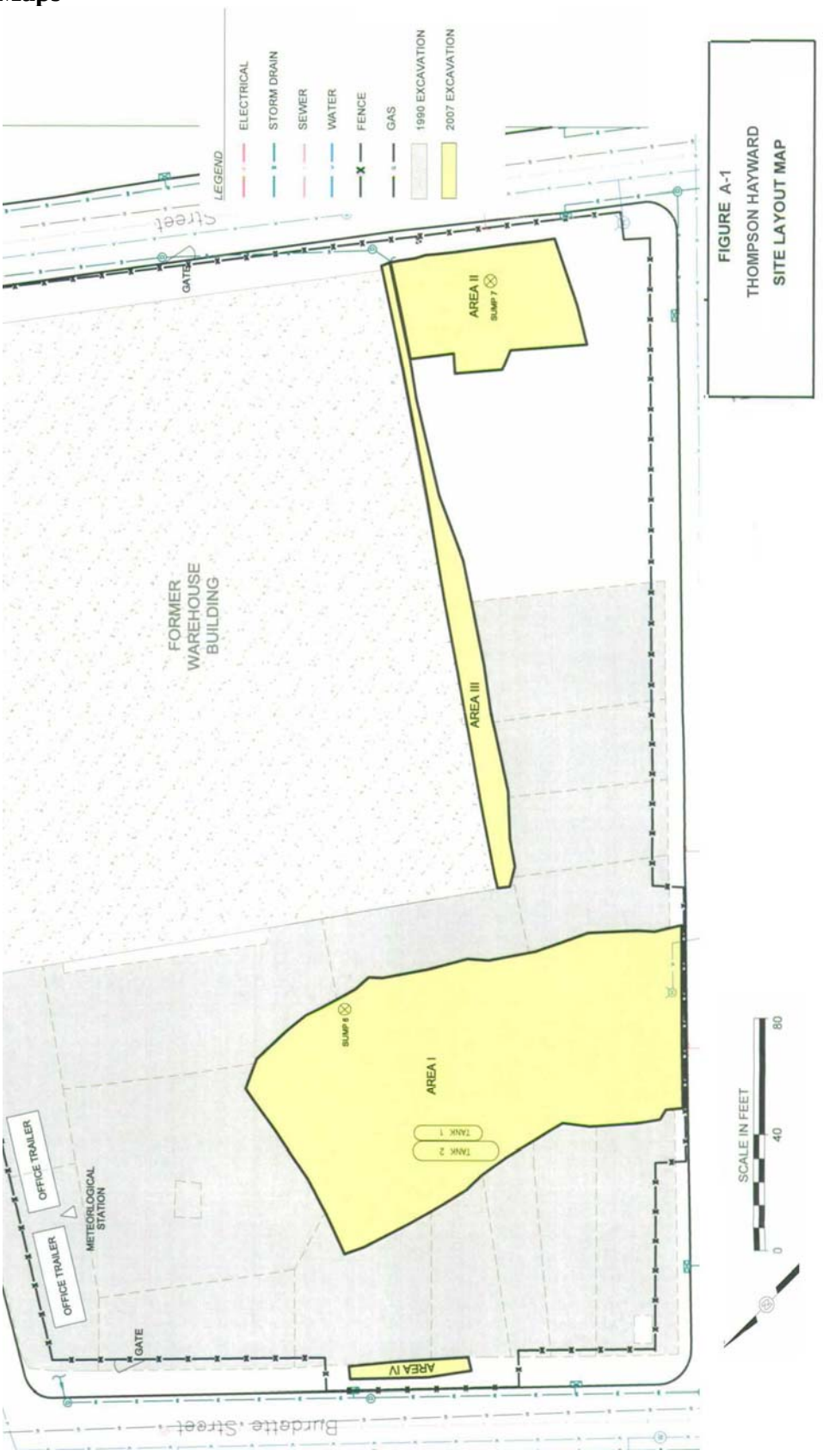
1. Shaw Environmental, Inc. Remedial activities and site closure report: 7700 Earhart Boulevard Facility, New Orleans, Louisiana. Prepared for T H Agriculture & Nutrition, LLC & Elementis Chemicals, Inc. 2007 Oct.

2. Agency for Toxic Substances and Disease Registry. Health Consultation: Review of Louisiana Tumor Registry Data, Thompson Hayward Site (a/k/a Thompson-Hayward Chemical Company). Atlanta: US Department of Health and Human Services: 2001 Jun 25.

3. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Aldrin/Dieldrin. Atlanta: US Department of Health and Human Services; 2002 Oct.

4. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Tetrachloroethylene. Atlanta: US Department of Health and Human Services; 1997 Sept.

Appendix A: Maps



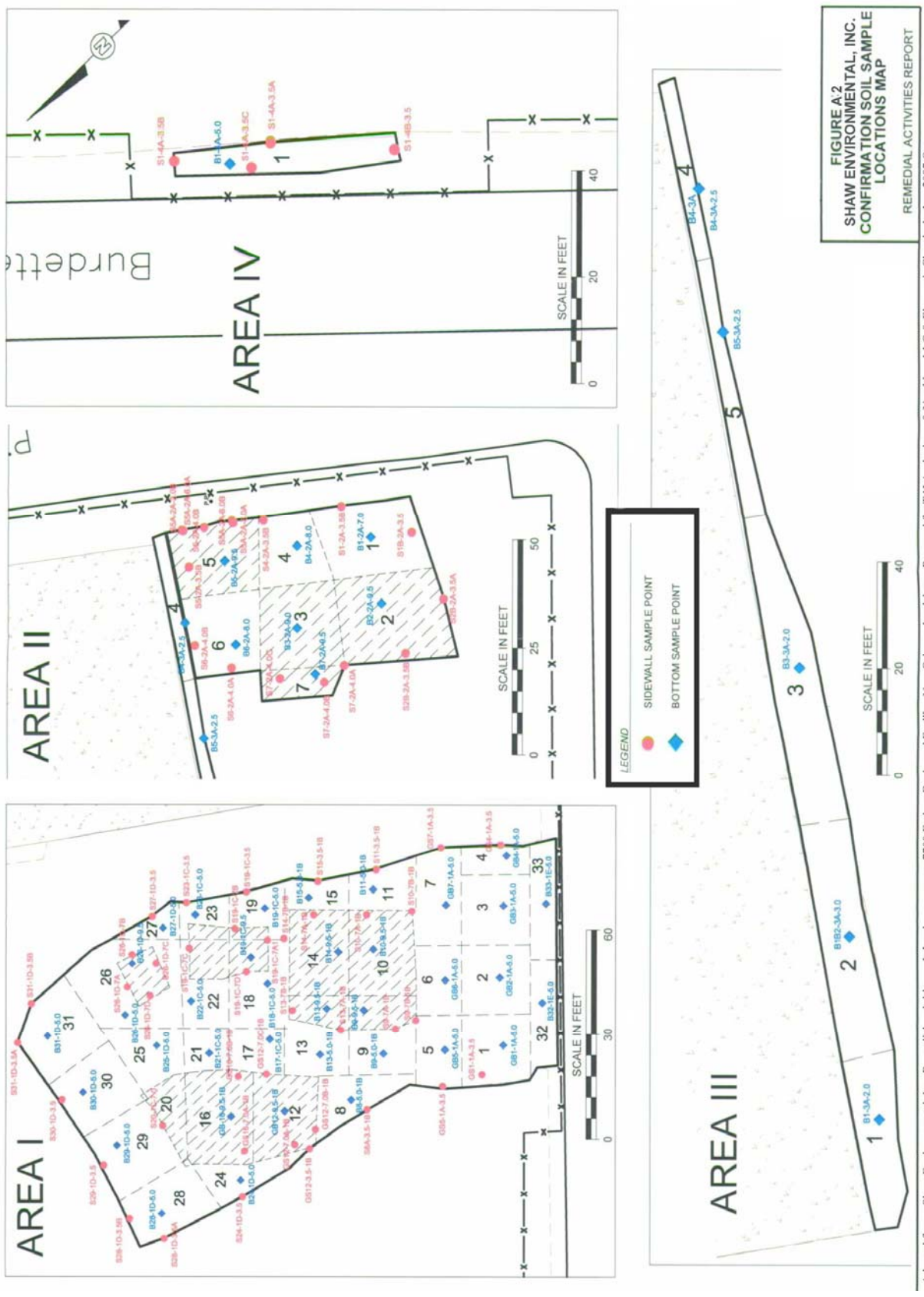


FIGURE A-2
SHAW ENVIRONMENTAL, INC.
CONFIRMATION SOIL SAMPLE LOCATIONS MAP
REMEDIAL ACTIVITIES REPORT

Adapted from : Shaw Environmental, Inc. Remedial activities and site closure report: 7700 Earhart Boulevard Facility, New Orleans, Louisiana. Prepared for T H Agriculture & Nutrition, LLC & Elementis Chemicals, Inc. 2007 Oct.

FIGURE A-3: LDEQ's Confirmatory Sampling Locations

Sample Location

Date: 9/25/2007
Number: 200701722
Projection: UTM Zone 15, NAD 83
Source: 2007 Teleatlas Streets and Water; USGS High-Res Aerial Photography (2002)

N W E S

0 50 100 200 Feet

DEQ GIS CENTER

LDEQ Disclaimer:
The Louisiana Department of Environmental Quality (LDEQ) has made every reasonable effort to ensure quality and accuracy in producing this map or data set. Nevertheless, the user should be aware that the information on which it is based may have come from any of a variety of sources, which are of varying degrees of map accuracy. Therefore, LDEQ cannot guarantee the accuracy of this map or data set, and does not accept any responsibility for the consequences of its use.

(Map size adjusted from original LDEQ map)

Appendix B: Evaluation Process

Screening Process

Health-based comparison values were used to determine which samples needed close evaluation. These values are not predictors of adverse health effects. They are media-specific concentrations used to determine which environmental contaminants need further evaluation. The comparison values used in the evaluation of samples collected from the Thompson Hayward site are listed below:

Environmental media evaluation guides (EMEGs) are estimated contaminant concentrations at which noncarcinogenic health effects are unlikely. They are calculated from the Agency for Toxic Substances and Disease Registry's (ATSDR) minimal risk levels (MRLs).

Reference dose media evaluation guides (RMEGs) are estimated contaminant concentrations at which noncarcinogenic health effects are unlikely. They are calculated from the U.S. Environmental Protection Agency's (EPA) reference dose (RfD).

Cancer risk evaluation guides (CREGs) are estimated contaminant concentrations that would be expected to cause no more than one additional excess cancer in 1 million exposed persons over a lifetime. CREGs are calculated from EPA's cancer slope factors (CSFs).

Risk-based concentrations (RBCs) are estimated contaminant concentrations in a media at which noncarcinogenic or carcinogenic health effects are unlikely. The RBCs used in this assessment were developed by EPA Region III and were last updated in October 2007.

Risk -based screening values are estimated contaminant concentrations in a media below which no additional regulatory attention is warranted. Risk-based screening values are derived from equations combining exposure assumptions with toxicity data[1]. The risk-based screening values used in this assessment were obtained from the Texas Commission for Environmental Quality website

Tables B-1 and B-2 list the contaminants that were identified through the screening process as needing further consideration. These contaminants are identified as contaminants of concern (COCs).

1 The Interstate Technology and Regulatory Council Risk Assessment Resources Team. Examination of risk-based screening values and approaches of selected states. 2005 Dec.

Table B-1: Contaminants of Concern (COCs) detected in soil sampled by Shaw Environmental at the Thompson Hayward site

COC	Concentration Range (mg/kg*) Low	High	CV † (mg/kg)	CV reference
Metals				
Arsenic	2.5 ND‡	31.8	1.9	EPA III Industrial RBC§
Pesticides				
Aldrin	8.5E-4 ND	70	1.7E-1	EPA III Industrial RBC
Alpha-BHC	8E-3 ND	7.9	4.5E-1	EPA III Industrial RBC
Beta-BHC	4.25E-4 ND	8.5	1.6	EPA III Industrial RBC
Delta-BHC	9.5E-4 ND	12	1.6	EPA III Industrial RBC for Beta-BHC
Gamma-BHC	8.5E-4 ND	4.25 ND	2.2	EPA III Industrial RBC
4,4-DDD	1.65E-3 ND	120	12	EPA III Industrial RBC
4,4-DDE	4.8E-4 ND	9.5 ND	8.4	EPA III Industrial RBC
4,4-DDT	1.65E-3 ND	35	8.4	EPA III Industrial RBC
Dieldrin	1.65E-3 ND	9.4	1.8E-1	EPA III Industrial RBC
Heptachlor	8.5E-4 ND	4.25 ND	6.4E-1	EPA III Industrial RBC
Heptachlor Epoxide	8.5E-4 ND	4.25 ND	3.1E-1	EPA III Industrial RBC
Gamma-Chlordane	8.5E-4 ND	15	8.2	EPA III Industrial RBC
Semivolatile Organic Compounds				
Benzo(a)pyrene	1.65E-1 ND	4.5E-1 ND	3.9E-1	EPA III Industrial RBC
Dibenzo(a,h)anthracene	1.65E-1 ND	4.5E-1 ND	3.9E-1	EPA III Industrial RBC
Pentachlorophenol	1.95E-3 ND	36	24	EPA III Industrial RBC
Volatile Organic Compounds				
2-Hexanone	4.9E-4 ND	27 ND	6.2	TCEQ RBSL**
Tetrachloroethene	8.5E-4 ND	3600	5.3	EPA III Industrial RBC
Trichloroethene	1.95E-3 ND	89	7.2	EPA III Industrial RBC
Vinyl Chloride	1.95E-3 ND	10.5 ND	4	EPA III Industrial RBC

* mg/kg=milligrams per liter
† CV=comparison value
‡ A designation of ND denotes a sample in which this contaminant was not detected. The concentration listed is the lowest detection limit possible for the analytical method used.
§ US Environmental Protection Agency Risk-Based Concentration for industrial (occupational) exposures to soil
** Texas Commission of Environmental Quality's Risk-Based Screening Values for soil

Table B-2: Contaminants of Concern (COCs) detected in soil sampled by the Louisiana Department of Environmental Quality at the Thompson Hayward site

COC	Concentration Range (mg/kg*) Low	High	CV † (mg/kg)	CV reference
Metals				
Arsenic	2.5 ND‡	2.5 ND	1.9	EPA III Industrial RBC§
Pesticides				
Aldrin	8.5E-4 ND	1.5	1.7E-1	EPA III Industrial RBC
Delta-BHC	8.5E-4 ND	1.6	1.6	EPA III Industrial RBC for Beta-BHC
4,4-DDD	8.5E-4 ND	16	12	EPA III Industrial RBC
Dieldrin	8.5E-4 ND	1.5	1.8E-1	EPA III Industrial RBC
Volatile Organic Compounds				
1,2,4-Trimethylbenzene	2.5E-3 ND	21.7	9.6	TCEQ RBSL**
Tetrachloroethene	4.49E-3 ND	151	5.3	EPA III Industrial RBC
Trichloroethene	4.49E-3 ND	8.33	7.2	EPA III Industrial RBC

* mg/kg=milligrams per liter
†CV=comparison value
‡A designation of ND denotes a sample in which this contaminant was not detected. The concentration listed is the lowest detection limit possible for the analytical method used.
§US Environmental Protection Agency Risk-Based Concentration for industrial (occupational) exposures to soil
** Texas Commission of Environmental Quality's Risk-Based Screening Values for soil

Table B-3: Default values used to estimate doses for contaminants of concern at the Thompson Hayward site

VARIABLE	VALUE
Ingestion: Soil Intake Rate For incidental ingestion (accidental swallowing)	100 mg/day*
Occupational Exposure Time (EF)	8 hours/day 313 days/year
Dermal: **Skin Surface Area (24% exposed†)**	4,656 cm^{2}‡
Dermal: **Total Soil/Sediment Adherence**	325.92 mg
Body Weight:	70 kg§

* mg/day = milligrams per day
† ATSDR. Public Health Assessment Guidance Manual, Appendix G: Calculating Exposure Doses. Accessed 05 Dec 2007 at URL: http://www.atsdr.cdc.gov/HAC/PHAManual/appg.html
‡cm2 = square centimeters
§kg = kilograms

Noncancer Health Effects

Dermal and ingestion doses for occupational exposures to contaminants recognized as COCs were estimated using ATSDR's dose calculation equations. The default values used in calculating the exposure doses are listed in Table B-3. The equations used to estimate ingestion and dermal exposures are as follows:

Ingestion Exposure Dose Equation: ED= (C) (IR) (EF) (CF) / (BW)

where C= Contaminant concentration

IR= Ingestion Rate

EF= Exposure Factor = $\frac{hours}{day} X \frac{days}{year} = \frac{hours}{24\ hours} X \frac{days}{365\ days}$

CF= Conversion Factor= 10^{-06}

BW= Body Weight

Soil Dermal Exposure Dose Equation: ED= (C) (A) (AF) (EF) (CF) / (BW)

where C= Concentration

A= Total Soil Adhered

AF= Bioavailability Factor

EF= Exposure Factor= $\frac{hours}{day} X \frac{days}{year} = \frac{hours}{24\ hours} X \frac{days}{365\ days}$

CF= Conversion Factor= 10^{-06}

BW= Body Weight

Chemical-specific bioavailability factors were used to determine how much of each contaminant would be absorbed. The following bioavailability factors were used to estimate dermal absorption at Thompson Hayward[2]:

aldrin	0.1
tetrachloroethene	0.03

The estimated exposure doses were compared to each contaminant's *reference dose* (RfD), which is an estimated daily lifetime exposure to a substance that is unlikely to cause adverse noncancer health effects to human populations. These values are based on valid toxicological studies. If a reference dose was unavailable, the estimated dose was compared to the *no-observed-adverse-effects level* (NOAEL) or *lowest-observed-adverse-effects level* (LOAEL) for that contaminant. The NOAEL is the lowest level of continuous exposure to a contaminant that has been observed to cause no adverse health effects. The LOAEL is the lowest level of continuous exposure to a contaminant that has been observed to result in adverse health effects. If the estimated dose for a COC was below that which would be expected to cause noncancer or, for COCs recognized as carcinogens, cancer health effects, no further assessment was required. Tables B-4 and B-5 list the estimated exposure doses that exceeded health guideline values.

Cancer Health Effects

To determine whether contaminants recognized as potential cancer-causing agents were present at concentrations that could increase an individual's risk of developing cancer, SEET estimated the lifetime excess cancer risk (LECR) for each contaminant. The LECR represents the increase in the probability of an individual developing cancer as a result of being exposed to a contaminant over a lifetime of 70 years. Cancer risks were calculated by multiplying each exposure dose over a 70-year (lifetime) period by EPA's *cancer slope factor* (available at http://www.epa.gov/iris).

Because of the uncertainty involved in estimating carcinogenic risk, ATSDR employs a weight-of-evidence approach to describe this risk, using words as well as numeric terms. The LECR estimates the worst-case maximum increase in the risk of developing cancer after exposure to the contaminant. This estimation is accurate within one order of magnitude. Therefore, a calculated cancer risk of 3 excess cancers per 10,000 people might actually be 3 excess cancers per 1,000 people or 2 excess cancers per 100,000 people. The risk above which cancer may potentially be due to an external cause rather than to population variation is 10^{-4} or 1 excess cancer per 10,000 people. Tables B-4 and B-5 list site contaminants that pose a cancer risk higher than 1 excess cancer per 10,000 people.

2 U.S. Environmental Protection Agency. Mid-Atlantic Risk Assessment: Technical Guidance Manual. Accessed 05 Dec 2007 at URL: http://www.epa.gov/reg3hscd/risk/human/info/solabsg2.htm

Table B-4: Estimated occupational exposures to aldrin (RfD*=3.00E-5 mg/kg/day†) in soil at the Thompson Hayward site

Sample ID	Concentration (mg/kg)	Estimated Dose (mg/kg/day)	Location	Sample Depth (ft‡)	Cancer Risk	
					Oral Exposure	Dermal Exposure
S107A1B	70	2.9E-5	Area 1, grid 10	7	4.90E-04	1.50E-04
B217D5_0	66	2.7E-5	Area 1, grid 27	5	4.60E-04	1.40E-04
B231C5_0	58	24E-5	Area 1, grid 23	5	4.10E-04	1.30E-04
GB71A5_0	54	2.2E-5	Area 1, grid 7	5	3.70E-04	1.22E-04
S147B1B	50	2.0E-5	Area 1, grid 19	7	3.40E-04	1.14E-04
B191C5_0	37	1.5E-5	Area 1, grid 19	5	2.60E-04	--
B109_51B	32	1.3E-5	Area 1, grid 10	9.5	2.20E-04	--

*RfD = reference dose
†mg/kg/day = milligrams per kilogram per day
‡ft=feet

Table B-5: Estimated occupational exposures to tetrachloroethene (RfD*=1.00E-2 mg/kg/day†) in soil at the Thompson Hayward site

Sample ID	Concentration (mg/kg)	Estimated Dose (mg/kg/day)	Location	Sample Depth (ft‡)	Cancer Risk for Oral Exposure
S5A2A6_0A	3600	1.5E-3	Area 2, grid 5	6	8.10E-04
B52A9_5	2400	9.8E-4	Area 2, grid 5	9.5	5.29E-04
S52A4_0B	800	3.3E-4	Area 2, grid 5	4	1.78E-04
S261D7B	490	2E-4	Area 1, grid 26	7	1.08E-04

*RfD = reference dose
†mg/kg/day = milligrams per kilogram per day
‡ft=feet

Certification

This health consultation for Thompson Heyward was prepared by Louisiana Department of Health and Hospitals under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedure existing at the time the health consultation was initiated.

Jeff Kellam
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Alan W. Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR