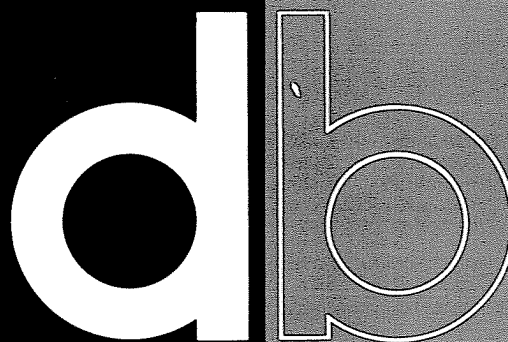


**New York State Department
of Environmental Conservation**

**PRELIMINARY BASELINE
HEALTH RISK ASSESSMENT
VOLUME I**

**REMEDIAL INVESTIGATION
AND FEASIBILITY STUDY**

**Booth Oil Site
City of North Tonawanda,
Niagara County, New York
(Site Registry No. 9-32-100)**



Dvirka and Bartilucci

Consulting Engineers

IN ASSOCIATION WITH
SADAT ASSOCIATES

MARCH 1991

RECEIVED

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N.Y.S. DEPT. OF
ENVIRONMENTAL CONSERVATION
REGION 9

**PRELIMINARY BASELINE HUMAN HEALTH
RISK ASSESSMENT
BOOTH OIL SITE, NORTH TONAWANDA
NIAGARA COUNTY, NEW YORK**

VOLUME I

**SUBMITTED TO:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ALBANY, NEW YORK**

**PREPARED FOR:
DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
SYOSSET, NEW YORK**

**PREPARED BY:
SADAT ASSOCIATES, INC.
PRINCETON, NEW JERSEY**

FEBRUARY 26, 1991

TABLE OF CONTENTS

VOLUME I

EXECUTIVE SUMMARY	i
1.0 INTRODUCTION	1-1
2.0 BACKGROUND	2-1
2.1 General	2-1
2.2 Surficial Soil	2-3
2.3 Subsurface Soil	2-12
2.4 Catch Basin Sediment	2-18
2.5 Catch Basin Surface Water	2-21
2.6 Groundwater	2-24
3.0 IDENTIFICATION OF INDICATOR CHEMICALS	3-1
3.1 Overview	3-1
3.2 Methods	3-2
3.3 Indicator Chemicals	3-4
3.3.1 Surficial soil	3-7
3.3.2 Subsurface soil	3-13
3.3.3 Catch basin sediment	3-20
3.3.4 Catch basin surface water	3-22
3.4 Summary	3-23
4.0 EXPOSURE ASSESSMENT	4-1
4.1 Identification of Exposed Populations	4-1
4.2 Estimation of Exposure Point Concentrations	4-5
4.2.1 Volatile emissions	4-5
4.2.2 Fugitive dust emissions	4-11
4.2.2.1 Emissions from traffic on-site	4-19
4.2.2.2 Emissions from construction on-site	4-22
4.3 Ingestion Exposure	4-33
4.4 Inhalation Exposure	4-39
4.5 Dermal Exposure	4-44

Table of Contents (cont'd)

Volume II

5.0	RISK CHARACTERIZATION	5-1
5.1	Methodology	5-1
5.1.1	Calculation of Noncarcinogenic Risk	5-1
5.1.2	Calculation of Carcinogenic Risk	5-3
5.2	Risks Due to Ingestion	5-7
5.3	Risks Due to Inhalation	5-15
5.4	Risks Due to Dermal Exposure	5-29
5.5	Total Risks to Exposed Populations	5-41
6.0	IMPACTS OF SURFACE RUNOFF	6-1
7.0	UNCERTAINTY ANALYSIS	7-1
8.0	DEVELOPMENT OF RISK-BASED CLEANUP LEVELS	8-1
9.0	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	9-1

List of Tables

Table 2-1	Surficial Soil Results - Volatile Organic Compounds
Table 2-2	Surficial Soil Results - Semivolatile Organic Compounds
Table 2-3	Surficial Soil Results - Inorganic Compounds
Table 2-4	Surficial Soil Results - Pesticides/PCBs
Table 2-5	Surficial Soils - Mean Contaminant Concentrations
Table 2-6	Subsurface Soil Results - Volatile Organic Compounds
Table 2-7	Subsurface Soil Results - Semivolatile Organic Compounds
Table 2-8	Subsurface Soil Results - Inorganic Compounds
Table 2-9	Subsurface Soil Results - Pesticides/PCBs
Table 2-10	Subsurface Soil - Mean Contaminant Concentrations
Table 2-11	Catch Basin Sediment Results - Volatile Organic Compounds
Table 2-12	Catch Basin Sediment Results - Semivolatile Organic Compounds
Table 2-13	Catch Basin Sediment Results - Inorganic Compounds
Table 2-14	Catch Basin Sediment Results - Pesticides/PCBs
Table 2-15	Catch Basin Sediment - Mean Contaminant Concentrations
Table 2-16	Catch Basin Surface Water Results - Volatile Organic Compounds
Table 2-17	Catch Basin Surface Water Results - Semivolatile Organic Compounds
Table 2-18	Catch Basin Surface Water Results - Inorganic Compounds
Table 2-19	Catch Basin Surface Water Results - Pesticides/PCBs
Table 2-20	Catch Basin Surface Water - Mean Contaminant Concentrations

Table of Contents (cont'd)

Table 2-21	Groundwater Results - Volatile Organic Compounds
Table 2-22	Groundwater Results - Semivolatile Organic Compounds
Table 2-23	Groundwater Results - Inorganic Compounds
Table 2-24	Groundwater Results - Pesticides/PCBs
Table 2-25	Groundwater - Mean Contaminant Concentrations
Table 3-1	EPA Reference Doses and Carcinogenic Slope Factors
Table 3-2	Compounds Without EPA Reference Doses or Slope Factors
Table 3-3	Indicator Chemical Scores - Surficial Soil - Area A
Table 3-4	Indicator Chemical Scores - Surficial Soil - Area B
Table 3-5	Indicator Chemical Scores - Surficial Soil - Area C
Table 3-6	Indicator Chemical Scores - Surficial Soil - Area D
Table 3-7	Indicator Chemical Scores - Surficial Soil - Entire Site
Table 3-8	Indicator Chemical Scores - Surficial Soil - Playground
Table 3-9	Indicator Chemicals - Surficial Soil
Table 3-10	Indicator Chemical Scores - Subsurface Soil - Area A
Table 3-11	Indicator Chemical Scores - Subsurface Soil - Area B
Table 3-12	Indicator Chemical Scores - Subsurface Soil - Area C
Table 3-13	Indicator Chemical Scores - Subsurface Soil - Area D
Table 3-14	Indicator Chemical Scores - Subsurface Soil - Entire Site
Table 3-15	Indicator Chemicals - Subsurface Soil
Table 3-16	Indicator Chemical Scores - Catch Basin Sediment

Table of Contents (cont'd)

Table 3-17	Indicator Chemicals - Catch Basin Sediment
Table 3-18	Indicator Chemical Scores - Catch Basin Surface Water
Table 3-19	Indicator Chemicals - Catch Basin Surface Water
Table 3-20	Summary of Highest Indicator Chemical Scores for Each Area and Medium
Table 4-1	Booth Oil Site - Exposure Scenarios - Preliminary Baseline Human Health Risk Assessment
Table 4-2	Henry's Law Constant and Organic Carbon Partition Coefficients for the Organic Indicator Chemicals
Table 4-3	Volatilization Emission Rates - Surficial Soil - Area A
Table 4-4	Volatilization Emission Rates - Surficial Soil - Area B
Table 4-5	Volatilization Emission Rates - Surficial Soil - Area C
Table 4-6	Volatilization Emission Rates - Surficial Soil - Area D
Table 4-7	Distances to Downwind Receptors
Table 4-8	Airborne Contaminant Concentrations Due to Volatilization from Surficial Soil in Area A
Table 4-9	Airborne Contaminant Concentrations Due to Volatilization from Surficial Soil in Area B
Table 4-10	Airborne Contaminant Concentrations Due to Volatilization from Surficial Soil in Area C
Table 4-11	Airborne Contaminant Concentrations Due to Volatilization from Surficial Soil in Area D
Table 4-12	Airborne Fugitive Dust Levels at the Receptor Points
Table 4-13	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Recreational Traffic On-site - Area A - Surficial Soil

Table of Contents (cont'd)

Table 4-14	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Recreational Traffic On-site - Area B - Surficial Soil
Table 4-15	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Recreational Traffic On-site - Area C - Surficial Soil
Table 4-16	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Recreational Traffic On-site - Area D - Surficial Soil
Table 4-17	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Parking On-site - Area B - Surficial Soil
Table 4-18	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Traffic On-site - Area A - Surficial Soil
Table 4-19	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Traffic On-site - Area B - Surficial Soil
Table 4-20	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Traffic On-site - Area C - Surficial Soil
Table 4-21	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Traffic On-site - Area D - Surficial Soil
Table 4-22	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Activities On-site - Area A - Surficial Soil
Table 4-23	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Activities On-site - Area B - Surficial Soil
Table 4-24	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Activities On-site - Area C - Surficial Soil
Table 4-25	Airborne Contaminant Concentrations Due to Fugitive Dust Releases from Construction Activities On-site - Area D - Surficial Soil
Table 4-26	Calculated Ingestion Exposure Doses - Area A - Surficial Soil

Table of Contents (cont'd)

Table 4-27	Calculated Ingestion Exposure Doses - Area B - Surficial Soil
Table 4-28	Calculated Ingestion Exposure Doses - Area C - Surficial Soil
Table 4-29	Calculated Ingestion Exposure Doses - Area D - Surficial Soil
Table 4-30	Total Ingestion Exposure Doses - Surficial Soil
Table 4-31	Calculated Ingestion Exposure Doses - Playground - Surficial Soil
Table 4-32	Inhalation Exposure Doses Due to Volatilization from Surficial Soil - Area A
Table 4-33	Inhalation Exposure Doses Due to Volatilization from Surficial Soil - Area B
Table 4-34	Inhalation Exposure Doses Due to Volatilization from Surficial Soil - Area C
Table 4-35	Inhalation Exposure Doses Due to Volatilization from Surficial Soil - Area D
Table 4-36	Total Inhalation Exposure Doses Due to Volatilization from Surficial Soil
Table 4-37	Inhalation Exposure Doses Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area A
Table 4-38	Inhalation Exposure Doses Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area B
Table 4-39	Inhalation Exposure Doses Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area C
Table 4-40	Inhalation Exposure Doses Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area D
Table 4-41	Inhalation Exposure Doses Due to Fugitive Dust Releases From Parking On-site - Surficial Soil - Area B

Table of Contents (cont'd)

Table 4-42	Total Inhalation Exposure Doses Due to Fugitive Dust Releases From Recreational Traffic and Parking On-site
Table 4-43	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area A
Table 4-44	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area B
Table 4-45	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area C
Table 4-46	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area D
Table 4-47	Total Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Traffic On-site
Table 4-48	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Activities On-site - Surficial Soil - Area A
Table 4-49	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Activities On-site - Surficial Soil - Area B
Table 4-50	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Activities On-site - Surficial Soil - Area C
Table 4-51	Inhalation Exposure Doses Due to Fugitive Dust Releases From Construction Activities On-site - Surficial Soil - Area D
Table 4-52	Total Inhalation Exposure Doses Due to Fugitive Dust Releases from Construction Activities On-site
Table 4-53	Total Inhalation Exposure Doses - Booth Oil Site
Table 4-54	Calculated Dermal Exposure Doses - Area A - Surficial Soil
Table 4-55	Calculated Dermal Exposure Doses - Area B - Surficial Soil

Table of Contents (cont'd)

Table 4-56	Calculated Dermal Exposure Doses - Area C - Surficial Soil
Table 4-57	Calculated Dermal Exposure Doses - Area D - Surficial Soil
Table 4-58	Total Dermal Exposure Doses - Surficial Soil
Table 4-59	Calculated Dermal Exposure Doses - Playground - Surficial Soil
Table 4-60	Calculated Dermal Exposure Doses - Area A - Subsurface Soil
Table 4-61	Calculated Dermal Exposure Doses - Area B - Subsurface Soil
Table 4-62	Calculated Dermal Exposure Doses - Area C - Subsurface Soil
Table 4-63	Calculated Dermal Exposure Doses - Area D - Subsurface Soil
Table 4-64	Total Dermal Exposure Doses - Subsurface Soil
Table 4-65	Total Dermal Exposure Doses - Booth Oil Site
Table 5-1	Calculated Ingestion Exposure Risks - Area A - Surficial Soil
Table 5-2	Calculated Ingestion Exposure Risks - Area B - Surficial Soil
Table 5-3	Calculated Ingestion Exposure Risks - Area C - Surficial Soil
Table 5-4	Calculated Ingestion Exposure Risks - Area D - Surficial Soil
Table 5-5	Total Ingestion Exposure Risks - Booth Oil Site - Surficial Soil
Table 5-6	Calculated Ingestion Exposure Risks - Playground - Surficial Soil
Table 5-7	Inhalation Exposure Risks Due to Volatilization from Surficial Soil - Area A
Table 5-8	Inhalation Exposure Risks Due to Volatilization from Surficial Soil - Area B

Table of Contents (cont'd)

Table 5-9	Inhalation Exposure Risks Due to Volatilization from Surficial Soil - Area C
Table 5-10	Inhalation Exposure Risks Due to Volatilization from Surficial Soil - Area D
Table 5-11	Total Inhalation Exposure Risks Due To Volatilization from Surficial Soil
Table 5-12	Inhalation Exposure Risks Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area A
Table 5-13	Inhalation Exposure Risks Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area B
Table 5-14	Inhalation Exposure Risks Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area C
Table 5-15	Inhalation Exposure Risks Due to Fugitive Dust Releases From Recreational Traffic On-site - Surficial Soil - Area D
Table 5-16	Inhalation Exposure Risks Due to Fugitive Dust Releases From Parking Traffic On-site - Surficial Soil - Area B
Table 5-17	Total Inhalation Exposure Risks Due to Fugitive Dust Releases From Recreational Traffic and Parking On-site
Table 5-18	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area A
Table 5-19	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area B
Table 5-20	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area C
Table 5-21	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction Traffic On-site - Surficial Soil - Area D
Table 5-22	Total Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction Traffic On-site

Table of Contents (cont'd)

Table 5-23	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction On-site - Surficial Soil - Area A
Table 5-24	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction On-site - Surficial Soil - Area B
Table 5-25	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction On-site - Surficial Soil - Area C
Table 5-26	Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction On-site - Surficial Soil - Area D
Table 5-27	Total Inhalation Exposure Risks Due to Fugitive Dust Releases From Construction On-site
Table 5-28	Total Inhalation Exposure Risks - Booth Oil Site
Table 5-29	Calculated Dermal Exposure Risks - Area A - Surficial Soil
Table 5-30	Calculated Dermal Exposure Risks - Area B - Surficial Soil
Table 5-31	Calculated Dermal Exposure Risks - Area C - Surficial Soil
Table 5-32	Calculated Dermal Exposure Risks - Area D - Surficial Soil
Table 5-33	Total Dermal Exposure Risks - Surficial Soil
Table 5-34	Calculated Dermal Exposure Risks - Playground - Surficial Soil
Table 5-35	Calculated Dermal Exposure Risks - Area A - Subsurface Soil
Table 5-36	Calculated Dermal Exposure Risks - Area B - Subsurface Soil
Table 5-37	Calculated Dermal Exposure Risks - Area C - Subsurface Soil
Table 5-38	Calculated Dermal Exposure Risks - Area D - Subsurface Soil

Table of Contents (cont'd)

Table 5-39	Total Dermal Exposure Risks - Subsurface Soil
Table 5-40	Total Dermal Exposure Risks - Booth Oil Site
Table 5-41	Total Carcinogenic Risks and Noncarcinogenic Hazard Indices - Booth Oil Site
Table 6-1	Maximum Risk-Based Contaminant Levels in Surface Water Based Upon Ingestion of Fish
Table 6-2	Required Flows in the Little River to Provide Acceptable Risks Via Ingestion of Fish
Table 8-1	Target Contaminant Concentrations in Surficial Soil Based Upon Acceptable Risks and Ingestion Exposure
Table 9-1	Total Carcinogenic Risks and Noncarcinogenic Hazard Indices - Booth Oil Site
Table 9-2	Summary of Elevated Risks by Area and Contaminant

LIST OF FIGURES

Figure 2-1	Site Location Map
Figure 2-2	Site Plan
Figure 2-3	Final Phase I Surficial Soil Sampling Locations
Figure 2-4	Final Phase I Soil Boring and Monitoring Well Locations
Figure 4-1	Assumed Locations of Off-Site Receptors

Summary

EXECUTIVE SUMMARY

The Booth Oil Site comprises approximately 2.5 acres in North Tonawanda, Niagara County, New York. Past operations at the site consisted of waste oil collection, storage and reclamation. This Preliminary Baseline Human Health Risk Assessment evaluates the potential health risks posed to children, residents, commercial populations and unprotected remedial workers exposed to contamination at and emanating from the Booth Oil Site.

Specifically, the following exposure scenarios are evaluated:

1. Children exposed to contamination during recreational activities on-site. Exposure pathways include ingestion of surficial soil, dermal contact with surficial soil, and inhalation of contaminated fugitive dust and volatilized contaminants during on-site recreational activities.
2. Children exposed to contamination during recreational activities at the playground. Exposure pathways include ingestion of surficial soil at the playground, dermal contact with surficial soil at the playground, and inhalation of contaminated fugitive dust and volatilized contaminants from the site while at the playground.

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February 26, 1991

3. Nearby residential and commercial populations exposed to contamination through inhalation of fugitive dust and volatilized contaminants from the site.
4. Unprotected construction workers exposed to contamination through inhalation of contaminated fugitive dust and volatilized contaminants on-site, and direct contact with contaminated surficial and subsurface soil.

In addition, the potential impacts to the Little River by surface runoff from the Booth Oil Site are evaluated.

The carcinogenic risks and hazard indices calculated herein for residential and commercial populations within the vicinity of the Booth Oil Site are within acceptable limits. However, the carcinogenic risks and ranges of hazard indices calculated for children and unprotected construction workers at the site all exceed the acceptable limit of 1.0 for hazard index and the NYSDOH goal of $1.00\text{E}-06$ for carcinogenic risk. In addition, the total carcinogenic risks and the upper limit of the hazard index calculated for children at the playground exceed the NYSDOH goal.

It must be noted that exposure of unprotected construction workers at the Booth Oil Site is included herein as a baseline

assessment. These risks may be mitigated through the use of control measures, such as dust suppression, or through the use of personal protective equipment. The site-specific health and safety plan will address the personal protection and control measures deemed necessary for construction workers at the site during remedial activities.

Overall, the data indicate that ingestion and dermal exposures of children are of concern at the Booth Oil Site. Total PCBs, total CaPAHs and organic lead consistently result in elevated risks to children due to ingestion and dermal exposures at the Booth Oil Site. In addition, inorganic lead and antimony result in hazard indices that exceed the limit of 1.0 for dermal exposures of children to surficial soil for the conservative exposure scenarios utilized in this assessment.

Dermal exposures contribute most significantly to the elevated risks and hazard indices calculated for children at the Booth Oil Site. However, the dermal risks presented herein are expected to be overestimated due to the extremely conservative methods employed in the dose estimations. In addition, it must be noted that NYSDOH does not currently require risk assessment for dermal exposure to inorganics in soil, due to the limited availability of these contaminants for dermal uptake from soil. Accordingly, the

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February 26, 1991

elevated risks calculated herein for dermal exposure, particularly those for inorganics, are likely overestimated by several orders of magnitude and are not considered to be indicative of actual risks to exposed populations.

Risk-based target contaminant concentrations are calculated for those contaminants which result in elevated carcinogenic and noncarcinogenic risks for ingestion exposure in this assessment. These contaminants consist of CaPAHs, PCBs and lead. The target concentration calculated for total CaPAHs is 3.56 mg/kg. The target concentration calculated for total PCBs is 5.90 mg/kg. The target concentration calculated for ingestion exposure to inorganic lead is $1.15\text{E}+04$ mg/kg, and the target concentration calculated for organic lead is 1.01 mg/kg.

There is a large discrepancy between the target concentrations calculated for inorganic and organic lead. The target concentration calculated for ingestion exposure to organic lead (1.01 mg/kg) is four orders of magnitude lower than that calculated for inorganic lead ($1.15\text{E}+04$ mg/kg). In addition, the target concentration for ingestion of organic lead is highly restrictive in comparison to the EPA guideline of 500-1000 ppm, while the target concentration for ingestion of inorganic lead is extremely lenient in comparison with this guideline. These discrepancies are

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February 26, 1991

attributed to the great uncertainties associated with quantification of risks due to lead exposure, as discussed herein. Accordingly, it is suggested that the EPA guideline of 500 - 1000 ppm be considered for use in the selection of remedial goals for the Booth Oil Site.

In the absence of measured flow data, a method of back-calculation was employed herein to assess the potential impact of surface runoff from the Booth Oil Site on the Little River. Required flows in the Little River to provide adequate dilution of surface runoff from the Booth Oil Site are calculated herein based upon acceptable contaminant levels in fish. The results of this analysis indicate that the flow of the Little River must be at least 205 cubic feet per second (cfs) to provide acceptable levels of lead (as organic lead), in fish inhabiting the river for human consumption. This is the most stringent requirement calculated in the analysis. The NYSDEC reports that the flow of the Niagara River at Tonawanda Island is approximately 62,000 cfs. Based upon this flow rate, it is highly likely that the flow in the Little River will be significantly greater than the requirements calculated herein. Accordingly, runoff from the Booth Oil Site is not expected to contribute significantly to the contaminant levels in the Little/Niagara River System.

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February 26, 1991

Section 1



1.0 INTRODUCTION

As part of the State of New York's program to clean up inactive hazardous waste sites, the New York State Department of Environmental Conservation (NYSDEC) entered into a contract with the firm of Dvirka and Bartilucci Consulting Engineers to undertake a Remedial Investigation and Feasibility Study (RI/FS) of the Booth Oil Site in North Tonawanda, Niagara County, New York. Sadat Associates, Inc. was retained as part of the Project Team to conduct a Human Health and Environmental Risk Assessment for the Booth Oil Site.

The Human Health and Environmental Risk Assessment is performed in two phases. The initial phase or baseline assessment is conducted in conjunction with the Phase I RI. The baseline assessment examines the human health and environmental risks associated with direct exposure to the site by local populations under current site conditions (i.e., the no-action alternative). The final assessment, conducted upon completion of the RI, reevaluates baseline risks and evaluates the health risks associated with the chosen remedial alternative.

This Preliminary Baseline Human Health and Environmental Risk Assessment is based upon the results of the Phase I RI. Volume I

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February 26, 1991

provides data relevant to the exposures of human receptors to contamination at and emanating from the Booth Oil Site. Volume II evaluates potential ecological impacts due to the contamination at the site.

The Preliminary Baseline Human Health Risk Assessment evaluates the potential health risks posed by the following exposure scenarios:

1. Children exposed to contamination during recreational activities on-site. Exposure pathways include: ingestion of surficial soil, dermal contact with surficial soil, and inhalation of contaminated fugitive dust and volatilized contaminants during on-site recreational activities.
2. Children exposed to contamination during recreational activities at the playground. Exposure pathways include: ingestion of surficial soil at the playground, dermal contact with surficial soil at the playground, and inhalation of contaminated fugitive dust and volatilized contaminants from the site while at the playground.

3. Nearby residential and commercial populations exposed to contamination through inhalation of fugitive dust and volatilized contaminants from the site.
4. Unprotected construction workers exposed to contamination through inhalation of contaminated fugitive dust and volatilized contaminants, and direct contact with contaminated soil.

This Preliminary Baseline Human Health Risk Assessment is presented in seven parts:

- Background
- Identification of Indicator Chemicals
- Exposure Assessment
- Risk Characterization
- Impacts of Surface Runoff
- Uncertainty Analysis
- Development of Risk-based Cleanup Levels

Section 2.0 of this Preliminary Baseline Human Health Risk Assessment presents a discussion of the results of the Phase I RI. The data collected at the site are evaluated for usability, and

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February 26, 1991

mean contaminant concentrations are developed for use in the quantitative assessment.

The first step in the quantitative risk assessment is the identification of indicator chemicals. In Section 3.0 of this assessment, contaminants detected in the Phase I RI sampling program are ranked according to concentration and toxicity to identify those compounds which are of greatest potential concern to public health. The identification of these chemicals determines the proper focus for the risk assessment, by eliminating relatively minor or innocuous contaminants from the quantitative assessment.

Section 4.0 of this assessment, entitled "Exposure Assessment," begins with the identification of potentially exposed populations. These populations are characterized by their proximity to the Booth Oil Site, and by those activities which may bring them into contact with contamination at and/or emanating from the site. Next, contaminant releases from the site to the atmosphere and the resultant concentrations at the exposure points are estimated. These estimations, along with the Phase I RI sampling data, are used to calculate exposure point doses for each potentially exposed population for each potential route of exposure.

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The potential human health risks associated with the exposure to the site are estimated in Section 5.0. Potential human health risks are quantified by comparing the calculated exposure point doses to the most recent toxicity values available from the United States Environmental Protection Agency (EPA).

The uncertainties associated with the Preliminary Baseline Human Health Risk Assessment are identified and discussed in Section 6.0 of this document.

Finally, the results of the Preliminary Baseline Human Health Risk Assessment are utilized to develop alternative risk-based cleanup levels for the site. The risk-based cleanup levels, presented in Section 8.0 of this report, are the highest individual contaminant concentrations which would result in acceptable risks for the exposed populations.

Section 2

2.0 BACKGROUND

2.1 General

The Booth Oil Site is located in North Tonawanda, Niagara County, New York (see Figure 2-1). The site, which is transected by Consolidated Rail Corporation (Conrail) - Erie rail lines, consists of two properties (see Figure 2-2). The eastern parcel, which is owned by Booth Oil, comprises approximately 1.8 acres. The western parcel occupies approximately 0.6 acres, and is owned by Conrail. Based upon the locations of the railroad right-of-ways and property holdings, the site is divided into four areas of concern, as shown in Figure 2-2.

Booth Oil Company operated a waste oil collection, storage and reclaiming plant at the site for a period of approximately 50 years. The processing operations at the site ceased in the early 1980's. However, NYSDEC reports that storage of waste oil at the site continued until 1985.

In 1984, PCB contamination was discovered in samples of oil collected from an underground tank on the western parcel of the site. Soil samples collected adjacent to this tank also indicated contamination with PCBs. Further investigation in the area

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February 26, 1991

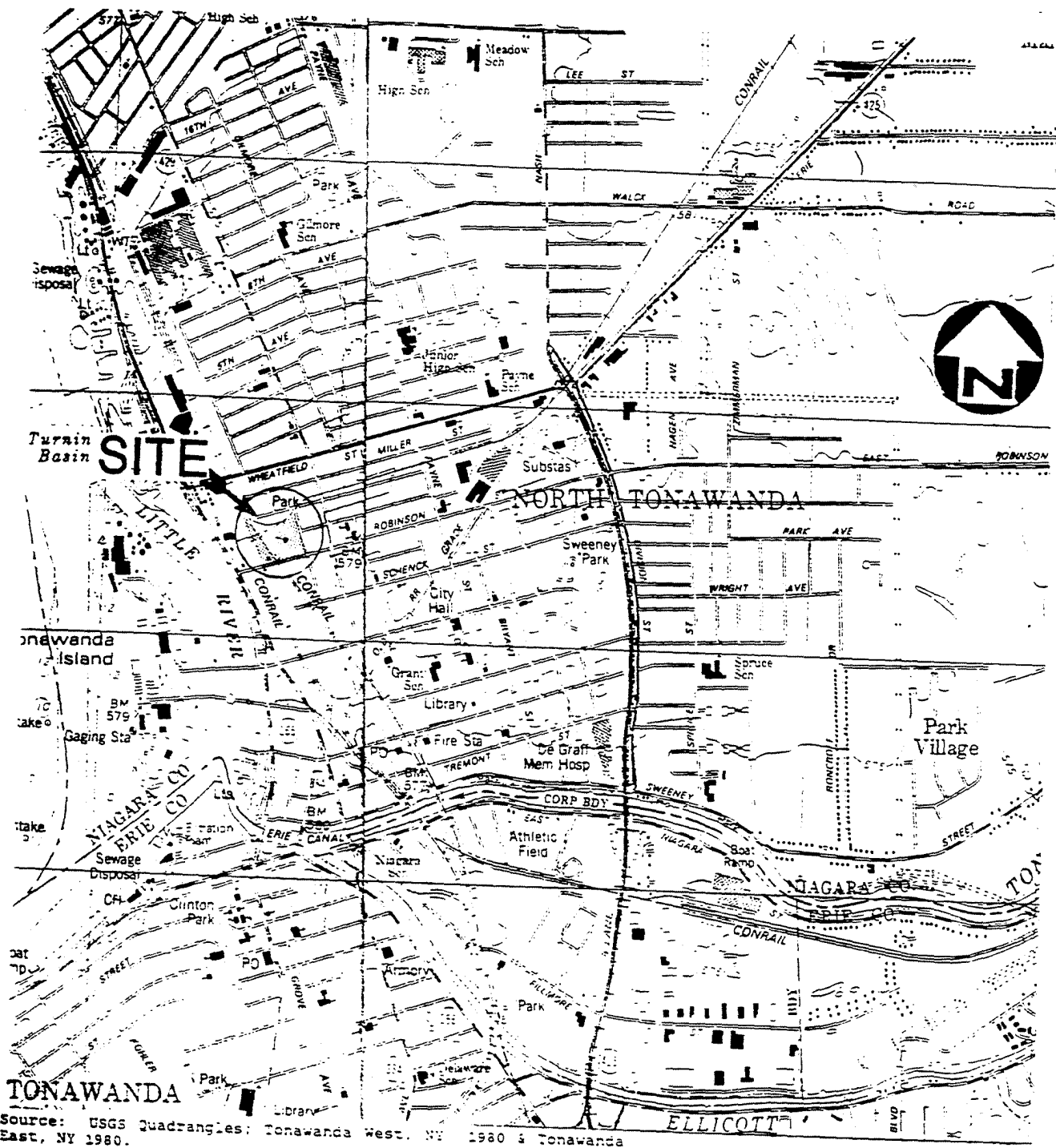
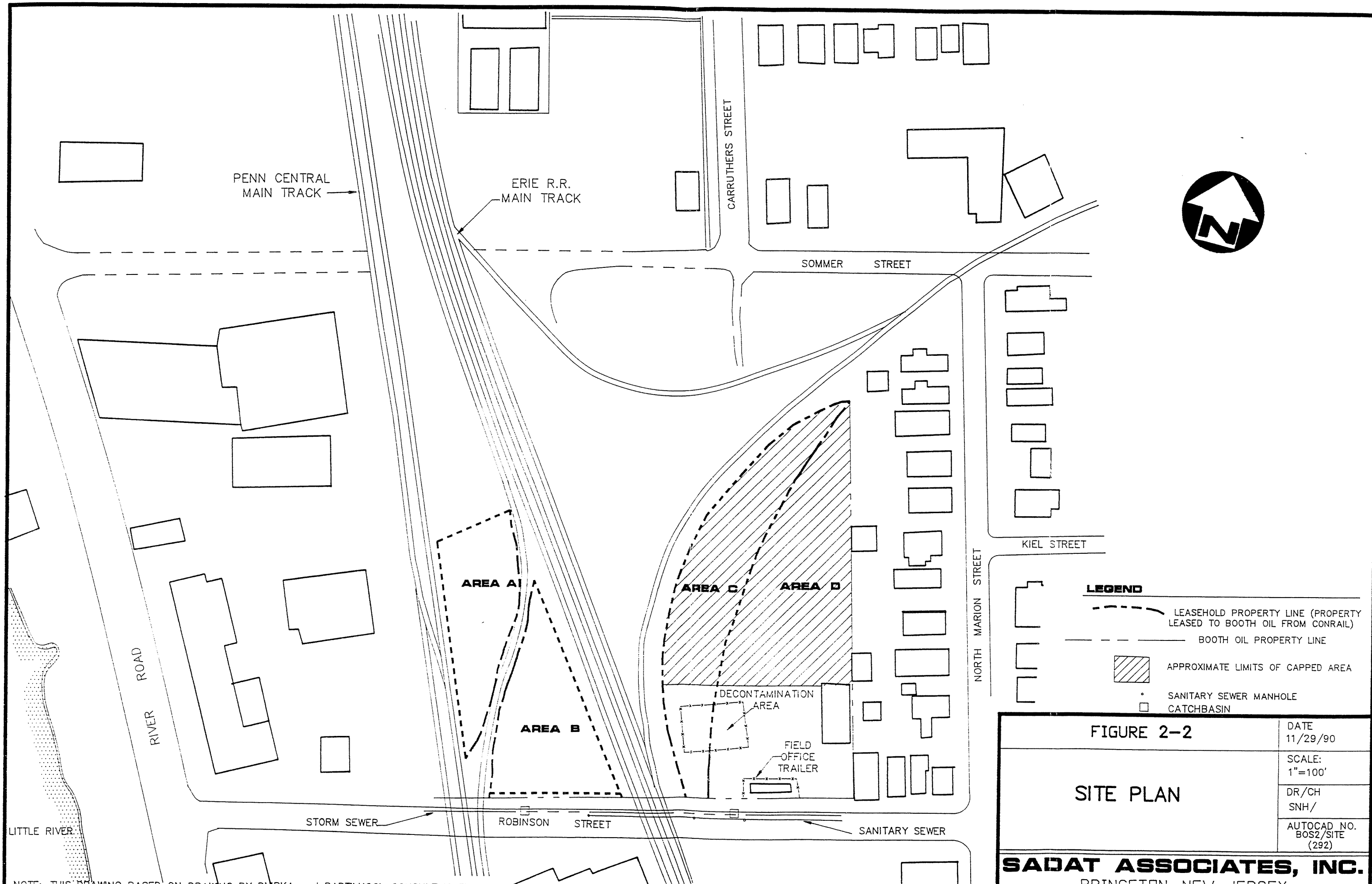


FIGURE 2-1

Site Location Map

SADAT ASSOCIATES, INC.
PRINCETON, NEW JERSEY

Scale 1:2500



LEGEND

- LEASEHOLD PROPERTY LINE (PROPERTY LEASED TO BOOTH OIL FROM CONRAIL)
- BOOTH OIL PROPERTY LINE
- APPROXIMATE LIMITS OF CAPPED AREA
- SANITARY SEWER MANHOLE
- CATCHBASIN

FIGURE 2-2

SITE PLAN

DATE
11/29/90

SCALE:
1"=100'

DR/CH
SNH/

AUTOCAD NO.
BOS2/SITE
(292)

SADAT ASSOCIATES, INC.

PRINCETON, NEW JERSEY

NOTE: THIS DRAWING BASED ON DRAWING BY DUKA AND BARTHOLOMEW CONSULTING ENGINEERS

revealed the presence of 6 underground tanks, which were removed in 1986.

In 1986, an investigation at the site was conducted by Booth Oil Company. A total of 15 test pits were excavated throughout the site, and soil samples were collected at one-foot intervals. Samples were analyzed for PCBs, lead, oil and grease, and other target parameters. High levels of oil and grease and lead were detected in the test pit samples. However, levels of PCBs were generally less than 10 ppm.

On two occasions in 1987, samples of oily material were collected by NYSDEC from sorbent booms located at the discharge of the Robinson Street sewer into the Niagara River. (The storm sewer starts in front of the site, and receives discharge from the site, Robinson Street, and the railroad crossings.) The first sample, collected during period of heavy rainfall in June 1987, contained PCBs at a concentration of 379 ppm. The second sample, collected during a less intense storm event, contained PCBs in excess of 50 ppm.

The Booth Oil Site is currently under investigation by NYSDEC Division of Hazardous Waste Remediation (DHWR) under New York State's Inactive Hazardous Waste Site Remediation project. Under

BOS2REPa/bos-t2
February 26, 1991

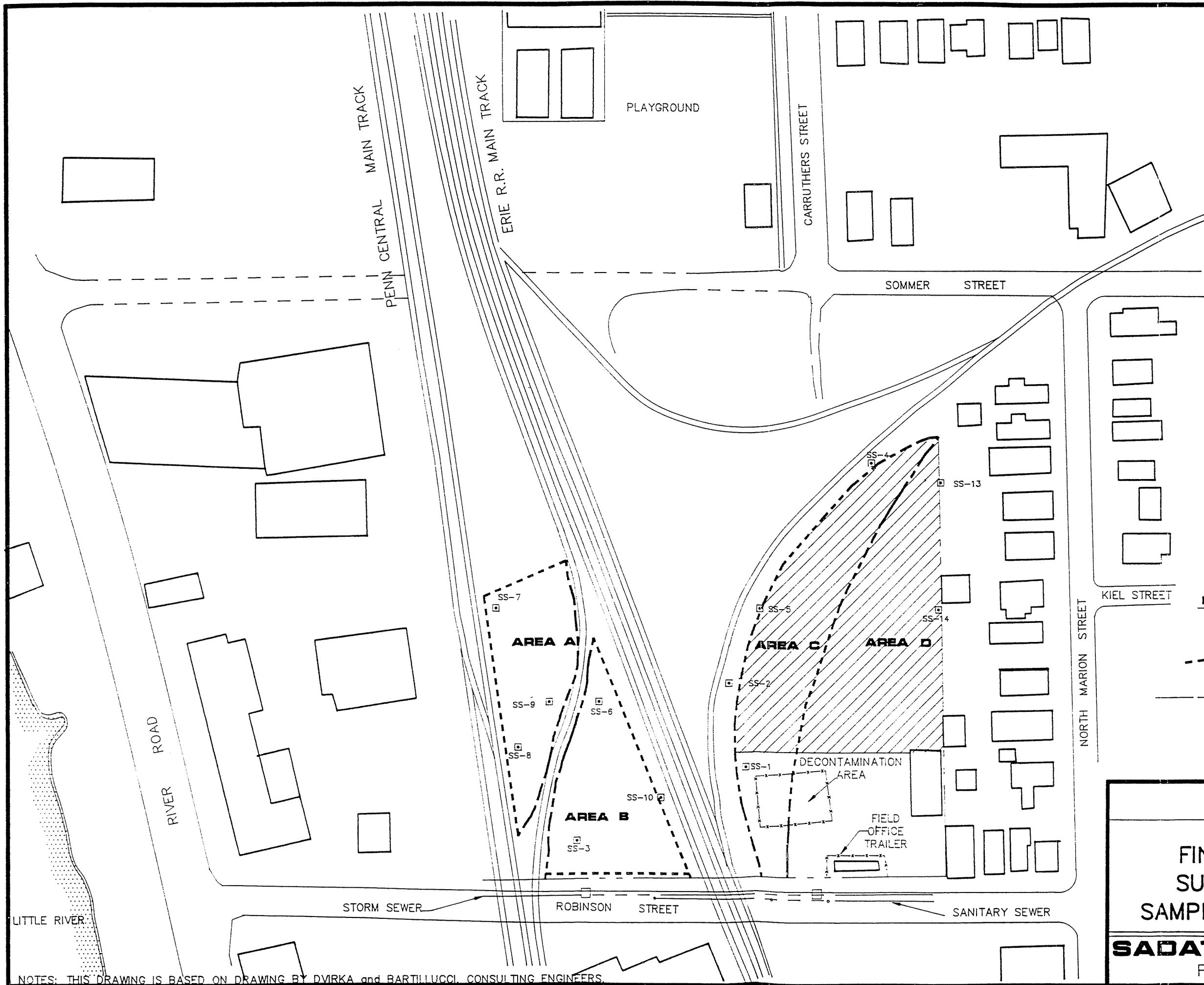
this program, NYSDEC entered into contract with the firm of Dvirka & Bartilucci Consulting Engineers to undertake a Remedial Investigation and Feasibility Study (RI/FS) of the Booth Oil Site. Phase I of the RI has recently been completed.

The Phase I RI included the collection of surficial and subsurface soil samples, installation and sampling of groundwater monitoring wells, and collection of sediment and aqueous samples from the catch basin and underground piping. It must be noted that the material in the underground piping is not subject to exposures, and is therefore not discussed herein.

2.2 Surficial Soil

During the Phase I RI, a total of fourteen surficial soil samples were collected and analyzed. Locations of the surficial soil samples collected on-site are shown in Figure 2-3. Surficial soil samples SS-11 and SS-12, not shown in Figure 2-3, were collected in the playground adjacent to the site.

Analytical results of the surficial soil samples collected during the Phase I RI are included in Tables 2-1, 2-2, 2-3 and 2-4. It must be noted that the data, as presented herein, have been quality-assured for the purposes of development of representative



LEGEND

- SS-14 SURFICIAL SAMPLING LOCATIONS (SAMPLE LOCATIONS IN THE PLAYGROUND AREA (SS-11,SS-12) ARE NOT SHOWN)
- LEASEHOLD PROPERTY LINE (PROPERTY LEASED TO BOOTH OIL FROM CONRAIL)
- BOOTH OIL PROPERTY LINE
- APPROXIMATE LIMITS OF CAPPED AREA
- SANITARY SEWER MANHOLE
- CATCHBASIN

FIGURE 2-3	DATE 11/29/90
FINAL PHASE I SURFICIAL SOIL SAMPLING LOCATIONS	SCALE 1"=100'
	DR/CH SNH/
	AUTOCAD NO. BOSURSAM (293)

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NOTES: THIS DRAWING IS BASED ON DRAWING BY DVIRKA and BARTILUCCI, CONSULTING ENGINEERS.

mean contaminant concentrations for quantitative risk assessment. For example, where a contaminant, which is otherwise confirmed to be present in an area of the site, is not detected in a particular sample, it cannot be assumed that the concentration of that contaminant is zero for that sample (EPA, 1989c). In fact, the chemical may be absent from the sample, or it may be present at a concentration just below the detection limit. Accordingly, a proxy concentration of 1/2 the sample detection limit is utilized for compounds reported as non-detected (i.e., designated as "U"). Similarly, reported concentrations are evaluated, in accordance with EPA guidelines (EPA, 1989c), with respect to analytical blank results and laboratory qualifiers to determine usability for the risk assessment.

The levels of Target Compound List (TCL) volatile organic compounds detected in the surficial soil samples collected at the Booth Oil Site are presented in Table 2-1. A total of 8 of the 14 surficial soil samples collected were analyzed for TCL volatile compounds with a library search for non-target compounds. The table also lists the preliminary cleanup guidelines for each compound.

The preliminary soil cleanup criteria for 1,1-dichloroethane (0.100 mg/kg), trichloroethene (0.049 mg/kg), and tetrachloroethene

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-1
Surficial Soil Results
Volatiles Organic Compounds

	Area A BOSS7S 6/26/90 (mg/kg)	Area A BOSS8S* 6/26/90 (mg/kg)	Area A BOSS9S 6/26/90 (mg/kg)	Area B BOSS3S 6/26/90 (mg/kg)	Area B BOSS6S* 6/26/90 (mg/kg)	Area B BOSS10S 6/26/90 (mg/kg)	Area C BOSS1S 6/26/90 (mg/kg)	Area C BOSS2S 6/26/90 (mg/kg)
VOLATILES	1.180	1.120	-	-	1.050	1.270	-	-
DILUTION FACTOR								
Benzene	0.003 U	0.347 U	NA	NA	0.370 J	0.003 U	NA	NA
Carbon Disulfide	0.003 U	0.090 J	NA	NA	0.326 U	0.003 U	NA	NA
1,1-Dichloroethane	0.003 U	0.780 U	NA	NA	0.326 U	0.003 U	NA	NA
1,2-Dichloroethane (tot	0.003 U	0.160	NA	NA	0.500 J	0.007	NA	NA
Ethylbenzene	0.003 U	0.490 JB	NA	NA	0.326 U	0.003 U	NA	NA
Tetrachloroethene	0.003 U	0.140 J	NA	NA	1.300 U	0.003 J	NA	NA
Toluene	0.003 U	0.347 UB	NA	NA	0.326 U	0.003 U	NA	NA
Trichloroethene	0.003 U	0.347 U	NA	NA	2.300 U	0.003 U	NA	NA
Xylene (total)	0.003 U	10.000 B	NA	NA	0.326 U	0.003 U	NA	NA

QUALIFIERS

J: compound present below the detection limit
 B: compound is found in the blank as well as the sample
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established
 *: samples analyzed at medium level
 -value exceeds standard/guideline
 -sample detection limit exceeds standard/guideline

TABLE 2-1 (Cont.)
 Surficial Soil Results
 Volatile Organic Compounds

VOLATILES	Area C	Area C	Area D	Area D	Playground	Playground	Preliminary
	BOSS4S 6/26/90 (mg/kg)	BOSS5S 6/26/90 (mg/kg)	BOSS13S 6/26/90 (mg/kg)	BOSS14S 6/26/90 (mg/kg)	BOSS11S 6/26/90 (mg/kg)	BOSS12S 6/26/90 (mg/kg)	Soil Cleanup Criteria (mg/kg)
DILUTION FACTOR		1.100	1.220		1.220	1.750	
Benzene	NA	0.004 J	0.003 U	NA	0.003 U	0.004 U	---
Carbon Disulfide	NA	0.005 J	0.003 U	NA	0.003 U	0.004 U	0.168
1,1-Dichloroethane	NA	0.003 U	0.003 U	NA	0.003 U	0.004 U	0.100
1,2-Dichloroethane (tot	NA	0.065	0.003 U	NA	0.003 U	0.004 U	---
Ethylbenzene	NA	0.006	0.003 U	NA	0.003 U	0.004 U	0.668
Tetrachloroethene	NA	0.007	0.003 U	NA	0.003 U	0.004 U	0.008
Toluene	NA	0.014	0.003 U	NA	0.003 U	0.004 U	0.358
Trichloroethene	NA	0.019	0.003 U	NA	0.003 U	0.004 U	0.049
Xylene (total)	NA	0.036	0.003 U	NA	0.003 U	0.004 U	0.670

QUALIFIERS

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established

*: samples analyzed at medium level

value exceeds standard/guideline

sample detection limit exceeds standard/guideline

(0.008 mg/kg) are exceeded in 2 surficial soil samples. Review of the table indicates that for each 1,1-dichloroethane and trichloroethene only one of the elevated values is an actual reported concentration, the other elevated value for each of these compounds is a proxy concentration estimated from sample detection limits which are higher than the preliminary cleanup guidelines. The elevated concentrations shown in the table for tetrachloroethene are both actual reported concentrations.

The preliminary cleanup criteria for carbon disulfide (0.168 mg/kg) and xylene (0.670 mg/kg) are exceeded in one sample each. The elevated value listed for carbon disulfide is a proxy concentration estimated from sample detection limits, while the value for xylene is an actual reported concentration.

Analytical results for the TCL semivolatile organic compounds detected in the surficial soil are presented in Table 2-2. A total of 8 of the 14 surficial soil samples were analyzed for these compounds.

One sample (SS-6) exceeded the preliminary soil cleanup criteria for acenaphthene (2.220 mg/kg) and acenaphthylene (5.140 mg/kg). Both of these values are proxy concentrations estimated from sample detection limits which are higher than the preliminary

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-2
Surficial Soil Results
Semivolatile Organic Compounds

SEMIVOLATILES	Area A BOSS7S 6/26/90 (mg/kg)	Area A BOSS8S 6/26/90 (mg/kg)	Area A BOSS9S 6/26/90 (mg/kg)	Area B BOSS3S 6/26/90 (mg/kg)	Area B BOSS6S 6/26/90 (mg/kg)	Area B BOSS10S 6/26/90 (mg/kg)	Area C BOSS1S 6/26/90 (mg/kg)	Area C BOSS2S 6/26/90 (mg/kg)
DILUTION FACTOR	1.160	4.550	-	-	43.480	5.950	-	-
Acenaphthene	0.170 J	1.600 J	NA	NA	14.348 U	1.964 U	NA	NA
Acenaphthylene	0.460 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Anthracene	0.400 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Benzo(a)anthracene	1.100	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Benzo(b)fluoranthene	1.600	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Benzo(k)fluoranthene	0.383 U	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Benzoic acid	1.856 U	7.260 U	NA	NA	69.568 U	5.520 U	NA	NA
Benzo(g,h,i)perylene	0.430 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Benzo(a)pyrene	1.000	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Butylbenzylphthalate	0.383 U	0.750 J	NA	NA	14.348 U	1.964 U	NA	NA
Chrysene	0.910	1.300 J	NA	NA	14.348 U	1.964 U	NA	NA
Dibenzo(a,h)anthracen	0.383 U	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Dibenzofuran	0.440 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
2,4-Dimethylphenol	0.240 J	1.502 U	NA	NA	66.000 JB	6.100	NA	NA
bis(2-Ethylhexyl)phthal	0.383 U	2.600 JB	NA	NA	8.200 JB	39.000	NA	NA
Fluoranthene	1.300	2.500 J	NA	NA	14.348 U	1.964 U	NA	NA
Fluorene	0.220 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
Indeno(1,2,3-cd)pyrene	0.420 J	1.502 U	NA	NA	14.348 U	1.964 U	NA	NA
2-Methylnaphthalene	2.000	6.000	NA	NA	3800 J	2.000 J	NA	NA
2-Methylphenol	0.383 U	1.502 U	NA	NA	48.000	1.964 U	NA	NA
4-Methylphenol	0.410 J	1.502 U	NA	NA	360.000	13.000	NA	NA
Naphthalene	1.200	1.502 U	NA	NA	14.348 U	0.910 J	NA	NA
Di-n-octylphthalate	0.150 J	1.502 U	NA	NA	14.348 U	3.400 J	NA	NA
Phenanthrene	1.400	3.100	NA	NA	2.400 J	1.964 U	NA	NA
Phenol	0.383 U	1.502 U	NA	NA	210.000	1.964 U	NA	NA
Pyrene	1.100	2.000 J	NA	NA	14.348 U	3.500 J	NA	NA

QUALIFIERS

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established

-value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

TABLE 2-2 (Cont.)
 Surficial Soil Results
 Semivolatile Organic Compounds

SEMIVOLATILES	Area C BOSS4S 6/26/90 (mg/kg)	Area C BOSS5S 6/26/90 (mg/kg)	Area D BOSS13S 6/26/90 (mg/kg)	Area D BOSS14S 6/26/90 (mg/kg)	Playground BOSS11S 6/26/90 (mg/kg)	Playground BOSS12S 6/26/90 (mg/kg)	Preliminary Soil Cleanup Criteria (mg/kg)
DILUTION FACTOR		4,260	1,230		1,140	1,230	
Acenaphthene	NA	1,406 U	0.406 U	NA	0.043 J	0.406 U	2,220
Acenaphthylene	NA	1,406 U	0.140 J	NA	0.092 J	0.406 U	5,140
Anthracene	NA	1,406 U	0.087 J	NA	0.082 J	0.406 U	65,000
Benzo(a)anthracene	NA	1,406 U	0.406 U	NA	0.660 J	0.406 U	0.005
Benzo(b)fluoranthene	NA	1,800 J	1,500	NA	0.740 J	0.300 J	0.055
Benzo(k)fluoranthene	NA	0.810 J	0.406 U	NA	0.720 J	0.190 J	0.055
Benzoic acid	NA	6,318 U	0.200 J	NA	0.120 J	0.063 J	0.167
Benzo(g,h,i)perylene	NA	1,406 U	0.360 J	NA	0.560 J	0.230 J	593,110
Benzo(a)pyrene	NA	1,406 U	0.990	NA	0.650 J	0.210 J	---
Butylbenzylphthalate	NA	1,406 U	0.406 U	NA	0.376 U	0.406 U	---
Chrysene	NA	1,100 J	1,200	NA	0.960 J	0.330 J	0.020
Dibenzo(a,h)anthracen	NA	1,406 U	0.120 J	NA	0.120 J	0.406 U	713,680
Dibenzofuran	NA	1,406 U	0.042 J	NA	0.120 J	0.406 U	---
2,4-Dimethylphenol	NA	0.750 J	0.406 U	NA	0.376 U	0.406 U	0.050
bis(2-Ethylhexyl)phthal	NA	8,200 B	3,300 B	NA	0.376 U	0.406 U	1517,325
Fluoranthene	NA	1,500 J	2,200	NA	2,000	0.550 J	22,892
Fluorene	NA	1,406 U	0.406 U	NA	0.170 J	0.406 U	8,180
Indeno(1,2,3-cd)pyrene	NA	1,406 U	0.900	NA	0.620 J	0.230 J	0.028
2-Methylnaphthalene	NA	1,100 J	0.120 J	NA	0.190 J	0.089 J	21,250
2-Methylphenol	NA	1,406 U	0.406 U	NA	0.376 U	0.406 U	---
4-Methylphenol	NA	1,406 U	0.406 U	NA	0.376 U	0.406 U	---
Naphthalene	NA	1,406 U	0.068 J	NA	0.100 J	0.052 J	0.650
Di-n-octylphthalate	NA	1,406 U	0.406 U	NA	0.376 U	0.406 U	5,965
Phenanthrene	NA	1,700 J	0.620 J	NA	2,000	0.370 J	57,300
Phenol	NA	1,406 U	0.406 U	NA	0.376 U	0.406 U	0.000
Pyrene	NA	1,900 J	1,300	NA	1,400	0.340 J	210,000

QUALIFIERS

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established

[]: value exceeds standard/guideline

[]: sample detection limit exceeds standard/guideline

soil cleanup criteria. All 8 surficial soil samples exceeded the preliminary cleanup criteria for benzo(a)anthracene (0.005 mg/kg), benzo(b)fluoranthene (0.055 mg/kg), and benzo(k)fluoranthene (0.055 mg/kg). Further review of the table indicates that 2 of the values for benzo(a)anthracene are actual reported concentrations. Similarly, 5 values for benzo(b)fluoranthene and 3 values for benzo(k)fluoranthene are actual reported concentrations. The other values are proxy concentrations estimated from elevated sample detection limits.

The preliminary cleanup criteria for benzoic acid (0.167 mg/kg) is exceeded in 6 of the surficial soil samples, 1 of these exceedances is due to an actual reported concentration, while 5 are due to proxy concentrations. The preliminary cleanup criteria are exceeded in all 8 samples for chrysene (0.020 mg/kg), 2,4-dimethylphenol (0.050 mg/kg), and indeno(1,2,3-cd)pyrene (0.028 mg/kg). Six of the 8 elevated values listed for chrysene and 4 of the 8 elevated values listed for 2,4-dimethylphenol and indeno(1,2,3-cd)pyrene are actual reported concentrations. The remaining exceedances for each of these compounds are due to proxy concentrations estimated from sample detection limits which exceed the preliminary soil cleanup criteria.

BOS2REPa/bos-t2
February 26, 1991

Further review of Table 2-2 indicates that 1 of the 8 surficial soil samples shows an exceedance of preliminary cleanup criteria for fluorene (8.810 mg/kg) and di-n-octylphthalate (5.965 mg/kg). Both of these elevated concentrations are proxy concentrations estimated from sample detection limits which are greater than the preliminary soil cleanup criteria. The preliminary cleanup criteria for naphthalene (0.650 mg/kg) and phenol (0.00057 mg/kg) are exceeded in 5 and 8 samples, respectively. Two of the 5 values listed for naphthalene and only 1 of the 8 values listed for phenol are actual reported concentrations. The remaining values are proxy concentrations estimated from elevated sample detection limits.

The results of analysis for TCL inorganic compounds in the surficial soil samples from the Booth Oil Site are presented in Table 2-3. The New Jersey Department of Environmental Protection (NJDEP) Action Levels for inorganics are also listed in the table. The NJDEP Action Levels are identified as preliminary cleanup criteria for inorganic contaminants at the Booth Oil Site. The NJDEP Action Level for arsenic (20.00 mg/kg) is exceeded in 4 of the 8 samples analyzed. The NJDEP Action Levels for cadmium (3.0 mg/kg), chromium (100.0 mg/kg), and copper (170.0 mg/kg) are each exceeded in 1 of the 8 samples. The action level for lead (100.0

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-3
Surficial Soil Results
Inorganic Compounds

	Area A BOSS7S 6/26/90 (mg/kg)	Area A BOSS8S 6/26/90 (mg/kg)	Area A BOSS9S 6/26/90 (mg/kg)	Area B BOSS3S 6/26/90 (mg/kg)	Area B BOSS6S 6/26/90 (mg/kg)	Area B BOSS10S 6/26/90 (mg/kg)	Area C BOSS1S 6/26/90 (mg/kg)	Area C BOSS2S 6/26/90 (mg/kg)
INORGANICS								
Aluminum	11100.000	10800.000	NA	NA	31600.000	19300.000	NA	NA
Antimony	6.600	5.600	BN	NA	3.700	U	NA	NA
Arsenic	26.200	22.400		NA	4.100	12.300	NA	NA
Barium	118.000	188.000	*	NA	345.000	2600.000	*	NA
Beryllium	1.100	1.400		NA	5.600	2.000	NA	NA
Cadmium	1.300	1.600		NA	1.100	8.000	NA	NA
Calcium	107000.000	85200.000	*	NA	187000.000	73600.000	*	NA
Chromium	20.600	23.000	*	NA	39.800	152.000	*	NA
Cobalt	6.900	6.600	B	NA	2.800	11.600	NA	NA
Copper	75.600	83.000	E*	NA	54.700	541.000	E	NA
Iron	27000.000	28300.000	*	NA	13700.000	45300.000	*	NA
Lead	300.000	801.000		NA	1390.000	2280.000		NA
Magnesium	51900.000	24900.000		NA	57100.000	13700.000		NA
Manganese	946.000	876.000		NA	2550.000	1040.000		NA
Mercury	0.180	0.270		NA	0.160	0.170		NA
Nickel	16.800	19.200		NA	10.000	40.100		NA
Potassium	1730.000	1270.000		NA	2390.000	1540.000		NA
Selenium	1.000	1.500		NA	0.460	1.900		NA
Silver	0.910	0.820	U	NA	0.830	0.920	U	NA
Sodium	443.000	473.000	B	NA	1440.000	733.000	B	NA
Thallium	0.440	0.510	B	NA	0.510	0.670	B	NA
Vanadium	22.500	19.500	E	NA	13.700	26.400	E	NA
Zinc	235.000	336.000	N*	NA	358.000	1200.000	N*	NA
Cyanide	0.600	7.600	U	NA	1.900	5.500		NA

QUALIFIERS

U : value is less than the instrument detection limit (IDL)
 B : value is between IDL and contract required detection limit (CRDL)
 E : value is estimated due to interference
 M : duplicate injection precision not met
 N : spiked sample recovery not within control limits
 *: duplicate analysis not within control limits

NOTES

---: not established
 -value exceeds standard/guideline
 -sample detection limit exceeds standard/guideline

TABLE 2-3 (Cont.)
 Surficial Soil Results
 Inorganic Compounds

	Area C BOSS4S 6/26/90 (mg/kg)	Area C BOSS5S 6/26/90 (mg/kg)	Area D BOSS13S 6/26/90 (mg/kg)	Area D BOSS14S 6/26/90 (mg/kg)	Playground BOSS11S 6/26/90 (mg/kg)	Playground BOSS12S 6/26/90 (mg/kg)	NJDEP Soil Action Levels (mg/kg)
INORGANICS							
Aluminum	NA 13300.000	15400.000	15400.000	NA	14600.000	16700.000	----
Antimony	NA 4.800	B 4.200	UN	NA	4.100	4.300	U
Arsenic	NA 21.200	80.700		NA	16.600	8.800	20.000
Barium	NA 237.000	* 281.000	*	NA	134.000	* 120.000	*
Beryllium	NA 0.970	B 0.990	B	NA	0.860	B 1.100	B
Cadmium	NA 2.400	2.900		NA	0.970	B 0.920	B
Calcium	NA 73300.000	* 25800.000	*	NA	12300.000	* 14200.000	*
Chromium	NA 29.700	* 31.200	*	NA	22.900	* 26.100	*
Cobalt	NA 8.100	B 15.400		NA	10.100	B 9.800	B
Copper	NA 73.900	E* 89.900	E*	NA	68.800	E 39.000	E
Iron	NA 23800.000	* 56500.000	*	NA	34600.000	* 29700.000	----
Lead	NA 744.000	469.000		NA	133.000	103.000	100.000
Magnesium	NA 25300.000	12400.000		NA	6990.000	8260.000	----
Manganese	NA 745.000	751.000		NA	660.000	751.000	----
Mercury	NA 0.230	0.310		NA	0.120	0.120	U
Nickel	NA 22.400	29.000		NA	26.600	28.200	100.000
Potassium	NA 1990.000	2420.000		NA	2270.000	2500.000	----
Selenium	NA 0.670	B 1.500	B	NA	1.500	B 1.100	B
Silver	NA 0.830	U 0.930	U	NA	0.910	U 0.960	U
Sodium	NA 301.000	B 286.000	B	NA	214.000	B 270.000	B
Thallium	NA 0.420	U 0.620	B	NA	0.540	B 0.490	B
Vanadium	NA 21.700	E 45.600	E	NA	35.000	E 38.400	E
Zinc	NA 343.000	N* 940.000	N*	NA	279.000	N* 215.000	N*
Cyanide	NA 0.540	U 0.750		NA	0.590	U 0.640	U

QUALIFIERS

U : value is less than the instrument detection limit (IDL)
 B : value is between IDL and contract required detection limit (CRDL)
 E : value is estimated due to interference
 M : duplicate injection precision not met
 N : spiked sample recovery not within control limits
 * : duplicate analysis not within control limits

NOTES

---- : not established
 [] : value exceeds standard/guideline
 [] : sample detection limit exceeds standard/guideline

mg/kg) is exceeded in all 8 samples, and the action level for zinc (350.0 mg/kg) is exceeded in 3 of the 8 samples.

All 14 of the surficial soil samples collected during the Phase I RI were analyzed for PCBs. The results of these analyses are presented in Table 2-4. Review of Table 2-4 indicates that all 14 samples exceed the preliminary cleanup criteria for PCB-1242 (0.085 mg/kg). Of these 14 elevated concentrations, only 1 is due to an actual reported concentration. The remaining 13 are due to proxy concentrations estimated from sample detection limits which are higher than the preliminary cleanup criteria. The preliminary cleanup criteria for PCB-1254 (0.275 mg/kg) and PCB-1248 (0.205 mg/kg) are exceeded in 9 and 8 surficial soil samples, respectively. Five of the 9 exceedances for PCB-1254 and 7 of the 8 exceedances for PCB-1248 are due to actual reported concentrations. The remaining exceedances are due to proxy concentrations estimated from sample detection limits which are higher than the preliminary soil cleanup criteria.

The arithmetic mean and upper 95% confidence arithmetic mean for contaminants detected in the surficial soil samples collected at the Booth Oil Site are presented in Table 2-5. Mean contaminant concentrations are calculated for each area of the site for use in the quantitative risk assessment. In accordance with EPA

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-4
Surficial Soil Results
Pesticides/PCBs

	Area A	Area A	Area A	Area B	Area B	Area B	Area C	Area C
	BOSS7S	BOSS8S	BOSS9S	BOSS3S	BOSS6S	BOSS10S	BOSS1S	BOSS2S
	6/26/90	6/26/90	6/26/90	6/26/90	6/26/90	6/26/90	6/26/90	6/26/90
PESTICIDES/PCBS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
DILUTION FACTOR	1.160	5.680	5.490	5.210	10.870	11.900	21.740	10.640
PCB-1242	0.093 U	0.454 U	0.439 U	0.417 U	19.000 U	0.852 U	1.738 U	0.851 U
PCB-1254	9.100	15.000	11.000	0.834 U	1.740 U	44.000	82.000	1.702 U
PCB-1260	5.700	12.000	6.100	5.900	32.000	31.000	3.478 U	1.702 U
PCB-1248	4.100	16.000	13.000	15.000	0.870 U	37.000	1.739 U	32.000

QUALIFIERS

J: compound present below the detection limit
 B: compound is found in the blank as well as the sample
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established
 -value exceeds standard/guideline
 -sample detection limit exceeds standard/guideline

TABLE 2-4 (Cont.)
 Surficial Soil Results
 Pesticides/PCBs

PESTICIDES/PCBS	Area C		Area D		Area D		Area D		Playground		Playground		Preliminary Soil Cleanup Criteria (mg/kg)
	BOSS4S 6/26/90 (mg/kg)	BOSS5S 6/26/90 (mg/kg)	BOSS13S 6/26/90 (mg/kg)	BOSS14S 6/26/90 (mg/kg)	BOSS11S 6/26/90 (mg/kg)	BOSS12S 6/26/90 (mg/kg)	BOSS11S 6/26/90 (mg/kg)	BOSS12S 6/26/90 (mg/kg)	BOSS11S 6/26/90 (mg/kg)	BOSS12S 6/26/90 (mg/kg)	BOSS11S 6/26/90 (mg/kg)	BOSS12S 6/26/90 (mg/kg)	
DILUTION FACTOR	1.230	10.640	1.230	1.200	1.140	1.230	1.140	1.230	1.140	1.230	1.140	1.230	
PCB-1242	0.098 U	0.351 U	0.098 U	0.098 U	0.091 U	0.098 U	0.091 U	0.098 U	0.091 U	0.098 U	0.091 U	0.098 U	0.085
PCB-1254	0.197 U	1.702 U	0.197 U	0.192 U	0.182 U	0.197 U	0.182 U	0.197 U	0.182 U	0.197 U	0.182 U	0.197 U	0.275
PCB-1260	1.300	8.000	0.197 U	0.192 U	0.182 U	0.197 U	0.182 U	0.197 U	0.182 U	0.197 U	0.182 U	0.197 U	---
PCB-1248	0.098 U	35.000	0.098 U	0.096 U	0.091 U	0.098 U	0.091 U	0.098 U	0.091 U	0.098 U	0.091 U	0.098 U	0.205

QUALIFIERS

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES

---: not established

value exceeds standard/guideline

sample detection limit exceeds standard/guideline

TABLE 2-5
Surficial Soils
Mean Contaminant Concentrations

VOLATILES DILUTION FACTOR	Area A		Area B		Area C		Area D		TOTAL		Playground	
	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)	Arith Mean (mg/kg)	Upper 95% Confidence Arith Mean (mg/kg)
Benzene	0.175	0.413	0.187	0.441	0.004	N/A	0.003	N/A	0.122	0.354	0.004	0.005
Carbon Disulfide	0.047	0.107	0.165	0.388	0.005	N/A	0.003	N/A	0.072	0.235	0.004	0.005
1,1-Dichloroethane	0.392	0.930	0.165	0.388	0.003	N/A	0.003	N/A	0.186	0.589	0.004	0.005
1,2-Dichloroethane (tot	0.082	0.190	0.254	0.595	0.065	N/A	0.003	N/A	0.123	0.369	0.004	0.005
Ethylbenzene	0.247	0.584	0.165	0.388	0.006	N/A	0.003	N/A	0.139	0.411	0.004	0.005
Tetrachloroethene	0.072	0.166	0.652	1.550	0.007	N/A	0.003	N/A	0.243	0.902	0.004	0.005
Toluene	0.175	0.413	0.165	0.388	0.014	N/A	0.003	N/A	0.116	0.332	0.004	0.005
Trichloroethene	0.175	0.413	1.152	2.743	0.019	N/A	0.003	N/A	0.446	1.608	0.004	0.005
Xylene (total)	5.002	11.929	0.165	0.388	0.036	N/A	0.003	N/A	1.729	6.858	0.004	0.005

TABLE 2-5 (Cont.)
 Surficial Soils
 Mean Contaminant Concentrations

SEMIVOLATILES	Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 95% Confidence		Upper 9	

TABLE 2-5 (Cont.)
 Surficial Soils
 Mean Contaminant Concentrations

	Area A	Upper 95% Confidence	Area B	Upper 95% Confidence	Area C	Upper 95% Confidence	Area D	Upper 95% Confidence	TOTAL	Upper 95% Confidence	Playground	Upper 95% Confidence
	Arith Mean	(mg/kg)	Arith Mean	(mg/kg)	Arith Mean	(mg/kg)	Arith Mean	(mg/kg)	Arith Mean	(mg/kg)	Arith Mean	(mg/kg)
INORGANICS												
Aluminum	10950.000	11157.889	25450.000	33973.465	13300.000	N/A	15400.000	N/A	16916.667	26944.996	15650.000	17105.226
Antimony	6.100	6.793	79.850	185.389	4.800	N/A	4.200	N/A	30.150	108.163	4.200	4.339
Arsenic	24.300	26.933	8.200	13.882	21.200	N/A	80.700	N/A	27.817	62.120	12.700	18.105
Barium	153.000	201.508	1472.500	3035.135	237.000	N/A	281.000	N/A	628.167	1854.259	127.000	136.702
Beryllium	1.250	1.458	3.800	6.295	0.970	N/A	0.990	N/A	2.010	4.288	0.980	1.146
Cadmium	1.450	1.658	4.550	9.331	2.400	N/A	2.900	N/A	2.883	6.170	0.945	0.980
Calcium	96100.000	111206.629	130300.000	208882.191	73300.000	N/A	25800.000	N/A	91983.333	159801.713	13250.000	14566.633
Chromium	21.800	23.463	95.900	173.651	29.700	N/A	31.200	N/A	49.383	113.558	24.500	26.717
Cobalt	6.750	6.958	7.200	13.298	8.100	N/A	15.400	N/A	8.567	14.111	9.950	10.158
Copper	79.300	84.428	297.850	634.839	73.900	N/A	89.900	N/A	153.017	393.956	53.900	75.550
Iron	27650.000	28550.854	29500.000	51397.683	23800.000	N/A	56500.000	N/A	32433.333	52170.327	32150.000	35545.527
Lead	550.500	897.675	1835.000	2451.739	744.000	N/A	469.000	N/A	997.333	1921.440	118.000	138.789
Magnesium	38400.000	57110.045	35400.000	65474.666	25300.000	N/A	12400.000	N/A	30883.333	55106.641	7625.000	8505.065
Manganese	911.000	959.508	1795.000	2841.377	745.000	N/A	751.000	N/A	1151.333	2030.062	705.500	768.560
Mercury	0.225	0.287	0.165	0.172	0.230	N/A	0.310	N/A	0.220	0.297	0.120	0.120
Nickel	18.000	19.663	25.050	45.908	22.400	N/A	29.000	N/A	22.917	36.193	27.400	28.509
Potassium	1500.000	1818.764	1965.000	2554.020	1990.000	N/A	2420.000	N/A	1890.000	2476.201	2385.000	2544.382
Selenium	1.250	1.596	1.180	2.178	0.670	N/A	1.500	N/A	1.172	1.872	1.300	1.577
Silver	0.865	0.927	0.875	0.937	0.830	N/A	0.930	N/A	0.873	0.939	0.935	0.970
Sodium	458.000	478.789	1086.500	1576.426	301.000	N/A	286.000	N/A	612.667	1164.463	242.000	280.806
Thallium	0.475	0.524	0.590	0.701	0.420	N/A	0.620	N/A	0.528	0.653	0.515	0.550
Vanadium	21.000	23.079	20.050	28.851	21.700	N/A	45.600	N/A	24.900	38.775	36.700	39.056
Zinc	285.500	355.489	779.000	1362.476	343.000	N/A	940.000	N/A	568.667	1073.864	247.000	291.350
Cyanide	4.100	8.951	3.700	6.195	0.540	N/A	0.750	N/A	2.815	6.623	0.615	0.650

TABLE 2-5 (Cont.)
Surficial Soils
Mean Contaminant Concentrations

PESTICIDES/PCBS DILUTION FACTOR	Group A		Group B		Group C		Group D		TOTAL		Group P	
	Arith Mean	Upper 95% Confidence	Arith Mean	Upper 95% Confidence	Arith Mean	Upper 95% Confidence	Arith Mean	Upper 95% Confidence	Arith Mean	Upper 95% Confidence	Arith Mean	Upper 95% Confidence
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
PCB-1242	0.329	0.517	6.790	16.563	0.885	1.454	0.097	0.098	1.792	4.773	0.095	0.154
PCB-1254	11.700	14.483	15.525	38.314	21.400	55.693	0.195	0.198	11.976	26.401	0.190	0.317
PCB-1260	7.933	11.193	22.967	36.631	3.620	6.225	0.195	0.198	7.684	14.520	0.190	0.317
PCB-1248	11.033	16.752	17.623	34.446	17.209	33.218	0.097	0.098	11.072	20.148	0.095	0.154

guidelines (EPA, 1989c) the upper 95% confidence arithmetic mean contaminant concentrations will be used in the quantitative assessment to represent average contaminant levels in each area of the site. The upper 95% confidence arithmetic mean is a statistical value, calculated such that, assuming the data is representative of the site, 95% of any additional samples would be expected to yield results below this level. Use of this mean will provide a conservative upper-bound estimate of exposures to the Booth Oil Site.

Table 2-5 indicates that for the volatile organic compounds, Area A results in the highest mean concentrations for 1,1-dichloroethane, ethylbenzene, toluene, and xylene. Area B results in the highest mean concentrations for benzene, carbon disulfide, 1,2-dichloroethene, tetrachloroethene, and trichloroethene. Samples collected in Area D and the playground consistently result in the lowest mean contaminant concentrations for all contaminants.

Area B results in the highest mean contaminant concentrations for the majority of the semivolatile organic compounds, with the exception of benzo(g,h,i)perylene, 2-methylnaphthalene and phenanthrene. Area A results in the highest mean concentrations of these compounds (see Table 2-5). Area D results in the lowest mean contaminant concentrations for all on-site samples, with the

BOS2REPa/bos-t2
February 26, 1991

exception of chrysene and bis(2-ethylhexyl)phthalate. Area A results in the lowest mean concentrations of these compounds. The surficial soil samples collected from the playground off-site consistently result in lower mean contaminant concentrations than those detected on-site. The only exception to this is phenanthrene, which has a reported concentration of 0.620 mg/kg for Area D and a mean concentration of 1.185 mg/kg for the playground.

Further review of Table 2-5 indicates that Area B results in the highest mean contaminant concentrations for the inorganic compounds aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, copper, lead, manganese, and sodium. Area D results in the highest mean contaminant concentrations for the compounds arsenic, cobalt, iron, mercury, nickel, potassium, selenium, silver, thallium, vanadium, and zinc. Area A results in the highest mean contaminant concentrations for the remaining inorganic compounds, manganese and cyanide.

The surficial soil samples collected in the playground result in lower mean contaminant concentrations than the samples collected on-site for 11 out of the 24 inorganic parameters (antimony, barium, beryllium, cadmium, calcium, copper, lead, manganese, mercury, sodium and zinc). Areas A and C each have 8 compounds showing the lowest mean concentrations of the samples collected on-

site (i.e., excluding the playground). Area A has the lowest mean on-site concentrations of aluminum, barium, cadmium, chromium, cobalt, nickel, potassium and zinc. Of these, the mean concentrations of aluminum, chromium, cobalt, nickel, and potassium calculated for Area A are lower than those calculated for the playground. Area C has the lowest mean on-site concentrations of cadmium, copper, iron, manganese, selenium, silver, thallium and cyanide. Of these, the mean concentrations of iron, selenium, silver, thallium and cyanide calculated for Area C are lower than those calculated for the playground.

Area D results in the lowest mean on-site concentrations of antimony, calcium, lead, magnesium, and sodium. The mean concentration for magnesium calculated for Area D is lower than that calculated for the playground. Finally, Area B results in the lowest mean on-site concentrations of barium, mercury and vanadium. The mean concentrations of barium and vanadium calculated for Area B are lower than those calculated for the playground.

Further review of Table 2-5 indicates that Area B results in the highest mean contaminant concentrations for PCB-1242, PCB-1260, and PCB-1248. Area C results in the highest mean contaminant concentrations for PCB-1254. Area D consistently results in the lowest on-site mean contaminant concentrations for the PCBs. The

BOS2REPa/bos-t2
February 26, 1991

playground consistently results in lower mean PCB concentrations than on-site samples. The only exception to this, PCB-1242, is due to proxy concentrations calculated from elevated sample detection limits for the playground samples (see Table 2-4).

2.3 Subsurface Soil

A total of 18 subsurface soil samples were collected during the Phase I RI. Seven of these samples were collected from boreholes during the installation of monitoring wells, and 11 samples were collected from soil borings. The locations of these samples are shown in Figure 2-4.

Analytical results for 17 of the 18 subsurface soil samples are shown in Tables 2-6 through 2-9. (Sample SB-11 was analyzed for PHC and RCRA characteristics, which are not quantitatively assessed in the human health risk assessment. Therefore, this sample is not included in the tables.) A total of 11 of the 18 subsurface soil samples collected at the Booth Oil Site were analyzed for TCL volatile organic compounds with a library search for non-target compounds. Table 2-6 presents the levels of volatile organic compounds detected in these samples.

BOS2REPa/bos-t2
February 26, 1991

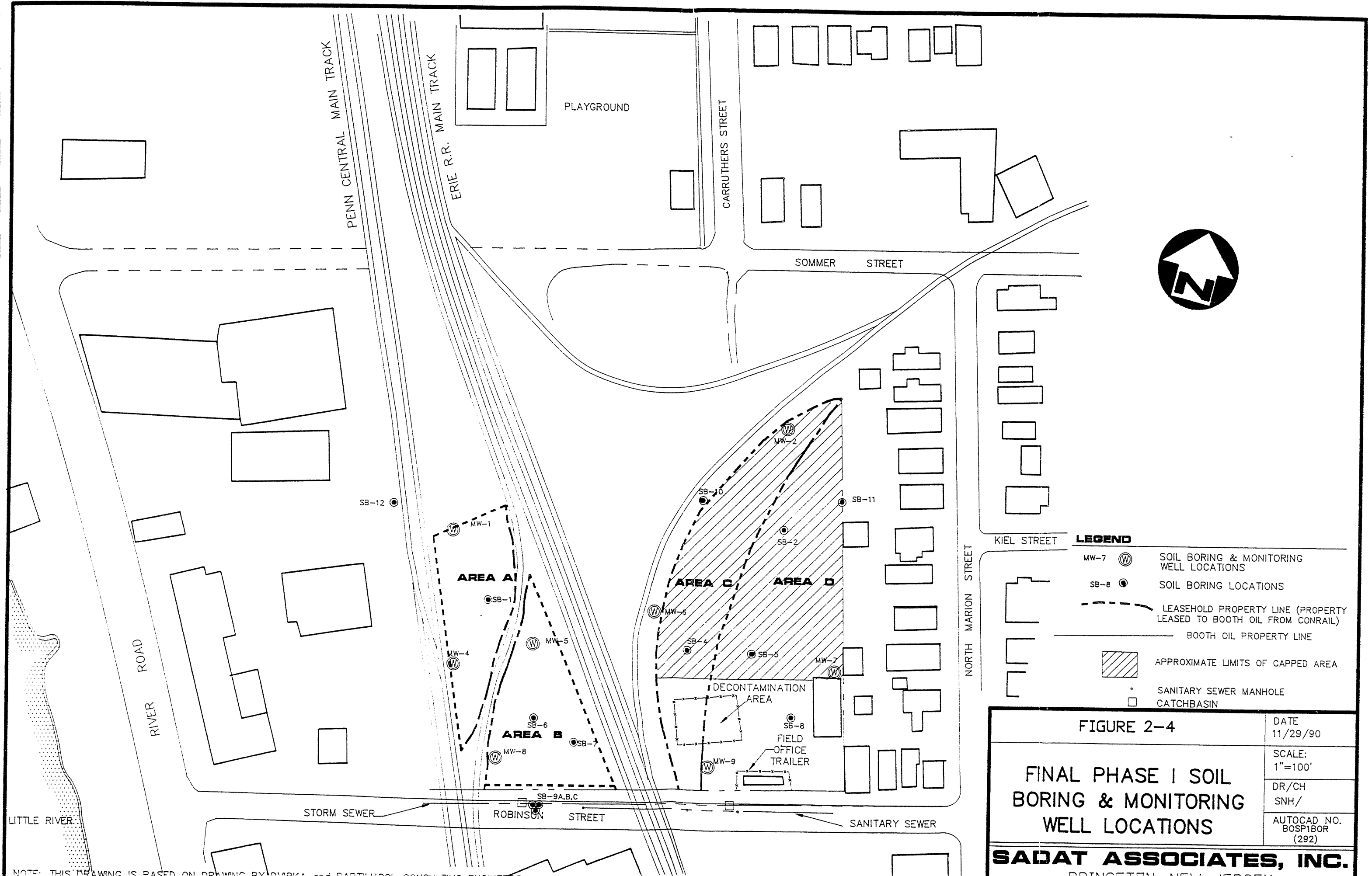


TABLE 2-6
Subsurface Soil Results
Volatile Organic Compounds

VOLATILES	Area A BOMW1S(0-2)* 7/12/90 (mg/kg)	Area A BOMW4S(0-2) 7/16/90 (mg/kg)	Area A BOSB1S(7-9)* 7/13/90 (mg/kg)	Area A BOSB12S(2-4) 7/18/90 (mg/kg)	Area B BOMW5S(4-6)* 7/16/90 (mg/kg)	Area B BOMW6S(2-4) 7/17/90 (mg/kg)
DILUTION FACTOR	1.180		1.320	1.150	1.090	
Benzene	0.366 U	NA	0.409 U	0.001 J	0.338 U	NA
Carbon Disulfide	0.366 U	NA	0.409 U	0.001 J	0.338 U	NA
1,1-Dichloroethane	0.366 U	NA	0.409 U	0.003 U	0.338 U	NA
1,1,1-Dichloroethane	0.366 U	NA	0.409 U	0.001 J	0.338 U	NA
1,2-Dichloroethane (total)	0.366 U	NA	0.640 J	0.002 J	8.300	NA
Ethylbenzene	3.800	NA	2.300	0.003 U	6.800	NA
Tetrachloroethene	0.366 U	NA	0.409 U	0.003 U	1.800	NA
Toluene	0.366 U	NA	0.409 U	0.002 J	7.800 B	NA
Trichloroethene	0.366 U	NA	0.220 J	0.003 U	0.338 U	NA
1,1,1-Trichloroethane	0.366 U	NA	0.409 U	0.003 U	1.200	NA
Xylene (total)	27.000	NA	8.100	0.003 U	38.000	NA

QUALIFIERS:

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES:

*

- a medium level soil analysis was performed

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-6 (cont.)
Subsurface Soil Results
Volatile Organic Compounds

	Area B BOSB7S(2-4)* 7/18/90 (mg/kg)	Area B BOSB9S(11-13) 7/12/90 (mg/kg)	Area C BOMW6S(1-4)* 7/11/90 (mg/kg)	Area C BOSB4S(6-8) 7/12/90 (mg/kg)	Area C BOSB4S(11-13) 7/12/90 (mg/kg)	Area C BOSB10S(0-2) 7/10/90 (mg/kg)
VOLATILES	1.140	6.300	1.210		2.560	1.000
DILUTION FACTOR						
Benzene	0.353 U	0.005 J	0.375 U	NA	0.006 U	0.001 J
Carbon Disulfide	0.353 U	0.016 U	0.375 U	NA	0.002 J	0.003 J
1,1-Dichloroethane	0.353 U	0.007 J	0.375 U	NA	0.005 J	0.003 U
1,1-Dichloroethene	0.353 U	0.016 U	0.375 U	NA	0.006 U	0.003 U
1,2-Dichloroethene (total)	3.000	0.073	0.630 J	NA	0.008 J	0.047
Ethylbenzene	2.800	0.041	0.200 J	NA	0.020	0.002 J
Tetrachloroethene	0.200 J	0.016 U	0.375 U	NA	0.019	0.120
Toluene	2.200 B	0.081	0.300 J	NA	0.007 JB	0.006
Trichloroethene	0.353 U	0.016 U	0.375 U	NA	0.032	0.044
1,1,1-Trichloroethane	0.353 U	0.016 U	0.375 U	NA	0.006 J	0.003 U
Xylene (total)	14.000	0.230	1.200	NA	0.050	0.020

QUALIFIERS:

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES:

* - a medium level soil analysis was performed

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-6 (cont.)
Subsurface Soil Results
Volatile Organic Compounds

VOLATILES	Area D BOMW7S(5-7) 7/11/90 (mg/kg)	Area D BOMW9S(0-2) 7/12/90 (mg/kg)	Area D BOSB2S(6-8) 7/10/90 (mg/kg)	Area D BOSB5S(3-7.5)* 7/10/90 (mg/kg)	Area D BOSBBS(2-4) 7/10/90 (mg/kg)	Preliminary Soil Cleanup Criteria (mg/kg)
DILUTION FACTOR	1.100			12.820		
Benzene	0.003 U	NA	NA	3.000 J	NA	---
Carbon Disulfide	0.003 U	NA	NA	3.000 U	NA	0.168
1,1-Dichloroethane	0.005 J	NA	NA	15.000	NA	0.100
1,1-Dichloroethene	0.003 U	NA	NA	3.000 U	NA	0.00057
1,2-Dichloroethene (total)	0.003 U	NA	NA	160.000	NA	---
Ethylbenzene	0.009 J	NA	NA	75.000	NA	0.668
Tetrachloroethene	0.003 U	NA	NA	220.000	NA	0.008
Toluene	0.003 U	NA	NA	300.000	NA	0.358
Trichloroethene	0.003 U	NA	NA	170.000	NA	0.049
1,1,1-Trichloroethane	0.003 U	NA	NA	22.000	NA	0.150
Xylene (total)	0.008	NA	NA	390.000 B	NA	0.670

QUALIFIERS:

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES:

*

- a medium level soil analysis was performed

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

Review of Table 2-6 indicates that the preliminary cleanup criteria for carbon disulfide (0.168 mg/kg) is exceeded in 6 out of 11 subsurface soil samples due to elevated detection limits. Similarly, the preliminary cleanup criteria for 1,1-dichloroethane (0.100 mg/kg) is exceeded in 6 subsurface soil samples. Further review of the table indicates that only 1 of these 6 values is an actual reported concentration, the other 5 values are proxy concentrations estimated from elevated sample detection limits.

The preliminary cleanup criteria for 1,1-dichloroethene (0.00057 mg/kg) is exceeded all in 11 subsurface soil samples analyzed for TCL volatile organic compounds. Further review of the table indicates that only 1 of the 11 values is an actual reported concentration. The other 10 values shown in Table 2-6 for 1,1-dichloroethene are proxy concentrations estimated from the sample detection limits.

Similarly, the preliminary cleanup criteria for tetrachloroethene (0.008 mg/kg), toluene (0.358 mg/kg), trichloroethene (0.049 mg/kg), and 1,1,1-trichloroethene (0.150 mg/kg) are also exceeded in the subsurface soil samples. The preliminary cleanup criteria for tetrachloroethene is exceeded in 9 samples, with 5 of these being actual reported concentrations. Three out of 5 exceedances noted for toluene are actual reported

BOS2REPa/bos-t2
February 26, 1991

concentrations (see Table 2-6). Two out of 6 exceedances noted for trichloroethene and 1,1,1-trichloroethene are actual reported concentrations, while the remaining 4 exceedances for each of these compounds are due to proxy concentrations estimated from elevated sample detection limits.

The preliminary cleanup criteria for ethylbenzene (0.668 mg/kg) and xylene (0.670 mg/kg) are exceeded in 5 and 6 samples, respectively. Review of Table 2-6 indicates that each of these exceedances are due to reported concentrations.

Table 2-7 presents the TCL semivolatile organic compounds detected in the subsurface soil at the Booth Oil Site. A total of 11 subsurface soil samples were analyzed for these parameters. Review of Table 2-7 indicates that one sample (SB-5) exceeds the preliminary soil cleanup criteria of 2.2 mg/kg for acenaphthene. All 11 subsurface soil samples exceed the preliminary cleanup criteria for benzo(a)anthracene (0.005 mg/kg). Further review of the table indicates that 7 of these exceedances are due to proxy concentrations estimated from elevated sample detection limits. Similarly, 10 samples exceed the preliminary cleanup criteria for benzo(b)fluoranthene (0.055 mg/kg), and all 11 samples exceed the preliminary cleanup criteria for benzo(k)fluoranthene (0.055 mg/kg). Table 2-7 indicates that only 2 samples have actual

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-7
Subsurface Soil Results
Semi-Volatile Organic Compounds

SEMI-VOLATILES	Area A BOMW1S(0-2) 7/12/90 (mg/kg)	Area A BOMW4S(0-2) 7/16/90 (mg/kg)	Area A BOSB1S(7-9) 7/13/90 (mg/kg)	Area A BOSB12S(2-4) 7/18/90 (mg/kg)	Area B BOMW5S(4-6) 7/16/90 (mg/kg)	Area B BOMW8S(2-4) 7/17/90 (mg/kg)
DILUTION FACTOR	4.560		1.300	1.250	1.420	
Acenaphthene	0.752 U	NA	0.215 U	0.412 U	0.469 U	NA
Anthracene	0.752 U	NA	0.215 U	0.041 J	0.469 U	NA
Benzo(a)anthracene	1.500 J	NA	0.480 J	0.160 J	0.469 U	NA
Benzo(b)fluoranthene	2.900 J	NA	0.215 U	0.220 J	0.469 U	NA
Benzo(k)fluoranthene	1.800 J	NA	0.215 U	0.170 J	0.469 U	NA
Butylbenzylphthalate	0.752 U	NA	0.215 U	0.412 U	0.469 U	NA
Chrysene	2.400 J	NA	0.700 J	0.330 J	0.469 U	NA
1,2-Dichlorobenzene	0.752 U	NA	0.215 U	0.412 U	0.469 U	NA
1,4-Dichlorobenzene	0.752 U	NA	0.215 U	0.412 U	0.469 U	NA
Fluoranthene	3.700	NA	0.960	0.260 J	0.469 U	NA
Fluorene	4.200	NA	0.215 U	0.052 J	0.960	NA
2-Methylnaphthalene	36.000	NA	13.000	0.420 J	17.000 E	NA
4-Methylphenol	0.752 U	NA	1.800	0.412 U	0.469 U	NA
Naphthalene	8.500	NA	0.215 U	0.310 J	11.000	NA
N-Nitrosodiphenylamine (1)	0.752 U	NA	0.215 U	0.412 U	1.100	NA
Di-n-octylphthalate	0.752 U	NA	0.200 JB	0.021 J	0.469 U	NA
Phenanthrene	13.000	NA	3.400	0.310 J	1.800	NA
Pyrene	5.100	NA	2.600	0.230 J	0.280 J	NA
1,2,4-Trichlorobenzene	0.752 U	NA	0.215 U	0.412 U	1.000	NA

QUALIFIERS:

J: compound present below the detection limit
 B: compound is found in the blank as well as the sample
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit
 E: exceeds calibration curve range
 D: Identified at a secondary dilution factor

NOTES:

* - a medium level soil analysis was performed
 - value exceeds standard/guideline
 - sample detection limit exceeds standard/guideline

TABLE 2-7 (cont.)
Subsurface Soil Results
Semi-Volatile Organic Compounds

SEMI-VOLATILES	Area B BOSB7S(2-4) 7/18/90 (mg/kg)	Area B BOSB9S(11-13) 7/13/90 (mg/kg)	Area C BOMW6S(1-4) 7/11/90 (mg/kg)	Area C BOSB4S(6-8) 7/12/90 (mg/kg)	Area C BOSB4S(11-13) 7/12/90 (mg/kg)	Area C BOSB10S(0-2) 7/10/90 (mg/kg)
DILUTION FACTOR	2.110	1.280	5.260		1.320	1.000
Acenaphthene	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U
Anthracene	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U
Benzo(a)anthracene	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U
Benzo(b)fluoranthene	0.696 U	0.211 U	1.740 U	NA	0.007 J	0.330 U
Benzo(k)fluoranthene	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U
Butylbenzylphthalate	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U
Chrysene	0.696 U	0.211 U	1.500 J	NA	0.217 U	0.330 U
1,2-Dichlorobenzene	0.696 U	0.211 U	0.420 J	NA	0.217 U	0.330 U
1,4-Dichlorobenzene	0.696 U	0.211 U	0.140 J	NA	0.217 U	0.330 U
Fluoranthene	0.696 U	0.210 J	0.590 J	NA	0.013 J	0.059 J
Fluorene	0.990 J	0.211 U	1.740 U	NA	0.007 J	0.330 U
2-Methylnaphthalene	11.000	0.630 J	4.100 J	NA	0.046 J	0.042 J
4-Methylphenol	0.696 U	0.211 U	0.610 J	NA	0.018 J	0.330 U
Naphthalene	4.800	0.211 U	2.000 J	NA	0.033 J	0.025 J
N-Nitrosodiphenylamine (1)	1.600	0.211 U	1.740 U	NA	0.217 U	0.330 U
Di-n-octylphthalate	0.340 J	0.211 U	1.740 U	NA	0.217 UB	0.260 JB
Phenanthrene	1.800	0.690 J	3.500 J	NA	0.217 U	0.054 J
Pyrene	0.696 U	0.220 J	1.740 U	NA	0.014 J	0.210 J
1,2,4-Trichlorobenzene	0.696 U	0.211 U	1.740 U	NA	0.217 U	0.330 U

QUALIFIERS:

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

E: exceeds calibration curve range

D: Identified at a secondary dilution factor

NOTES:

* - a medium level soil analysis was performed

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-7 (cont.)
Subsurface Soil Results
Semi-Volatile Organic Compounds

	Area D BOMW7S(5-7) 7/11/90 (mg/kg)	Area D BOMW9S(0-2) 7/12/90 (mg/kg)	Area D BOSB2S(6-8) 7/10/90 (mg/kg)	Area D BOSB5S(3-7.5) 7/10/90 (mg/kg)	Area D BOSB8S(2-4) 7/10/90 (mg/kg)	Preliminary Soil Cleanup Criteria (mg/kg)
SEMIVOLATILES						
DILUTION FACTOR	1,000			10,530		
Acenaphthene	0.330 U	NA	NA	16,000	NA	2,220
Anthracene	0.190 J	NA	NA	3,480 U	NA	65,000
Benzo(a)anthracene	0.270 J	NA	NA	3,480 U	NA	0.005
Benzo(b)fluoranthene	0.330 U	NA	NA	3,480 U	NA	0.055
Benzo(k)fluoranthene	0.330 U	NA	NA	3,480 U	NA	0.055
Butylbenzylphthalate	0.330 U	NA	NA	9,900	NA	---
Chrysene	0.320 J	NA	NA	6,800 J	NA	0.020
1,2-Dichlorobenzene	0.330 U	NA	NA	6,500 J	NA	0.066
1,4-Dichlorobenzene	0.330 U	NA	NA	0.890 J	NA	0.092
Fluoranthene	0.510 J	NA	NA	6,000 J	NA	22,892
Fluorene	0.330 U	NA	NA	3,480 U	NA	8,180
2-Methylnaphthalene	0.760	NA	NA	140,000	NA	21,250
4-Methylphenol	0.330 U	NA	NA	600,000 E	NA	---
Naphthalene	0.330 U	NA	NA	76,000	NA	0.650
N-Nitrosodiphenylamine (1)	3,800	NA	NA	3,480 U	NA	---
Di-n-octylphthalate	0.330 U	NA	NA	3,480 U	NA	5,965
Phenanthrene	2,000	NA	NA	54,000	NA	57,300
Pyrene	1,400	NA	NA	55,000	NA	210,000
1,2,4-Trichlorobenzene	0.330 U	NA	NA	3,480 U	NA	0.336

QUALIFIERS:

J: compound present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

E: exceeds calibration curve range

D: Identified at a secondary dilution factor

NOTES:

* - a medium level soil analysis was performed

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

reported concentrations above the preliminary cleanup criteria for each of these parameters. The remaining 8 exceedances for benzo(b)fluoranthene and 9 exceedances for benzo(k)fluoranthene are due to proxy concentrations estimated from elevated detection limits.

All 11 subsurface soil samples exceed the preliminary cleanup criteria for chrysene (0.020 mg/kg). Review of Table 2-7 indicates that 6 of these exceedances are due to actual reported concentrations, while the remaining 5 are due to elevated sample detection limits. Similarly, all 11 subsurface soil samples exceed the preliminary cleanup criteria for 1,2-dichlorobenzene (0.066 mg/kg) and 1,4-dichlorobenzene (0.092 mg/kg). Only 2 of these values for each compound are actual reported concentrations (see Table 2-7).

The reported concentrations for 2 subsurface soil samples exceed the preliminary cleanup criteria for 2-methylnaphthalene (21.25 mg/kg). Similarly, the preliminary cleanup criteria for naphthalene (0.65 mg/kg) is exceeded in 5 subsurface soil samples. Each of these values is an actual reported concentration and not a proxy value.

One subsurface soil sample exceeds the preliminary cleanup criteria for di-n-octylphthalate (5.965 mg/kg). Review of Table 2-7 reveals that this exceedance is due to a proxy concentration estimated from an elevated sample detection limit. The preliminary cleanup criteria for 1,2,4-trichlorobenzene (0.336 mg/kg) is exceeded in 6 out of 11 subsurface soil samples. Table 2-7 indicates that 2 of these exceedances are due to actual reported concentrations, while the remaining 4 exceedances are due to proxy concentrations estimated from sample detection limits.

Table 2-8 presents results for the TCL inorganic compounds for the subsurface soil samples collected at the Booth Oil Site. The NJDEP Action Levels for arsenic (20.0 mg/kg) and zinc (350.0 mg/kg) are exceeded in two samples. The NJDEP Action Level for lead (100.0 mg/kg) is exceeded in 7 out of 11 subsurface soil samples. Table 2-8 further indicates that the NJDEP Action Levels for the following compounds are exceeded in 1 out of the 11 subsurface soil samples analyzed for TCL compounds: cadmium (3.0 mg/kg), chromium (100.0 mg/kg), copper (170.0 mg/kg), mercury (1.0 mg/kg), and nickel (100.0 mg/kg).

Seventeen of the 18 subsurface soil samples collected at the Booth Oil Site were analyzed for PCBs. Thirteen of these 17

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-8
Subsurface Soil Results
Inorganic Compounds

	Area A BOMW1S(0-2) 7/12/90 (mg/kg)	Area A BOMW4S(0-2) 7/16/90 (mg/kg)	Area A BOSB1S(7-9) 7/13/90 (mg/kg)	Area A BOSB12S(2-4) 7/18/90 (mg/kg)	Area B BOMW5S(4-6) 7/16/90 (mg/kg)	Area B BOMW8S(2-4) 7/17/90 (mg/kg)
INORGANICS						
Aluminum	5690.000 *	NA	12500.000 *	12700.000 *	11600.000 *	NA
Antimony	3.800 U	NA	3.200 UN	3.500 UN	2.800 UN	NA
Arsenic	42.200 N*	NA	7.600 NS*	14.200 NS*	1.700 BN*	NA
Barium	107.000 N*	NA	117.000 N*	130.000 N*	95.700 N*	NA
Beryllium	0.730 B	NA	0.880 B	0.940 B	1.500	NA
Cadmium	1.400	NA	1.200	0.970	0.670 B	NA
Calcium	19300.000	NA	68700.000	26300.000	115000.000	NA
Chromium	16.600 N*	NA	16.900 N*	47.100 N*	6.600 N*	NA
Cobalt	11.100	NA	6.400 B	9.400 B	3.300 B	NA
Copper	106.000 EN	NA	37.900 EN	81.400 EN	29.800 EN	NA
Iron	53700.000	NA	20800.000	23900.000	14800.000	NA
Lead	286.000 *	NA	157.000 *	119.000 *	107.000 *	NA
Magnesium	6480.000	NA	29500.000	10200.000	44500.000	NA
Manganese	499.000	NA	685.000	542.000	1040.000	NA
Mercury	0.110 N	NA	0.090 UN	0.180 N	0.090 UN	NA
Nickel	26.300 N	NA	12.900 N	17.500 N	4.800 BN	NA
Potassium	733.000 B	NA	1710.000	1840.000	1300.000	NA
Selenium	1.800 N*	NA	0.700 BN*	0.910 BNS*	0.420 UN*	NA
Silver	0.840 U	NA	0.720 U	0.770 U	0.620 U	NA
Sodium	328.000 B	NA	424.000 B	472.000 B	593.000 B	NA
Thallium	0.480 B	NA	0.180 U	0.640 B	0.210 B	NA
Vanadium	17.500	NA	19.900	25.700 E	9.400 E	NA
Zinc	190.000 N*	NA	249.000 N*	220.000 N*	76.200 N*	NA
Cyanide	0.570 U	NA	3.800	0.670 U	0.640	NA

QUALIFIERS:

U: value is less than the instrument detection limit (IDL)

B: value is between the IDL and contract required limit

E: value is estimated due to interference

M: duplicate injection precision not met

N: spiked sample recovery not within control limits

*: Duplicate analysis not within control limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-8 (cont.)
Subsurface Soil Results
Inorganic Compounds

INORGANICS	Area B	Area B	Area B	Area C	Area C	Area C	Area C
	BOSB7S(2-4) 7/18/90 (mg/kg)	BOSB9S(11-13) 7/13/90 (mg/kg)	BOMW6S(1-4) 7/11/90 (mg/kg)	BOSB4S(6-8) 7/12/90 (mg/kg)	BOSB4S(11-13) 7/12/90 (mg/kg)	BOSB10S(0-2) 7/10/90 (mg/kg)	
Aluminum	14800.000 *	20500.000 *	13500.000 *	NA	25000.000 *	11200.000 *	
Antimony	3.300 UN	4.700 BN	10.400 BN	NA	3.800 UN	4.800 BN	
Arsenic	2.300 N*	3.000 BN*	17.200 NS*	NA	1.400 BN*	5.600 N*	
Barium	130.000 N*	121.000 N*	599.000 N*	NA	252.000 N*	109.000 N*	
Beryllium	1.700	0.820 B	1.500	NA	1.200	1.200	
Cadmium	0.630 B	0.340 B	2.400	NA	0.290 B	0.780 B	
Calcium	118000.000	78500.000	62500.000	NA	72100.000	84400.000	
Chromium	10.100 N*	27.600 N*	84.900 N*	NA	33.200 N*	12.500 N*	
Cobalt	3.700 B	14.200	7.400 B	NA	16.800	4.800 B	
Copper	23.400 EN	25.600 EN	198.000 N	NA	31.100 EN	28.500 N*	
Iron	18900.000	30200.000	25400.000	NA	34400.000	14500.000	
Lead	99.100 *	11.200	1350.000	NA	11.500	171.000 *	
Magnesium	47300.000	16700.000	19200.000	NA	16400.000	39500.000	
Manganese	1110.000	560.000	705.000	NA	658.000	792.000	
Mercury	0.090 UN	0.130 UN	0.150 N	NA	0.110 UN	0.100 UN	
Nickel	6.200 BN	28.600 N	21.100 N	NA	33.800 N	10.700 N	
Potassium	1720.000	5350.000	1580.000	NA	5980.000	1800.000	
Selenium	0.360 UN*	0.380 UN*	1.500 N*	NA	0.450 UN*	0.670 BN*	
Silver	0.730 U	0.950 U	0.860 U	NA	0.840 U	0.800 U	
Sodium	701.000	609.000 B	651.000 B	NA	777.000 B	510.000 B	
Thallium	0.180 B	0.190 U	0.470 U	NA	0.220 U	0.380 U	
Vanadium	13.800 E	36.800	21.600	NA	47.400	17.400	
Zinc	74.200 N*	75.200 N*	417.000 N*	NA	74.800 N*	103.000 N*	
Cyanide	2.300	0.670 U	0.720	NA	0.680 U	0.660	

QUALIFIERS:

U: value is less than the instrument detection limit (IDL)

B: value is between the IDL and contract required limit

E: value is estimated due to interference

M: duplicate injection precision not met

N: spiked sample recovery not within control limits

*: Duplicate analysis not within control limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-8 (cont.)
Subsurface Soil Results
Inorganic Compounds

	Area D BOMW7S(5-7) 7/11/90 (mg/kg)	Area D BOMW9S(0-2) 7/12/90 (mg/kg)	Area D BOSB2S(6-8) 7/10/90 (mg/kg)	Area D BOSB5S(3-7.5) 7/10/90 (mg/kg)	Area D BOSB8S(2-4) 7/10/90 (mg/kg)	NJDEP Soil Action Levels (mg/kg)
INORGANICS						
Aluminum	11500.000 *	NA	NA	7350.000 *	NA	-
Antimony	3.600 UN	NA	NA	10.500 BN	NA	-
Arsenic	2.800 N*	NA	NA	27.400 N*	NA	20.000
Barium	115.000 B	NA	NA	3170.000 N*	NA	-
Beryllium	0.490 B	NA	NA	0.350 B	NA	-
Cadmium	0.530 B	NA	NA	19.300	NA	3.000
Calcium	84800.000	NA	NA	54000.000	NA	-
Chromium	13.000 N*	NA	NA	200.000 N*	NA	100.000
Cobalt	6.400 B	NA	NA	11.000 B	NA	-
Copper	30.300 N	NA	NA	1160.000 N	NA	170.000
Iron	16200.000	NA	NA	30500.000	NA	-
Lead	90.000 *	NA	NA	27700.000 *	NA	100.000
Magnesium	44500.000	NA	NA	14000.000	NA	-
Manganese	565.000	NA	NA	389.000	NA	-
Mercury	0.110 UN	NA	NA	1.700 N	NA	1.000
Nickel	14.200 N	NA	NA	182.000 N	NA	100.000
Potassium	3410.000	NA	NA	1280.000	NA	-
Selenium	0.450 BN*	NA	NA	0.460 BN*	NA	4.000
Silver	0.800 U	NA	NA	2.000 B	NA	5.000
Sodium	397.000 B	NA	NA	1540.000	NA	-
Thallium	0.410 U	NA	NA	0.380 U	NA	-
Vanadium	21.700	NA	NA	21.100	NA	-
Zinc	108.000 N*	NA	NA	3040.000 N*	NA	350.000
Cyanide	0.580 U	NA	NA	8.900	NA	-

QUALIFIERS:

U: value is less than the instrument detection limit (IDL)

B: value is between the IDL and contract required limit

E: value is estimated due to interference

M: duplicate injection precision not met

N: spiked sample recovery not within control limits

*: Duplicate analysis not within control limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

samples were also analyzed for pesticides. The results of these analyses are presented in Table 2-9.

Table 2-9 indicates that 15 out of the 17 subsurface soil samples analyzed for PCBs exceed the preliminary cleanup criteria of 0.085 mg/kg for PCB-1242. Further review of the table reveals that 9 of these exceedances are due to proxy concentrations estimated from elevated sample detection limits. Seven samples exceed the preliminary cleanup criteria for PCB-1254 (0.275 mg/kg) and 11 samples exceed the preliminary cleanup criteria for PCB-1248 (0.205 mg/kg). Review of Table 2-9 indicates that, for each of these parameters, 4 of the exceedances are due to proxy concentrations estimated from sample detection limits which are higher than the preliminary cleanup criteria.

Table 2-10 presents the arithmetic mean and 95% confidence arithmetic mean for the subsurface soil samples collected at the Booth Oil Site. The table indicates that for volatile and semivolatile organic compounds, Area D consistently results in the highest mean contaminant concentrations.

Area D also results in the highest mean contaminant concentrations for the majority inorganic compounds, with the exception of aluminum, beryllium, calcium, cobalt, iron, manganese,

BOS2REPa/bos-t2
February 26, 1991

TABLE 2-9
Subsurface Soil Results
Pesticides/PCB's

	Area A BOMW1S(0-2) 7/12/90 (mg/kg)	Area A BOMW4S(0-2) 7/16/90 (mg/kg)	Area A BOSB1S(7-9) 7/13/90 (mg/kg)	Area A BOSB12S(2-4) 7/18/90 (mg/kg)	Area B BOMW5S(4-6) 7/16/90 (mg/kg)	Area B BOMW8S 7/17/90 (mg/kg)
PESTICIDES/PCBs	5.750	1.200	6.500	1.250	1.430	5.750
DILUTION FACTOR	0.023 U	NA	0.026 U	0.010 U	0.011 U	NA
Aldrin	13.000	25.000	0.260 U	0.100 U	1.400	6.600
PCB - 1242	0.460 U	0.192 U	0.520 U	0.200 U	0.229 U	1.700
PCB - 1254	0.460 U	5.200	2.000	0.200 U	1.100	0.920 U
PCB - 1260	0.230 U	0.096 U	7.000	0.100 U	0.114 U	0.460 U
PCB - 1248	0.046 U	NA	0.052 U	0.020 U	0.023 U	NA
4,4'-DDD						

QUALIFIERS:

J: compound present below the detection limit

U: analyzed for but not detected (reported concentration is 1/2 sample detection limit)

B: compound is found in the blanks as well as the sample

UB: reported concentration is 1/2 sample detection limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-9 (cont.)
Subsurface Soil Results
Pesticides/PCB's

	Area B BOSB7S(2-4) 7/18/90 (mg/kg)	Area B BOSB9S(11-13) 7/13/90 (mg/kg)	Area C BOMW6S(1-4) 7/11/90 (mg/kg)	Area C BOSB4S(6-8) 7/12/90 (mg/kg)	Area C BOSB4S(11-13) 7/12/90 (mg/kg)	Area C BOSB10S(0-2) 7/10/90 (mg/kg)
PESTICIDES/PCB's	1.050	1.280	12.220	6.250	1.300	1.070
DILUTION FACTOR	0.008 U	0.005 U	0.098 U	NA	0.005 U	0.009 U
Aldrin	3.500	0.051 U	0.078 U	0.330 U	0.052 U	0.068 U
PCB - 1242	0.168 U	0.102 U	23.000	0.300 U	0.104 U	0.171 U
PCB - 1254	1.600	1.200	13.000	3.700	0.104 U	0.960
PCB - 1260	0.084 U	3.000	31.000	0.350 U	0.052 U	0.930
PCB - 1248	0.017 U	0.010 U	0.196 U	NA	0.010 U	0.050
4,4'-DDD						

QUALIFIERS:

J: compound present below the detection limit

U: analyzed for but not detected (reported concentration is 1/2 sample detection limit)

B: compound is found in the blanks as well as the sample

UB: reported concentration is 1/2 sample detection limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-9 (cont.)
Subsurface Soil Results
Pesticides/PCB's

	Area D BOMW7S(5-7) 7/11/90 (mg/kg)	Area D BOMW9S(0-2) 7/12/90 (mg/kg)	Area D BOSB2S(6-8) 7/10/90 (mg/kg)	Area D BOSB5S(3-7.5) 7/10/90 (mg/kg)	Area D BOSB8S(2-4) 7/10/90 (mg/kg)	Preliminary Soil Cleanup Criteria (mg/kg)
PESTICIDES/PCBs	1.140	5.260	1.220	66.000	1.370	
DILUTION FACTOR	0.0067 J	NA	0.010 U	0.528 U	0.012 U	---
Aldrin	0.091 U	18.000	0.098 U	8.180 U	0.120 U	0.085
PCB - 1242	0.182 U	0.421 U	0.195 U	39.000	0.219 U	0.275
PCB - 1254	2.000	6.100	0.195 U	10.560 U	1.100	---
PCB - 1260	0.340	0.210 U	0.098 U	83.000	0.330	0.205
PCB - 1248	0.018 U	NA	0.020 U	1.056 U	0.022 U	---
4,4'-DDD						

QUALIFIERS:

J: compound present below the detection limit

U: analyzed for but not detected (reported concentration is 1/2 sample detection limit)

B: compound is found in the blanks as well as the sample

UB: reported concentration is 1/2 sample detection limit

NOTES:

- value exceeds standard/guideline

- sample detection limit exceeds standard/guideline

TABLE 2-10
Subsurface Soil
Mean Contaminant Concentrations

VOLATILES	Area A		95% Conf.		Area B		95% Conf.		Area C		95% Conf.		Area D		95% Conf.		TOTAL	
	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)
DILUTION FACTOR																		
Benzene	0.259		0.466		0.232		0.414		0.127		0.326		1.502		3.578		0.442	0.931
Carbon Disulfide	0.259		0.466		0.236		0.412		0.127		0.325		1.987		4.735		0.531	1.181
1,1-Dichloroethane	0.259		0.465		0.233		0.413		0.128		0.326		7.503		17.894		1.533	4.052
1,1-Dichloroethene	0.259		0.466		0.236		0.412		0.128		0.326		1.987		4.735		0.531	1.182
1,2-Dichloroethene (total)	0.336		0.632		3.791		7.644		0.228		0.550		80.002		190.874		15.734	42.730
Ethylbenzene	2.034		3.801		3.214		6.354		0.074		0.175		37.505		89.471		8.270	20.802
Tetrachloroethene	0.259		0.465		0.672		1.579		0.171		0.341		110.002		262.452		20.301	57.622
Toluene	0.259		0.466		3.360		7.045		0.104		0.261		150.002		357.889		28.289	79.082
Trichloroethene	0.196		0.365		0.236		0.412		0.150		0.330		85.002		202.803		15.614	44.465
1,1,1-Trichloroethane	0.259		0.465		0.523		1.087		0.128		0.326		11.002		26.245		2.249	5.945
Xylene (total)	11.701		24.501		17.410		35.071		0.423		1.045		195.004		465.255		43.510	108.665

TABLE 2-10 (cont.)
Subsurface Soil
Mean Contaminant Concentrations

SEMIVOLATILES DILUTION FACTOR	Area A		Area B		Area C		Area D		TOTAL	
	Arith. Mean (mg/kg)	95% Conf. Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	95% Conf. Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	95% Conf. Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	95% Conf. Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	95% Conf. Arith. Mean (mg/kg)
Acenaphthene	0.460	0.711	0.459	0.683	0.762	1.546	8.165	19.024	1.943	4.582
Anthracene	0.336	0.678	0.459	0.683	0.762	1.546	1.835	4.115	0.758	1.332
Benzo(a)anthracene	0.713	1.360	0.459	0.683	0.762	1.546	1.875	4.099	0.868	1.441
Benzo(b)fluoranthene	1.112	2.543	0.459	0.683	0.692	1.546	1.905	4.088	0.963	1.640
Benzo(k)fluoranthene	0.728	1.586	0.459	0.683	0.762	1.546	1.905	4.088	0.878	1.469
Butylbenzylphthalate	0.460	0.711	0.459	0.683	0.762	1.546	5.115	11.747	1.388	2.998
Chrysene	1.143	2.163	0.459	0.683	0.682	1.339	3.560	8.050	1.270	2.370
1,2-Dichlorobenzene	0.460	0.711	0.459	0.683	0.322	0.416	3.415	7.691	0.959	2.000
1,4-Dichlorobenzene	0.460	0.711	0.459	0.683	0.229	0.317	0.610	0.998	0.424	0.565
Fluoranthene	1.640	3.320	0.458	0.683	0.221	0.517	3.255	7.059	1.224	2.287
Fluorene	1.489	3.660	0.720	1.128	0.692	1.544	1.905	4.088	1.138	1.949
2-Methylnaphthalene	16.473	33.144	9.543	17.195	1.396	3.560	70.380	166.868	20.273	43.486
4-Methylphenol	0.988	1.656	0.459	0.683	0.319	0.593	300.165	715.715	55.057	156.896
Naphthalene	3.008	7.403	5.337	10.340	0.686	1.737	38.165	90.602	9.402	22.032
N-Nitrosodiphenylamine (1)	0.460	0.711	0.970	1.620	0.762	1.546	3.640	3.862	1.260	1.992
Di-n-octylphthalate	0.324	0.676	0.340	0.459	0.739	1.540	1.905	4.088	0.729	1.306
Phenanthrene	5.570	11.684	1.430	2.022	1.257	3.053	28.000	64.034	7.343	16.300
Pyrene	2.643	4.893	0.399	0.638	0.655	1.528	28.200	65.343	6.135	15.307
1,2,4-Trichlorobenzene	0.460	0.711	0.636	1.003	0.762	1.546	1.905	4.088	0.853	1.408

TABLE 2-10 (cont.)
Subsurface Soil
Mean Contaminant Concentrations

INORGANICS	Area A		95% Conf.		Area B		95% Conf.		Area C		95% Conf.		Area D		95% Conf.		TOTAL		95% Conf.	
	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)	Arith. Mean	(mg/kg)
Aluminum	10296.667		13983.925		15633.333		19798.643		16566.667		23397.880		9425.000		1230.803		13303.636		16368.542	
Antimony	3.500		3.777		3.600		4.510		6.333		9.620		7.050		11.831		4.945		6.515	
Arsenic	21.333		38.306		2.333		2.934		8.067		15.628		15.100		32.147		11.400		18.780	
Barium	118.000		128.656		115.567		131.998		320.000		552.816		1642.500		3759.507		449.609		964.657	
Beryllium	0.850		0.950		1.340		1.766		1.300		1.460		0.420		0.517		1.028		1.272	
Cadmium	1.190		1.389		0.547		0.713		1.157		2.177		9.915		22.922		2.592		5.732	
Calcium	38100.000		62797.728		103833.333		124151.545		73000.000		83142.882		69400.000		90743.311		71236.364		88703.059	
Chromium	26.867		43.057		14.767		25.162		43.533		77.987		106.500		236.084		42.591		74.648	
Cobalt	8.967		11.165		7.067		12.778		9.667		15.500		8.700		11.888		8.591		11.040	
Copper	75.100		106.962		26.267		29.271		65.867		123.598		595.150		1377.992		153.818		343.100	
Iron	32800.000		49584.692		21300.000		28669.067		24766.667		33973.955		23350.000		33259.394		25754.545		32206.172	
Lead	187.333		268.211		72.433		121.566		510.833		1186.337		13895.000		33027.754		2736.527		7406.515	
Magnesium	15393.333		26811.093		36166.667		51796.862		25033.333		36681.126		29250.000		50385.422		26207.273		34811.403	
Manganese	575.333		665.305		903.333		1179.954		718.333		781.151		477.000		598.962		685.909		810.879	
Mercury	0.127		0.170		0.103		0.125		0.120		0.144		0.905		2.007		0.260		0.530	
Nickel	18.900		25.191		13.200		25.540		21.867		32.556		98.100		214.379		32.555		60.960	
Potassium	1427.667		1986.751		2790.000		4847.596		3120.000		5410.732		2345.000		3821.015		2427.545		3404.438	
Selenium	1.137		1.676		0.387		0.415		0.873		1.385		0.455		0.462		0.736		1.010	
Silver	0.777		0.832		0.767		0.920		0.833		0.862		1.400		2.232		0.903		1.113	
Sodium	408.000		475.745		634.333		688.187		646.000		769.413		968.500		1760.559		636.545		82.045	
Thallium	0.433		0.649		0.193		0.207		0.357		0.474		0.395		0.416		0.340		0.427	
Vanadium	21.033		24.929		20.000		33.596		28.800		43.809		21.400		21.816		22.936		28.955	
Zinc	219.667		246.925		75.200		76.124		198.267		373.774		1574.000		3605.772		420.673		913.828	
Cyanide	1.680		3.377		1.203		2.081		0.687		0.715		4.740		10.505		1.835		3.275	

TABLE 2-10 (cont.)
Subsurface Soil
Mean Contaminant Concentrations

PESTICIDES/PCBs DILUTION FACTOR	Area A		95% Conf.		Area B		95% Conf.		Area C		95% Conf.		Area D		95% Conf.		TOTAL	
	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)	Arith. Mean (mg/kg)
Aldrin	0.015	0.026	0.026	0.026	0.006	0.006	0.010	0.010	0.028	0.079	0.111	0.336	0.044	0.044	0.123	0.123	0.123	0.123
PCB - 1242	9.590	19.706	19.706	19.706	2.888	2.888	5.309	5.309	0.342	0.709	4.718	10.799	4.404	4.404	7.815	7.815	7.815	7.815
PCB - 1254	0.343	0.489	0.489	0.489	0.550	0.550	1.202	1.202	5.944	15.595	8.003	21.588	3.963	3.963	8.837	8.837	8.837	8.837
PCB - 1260	1.965	3.916	3.916	3.916	1.205	1.205	1.449	1.449	4.441	9.456	3.991	7.371	2.965	2.965	4.696	4.696	4.696	4.696
PCB - 1248	1.857	4.767	4.767	4.767	0.915	0.915	2.103	2.103	8.058	21.043	16.796	45.811	7.488	7.488	17.104	17.104	17.104	17.104
4,4'-DDD	0.030	0.053	0.053	0.053	0.013	0.013	0.022	0.022	0.064	0.164	0.223	0.672	0.091	0.091	0.249	0.249	0.249	0.249

potassium, selenium, thallium, and vanadium. Of these compounds, Area A results in the highest mean concentrations for iron, selenium and thallium, Area B results in the highest mean concentrations for beryllium, calcium and manganese, and Area C results in the highest mean concentrations for aluminum, cobalt, potassium and vanadium.

Finally, for pesticides and PCBs, Area D results in the highest mean contaminant concentrations for aldrin, PCB-1254, PCB-1248 and 4,4'-DDD, Area A results in the highest mean concentration for PCB-1242, and Area C results in the highest mean concentration for PCB-1260.

2.4 Catch Basin Sediment

A total of 4 catch basin sediment samples were collected and analyzed during the Phase I RI. Analytical results of the catch basin sediment samples are presented in Tables 2-11 through 2-15.

One of the 4 catch basin sediment samples was analyzed for levels of TCL volatile organic compounds with a library search for non-target compounds. These results are presented in Table 2-11. The preliminary cleanup criteria for 1,2-dichloroethane (0.00057 mg/kg), 1,2-dichloroethene (0.00124 mg/kg), trans-1,3-

BOS2REPa/bos-t2
February 26, 1991

Table 2-11
Catch Basin Sediment Results
Volatile Organic Compounds

VOLATILES	BOCB1SD 6/27/90 (mg/kg)	BOCB2SD 6/27/90 (mg/kg)	BOCB3SD 6/27/90 (mg/kg)	BOCB5SD 6/27/90 (mg/kg)
2-Butanone	NA	NA	1.1 J	NA
1,1-Dichloroethane	NA	NA	0.14 J	NA
1,2-Dichloroethane	NA	NA	0.564 U	NA
1,2-Dichloroethene (total)	NA	NA	1.4	NA
trans-1,3-Dichloropropene	NA	NA	0.564 U	NA
Ethylbenzene	NA	NA	1.2	NA
2-Hexanone	NA	NA	1.092 U	NA
Tetrachloroethene	NA	NA	0.564 U	NA
Toluene	NA	NA	1.5	NA
Vinyl Chloride	NA	NA	0.85 J	NA
Xylene (total)	NA	NA	3.3 B	NA

QUALIFIERS

J: compound is present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES:



- value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

dichloropropene (0.142 mg/kg), ethylbenzene (0.668 mg/kg), tetrachloroethene (0.008 mg/kg), toluene (0.358 mg/kg), vinyl chloride (0.023 mg/kg), and xylene (0.67 mg/kg) are exceeded in the analyzed sample. Review of the table indicates that the exceedances noted for 1,2-dichloroethane, trans-1,3-dichloropropene and tetrachloroethene are due to proxy concentrations estimated from sample detection limits which exceed the preliminary cleanup criteria.

Analytical results for the TCL semivolatile organic compounds are presented in Table 2-12. Analyses for these compounds were performed on 1 of the 4 catch basin sediment samples collected. The preliminary soil cleanup criteria for benzo(a)anthracene (0.005 mg/kg), benzo(b)fluoranthene (0.055 mg/kg) and chrysene (0.02 mg/kg) are exceeded in the sample. These exceedances are all due to actual reported concentrations. The preliminary cleanup criteria for benzo(k)fluoranthene (0.055 mg/kg) is also exceeded in the sample. However, this exceedance is due to a proxy concentration estimated from the sample detection limit.

Table 2-13 presents the TCL inorganic compounds detected in the catch basin sediment samples from the Booth Oil Site. One of the 4 catch basin sediment samples was analyzed for these inorganic

BOS2REPa/bos-t2
February 26, 1991

Table 2-12
Catch Basin Sediment Results
Semi-volatile Organic Compounds

SEMIVOLATILES	BOCB1SD 6/27/90 (mg/kg)	BOCB2SD 6/27/90 (mg/kg)	BOCB3SD 6/27/90 (mg/kg)	BOCB5SD 6/27/90 (mg/kg)
Benzo(a)anthracene	NA	NA	2	NA
Benzo(b)fluoranthene	NA	NA	3.7	NA
Benzo(k)fluoranthene	NA	NA	0.97 U	NA
Benzo(g,h,i)perylene	NA	NA	0.83 J	NA
Chrysene	NA	NA	2.3	NA
bis(2-Ethylhexyl)phthalate	NA	NA	9.8 B	NA
Fluoranthene	NA	NA	4.3	NA
2-Methylnaphthalene	NA	NA	5.2	NA
Di-n-octylphthalate	NA	NA	1.6 J	NA
Phenanthrene	NA	NA	6.1	NA
Pyrene	NA	NA	1.5 J	NA

QUALIFIERS

J: compound is present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES:



- value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

Table 2-13
Catch Basin Sediment Results
Inorganic Compounds

INORGANICS	BOCB1SD 6/27/90 (mg/kg)	BOCB2SD 6/27/90 (mg/kg)	BOCB3SD 6/27/90 (mg/kg)	BOCB5SD 6/27/90 (mg/kg)
Aluminum	NA	NA	8760	NA
Antimony	NA	NA	5.6 U	NA
Arsenic	NA	NA	7.1	NA
Barium	NA	NA	141	NA
Beryllium	NA	NA	1 B	NA
Cadmium	NA	NA	2.7	NA
Calcium	NA	NA	126000	NA
Chromium	NA	NA	64.5	NA
Cobalt	NA	NA	3.8 B	NA
Copper	NA	NA	76.9 E	NA
Cyanide	NA	NA	1.5	NA
Iron	NA	NA	18100	NA
Lead	NA	NA	611	NA
Magnesium	NA	NA	33300	NA
Manganese	NA	NA	701	NA
Mercury	NA	NA	0.14 U	NA
Nickel	NA	NA	16.8	NA
Potassium	NA	NA	1300 B	NA
Selenium	NA	NA	0.91 B	NA
Silver	NA	NA	1.2 U	NA
Sodium	NA	NA	1350 B	NA
Thallium	NA	NA	0.63 U	NA
Vanadium	NA	NA	16.8 E	NA
Zinc	NA	NA	388	NA

QUALIFIERS

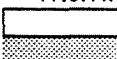
U : value is less than the instrument detection limit (IDL)

B : value is between IDL and contract required detection limit (CRDL)

E : value is estimated due to interference

NOTES

----: Not Available



- value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

compounds. This sample exceeded the NJDEP Soil Action Levels for two compounds, lead (100 mg/kg) and zinc (350 mg/kg).

All 4 the catch basin sediment samples were analyzed for pesticides and PCBs. Levels of PCB-1242 (0.085 mg/kg) and PCB-1254 (0.275 mg/kg) were found to exceed NJDEP soil action levels in 4 and 2 samples, respectively. One of the 4 exceedances for PCB-1242 is a proxy concentration estimated from elevated sample detection limits. The remaining exceedances for PCB-1242 and PCB-1254 are all actual reported concentrations.

Table 2-15 presents a summary of the contaminant concentrations for the catch basin sediment. It must be noted that mean and 95% confidence mean contaminant concentrations are only given for pesticides and PCBs, as these are the only compounds for which multiple samples were analyzed.

2.5 Catch Basin Surface Water

A total of 3 surface water samples were collected from the catch basin and analyzed during the Phase I RI. Analytical results of the catch basin surface water samples are presented in Tables 2-16 through 2-20.

BOS2REPa/bos-t2
February 26, 1991

Table 2-14
Catch Basin Sediment Results
Pesticides and PCB's

PESTICIDES/PCBs	BOCB1SD 6/27/90 (mg/kg)	BOCB2SD 6/27/90 (mg/kg)	BOCB3SD 6/27/90 (mg/kg)	BOCB5SD 6/27/90 (mg/kg)
PCB-1242	0.123 U	13	13	1.9
PCB-1254	0.246 U	31	4.6	1.2
PCB-1260	4.5	140	6.8	2.2

QUALIFIERS

J: compound is present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES



- value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

mcbsd/bos-3

Table 2-15
Catch Basin Sediment
Mean Contaminant Concentrations

VOLATILES	Arith. Mean (mg/kg)
2-Butanone	1.100
1,1-Dichloroethane	0.140
1,2-Dichloroethane	0.564
1,2-Dichloroethene (total)	1.400
trans-1,3-Dichloropropene	0.564
Ethylbenzene	1.200
2-Hexanone	1.092
Tetrachloroethene	0.564
Toluene	1.500
Vinyl Chloride	0.850
Xylene (total)	3.300

mcbsd/bos-3

Table 2-15 (cont.)
Catch Basin Sediment
Mean Contaminant Concentrations

SEMIVOLATILES	Arith. Mean (mg/kg)
Benzo(a)anthracene	2.000
Benzo(b)fluoranthene	3.700
Benzo(k)fluoranthene	0.970
Benzo(g,h,i)perylene	0.830
Chrysene	2.300
bis(2-Ethylhexyl)phthalate	9.800
Fluoranthene	4.300
2-Methylnaphthalene	5.200
Di-n-octylphthalate	1.600
Phenanthrene	6.100
Pyrene	1.500

mcbsd/bos-3

Table 2-15 (cont.)
Catch Basin Sediment
Mean Contaminant Concentrations

INORGANICS	Arith. Mean (mg/kg)
Aluminum	8760.000
Antimony	5.600
Arsenic	7.100
Barium	141.000
Beryllium	1.000
Cadmium	2.700
Calcium	126000.000
Chromium	64.500
Cobalt	3.800
Copper	76.900
Cyanide	1.500
Iron	18100.000
Lead	611.000
Magnesium	33300.000
Manganese	701.000
Mercury	0.140
Nickel	16.800
Potassium	1300.000
Selenium	0.910
Silver	1.200
Sodium	1350.000
Thallium	0.630
Vanadium	16.800
Zinc	388.000

mcbsd/bos-3

Table 2-15 (cont.)
Catch Basin Sediment
Mean Contaminant Concentrations

PESTICIDES/PCBs	Arith. Mean	Upper 95% Confidence
	(mg/kg)	Arith. Mean (mg/kg)
PCB-1242	7.006	12.912
PCB-1254	9.262	21.663
PCB-1260	38.375	95.897

The levels of TCL volatile organic compounds detected in the catch basin surface water samples collected at the Booth Oil Site are presented in Table 2-16. All three of the samples were analyzed and compared to NYSDEC Surface Water Standards/ Guidelines for Class A, Class C and Class D surface waters. It must be noted, however, that the "surface water" samples collected from the catch basin are not part of an actual surface water system. These data are compared to surface water standards/guidelines herein solely for the purpose of data interpretation.

Review of the table indicates that benzene exceeds guidelines for Class A waters (0.001 mg/l) in all 3 samples, and the guidelines for Class C (0.006 mg/l) and Class D (0.006 mg/l) in 1 sample. Of the three values shown in Table 2-16 for benzene, two are proxy values estimated from elevated sample detection limits, and one is an actual reported concentration. The surface water standards/guidelines are all exceeded by this actual concentration.

The NYSDEC Class A standard/guideline for 1,2-dichloroethene (0.05 mg/l), toluene (0.05 mg/l), and xylene (0.05 mg/l) are exceeded in one sample. All of these exceedances are due to actual reported concentrations. Vinyl chloride exceeds the Class A standard/guideline (0.0003 mg/l) in all three samples analyzed.

BOS2REPa/bos-t2
February 26, 1991

Table 2-16
Catch Basin Surface Water Results
Volatile Organic Compounds

VOLATILES	BOCB1SW		BOCB3SW		BOCB5SW		NYSDEC Class A		NYSDEC Class C		NYSDEC Class D	
	6/27/90	(mg/l)	6/27/90	(mg/l)	6/27/90	(mg/l)	Surface Water	(mg/l)	Surface Water	(mg/l)	Surface Water	(mg/l)
Acetone	0.012	U	0.01	U	0.005	U	---	---	---	---	---	---
Benzene	0.0025	U	0.025	U	0.0025	U	0.001	0.006	---	---	0.006	---
1,1-Dichloroethane	0.0025	U	0.049	U	0.0025	U	0.05	---	---	---	---	---
1,2-Dichloroethane (total)	0.0025	U	0.27	U	0.0025	U	0.05	---	---	---	---	---
Ethylbenzene	0.0025	U	0.019	U	0.0025	U	0.05	---	---	---	---	---
Toluene	0.0025	U	0.089	U	0.0025	U	0.05	---	---	---	---	---
Vinyl Chloride	0.005	U	0.32	U	0.005	U	0.0003	---	---	---	---	---
Xylene (total)	0.0025	U	0.085	U	0.0025	U	0.05	---	---	---	---	---

QUALIFIERS

J: compound is present below the detection limit
 B: compound is found in the blank as well as the sample
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit

NOTES

ST: Standard

GV: Guidance Value

-value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

Two of these values are proxy values estimated from sample detection limits, and the third is an actual reported concentration.

The three catch basin surface water samples were also analyzed for TCL semivolatile compounds. The results of these analyses are given in Table 2-17. Review of the table indicates that the NYSDEC Class C and D standards for total phenols (0.005 mg/l) are exceeded in surface water sample CB-3-SW by 2,4-dimethylphenol (0.052 mg/l), 2-methylphenol (0.012 mg/l) and 4-methylphenol (0.069 mg/l). Each of these exceedances is due to an actual reported concentration.

Table 2-18 presents the catch basin surface water results for TCL inorganic compounds. All 3 surface water samples exceed the NYSDEC Class C standard for aluminum (0.1 mg/l) and the Class A, C and D standard for iron (0.3 mg/l). All 3 samples exceed the Class C standard (0.0052 mg/l) for cyanide. However, review of the table indicates that one of these exceedances is due to a proxy concentration estimated from a sample detection limit which exceeds the standard. One sample each exceeds the Class A standards for lead (0.05 mg/l) and manganese (0.3 mg/l), and two samples exceed the Class C standard for zinc (0.03 mg/l). Review of the table indicates that each of these exceedances are due to actual reported contaminant concentrations.

BOS2REPa/bos-t2
February 26, 1991

Table 2-17
Catch Basin Surface Water Results
Semi-volatile Organic Compounds

SEMIVOLATILES	BOCB1SW 6/27/90 (mg/l)	BOCB3SW 6/27/90 (mg/l)	BOCB5SW 6/27/90 (mg/l)	NYSDEC Class A Surface Water Stds/Guidelines (mg/l)	NYSDEC Class C Surface Water Stds/Guidelines (mg/l)	NYSDEC Class D Surface Water Stds/Guidelines (mg/l)
Benzic acid	0.01 J	0.025 U	0.01 J	---	---	---
Di-n-butylphthalate	0.001 J	0.001 J	0.002 J	.05 GV	---	---
2,4-Dimethylphenol	0.005 U	0.062	0.005 U	---	.005 ST *	.005 ST *
Fluoranthene	0.0006 J	0.005 U	0.0008 J	.05 GV	---	---
2-Methylphenol	0.002 J	0.012	0.005 U	---	.005 ST *	.005 ST *
4-Methylphenol	0.005 U	0.069	0.005 U	---	.005 ST *	.005 ST *
Di-n-octylphthalate	0.005 U	0.0008 J	0.001 J	.05 GV	---	---

QUALIFIERS

J: compound is present below the detection limit

B: compound is found in the blank as well as the sample

U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)

UB: reported concentration is 1/2 the sample detection limit

NOTES

*: value pertains to total phenols

ST: Standard

GV: Guidance Value

-value exceeds standard/guideline

-sample detection limit exceeds standard/guideline

Table 2-18
Catch Basin Surface Water Results
Inorganic Compounds

INORGANICS	BOCB1SW 6/27/90 (mg/l)	BOCB3SW 6/27/90 (mg/l)	BOCB5SW 6/27/90 (mg/l)	NYSDEC Class A Surface Water Std's/Guidelines (mg/l)	NYSDEC Class C Surface Water Std's/Guidelines (mg/l)	NYSDEC Class D Surface Water Std's/Guidelines (mg/l)
Aluminum	0.336	0.121 B	0.432	....	0.1 ST	....
Arsenic	0.001 U	0.0085 B	0.001 U	0.05 ST	0.19 ST	0.36 ST
Barium	0.0283 B	0.208 E	0.317 BE	1 ST	....	....
Calcium	24.7	143	26.4	....	....	....
Chromium	0.0032 B	0.003 U	0.0073 B	0.05 ST	*	*
Copper	0.0302	0.0058 B	0.0369	0.2 ST	*	*
Cyanide	0.0185	0.01 U	0.0058	0.1 ST	0.0052 ST	0.022 GV
Iron	2.57	2.66	0.938	0.3 ST	0.3 ST	0.3 ST
Lead	0.0097	0.0036	0.0121	0.05 ST	*	*
Magnesium	3.02 B	33	315 B	35 ST	....	....
Manganese	0.183	0.447	0.0912	0.3 ST	....	....
Nickel	0.005 B	0.005 U	0.0062 B	....	*	*
Potassium	2.11 B	7.27	1.77 B	....	....	....
Sodium	19.4	335	12.6	....	....	....
Vanadium	0.005 B	0.006 B	0.002 U	....	0.014 GV	0.19 GV
Zinc	0.0767	0.0048 B	0.145	0.3 ST	0.03 ST	*

QUALIFIERS

U : value is less than the instrument detection limit (IDL)
 B : value is between IDL and contract required detection limit (CRDL)
 E : value is estimated due to interference

NOTES

ST: Standard
 GV: Guidance Value

-value exceeds standard/guideline
 -sample detection limit exceeds standard/guideline

All 3 of the catch basin surface water samples were analyzed for pesticides/PCBs. The positive results of these analyses are shown in Table 2-19. None of the surface water samples collected from the catch basin resulted in levels of pesticides or PCBs above the NYSDEC surface water standards/guidelines for Class A, C or D waters.

Table 2-20 presents the arithmetic mean and 95% confidence arithmetic mean calculated for the catch basin surface water samples collected during the Phase I RI.

2.6 Groundwater

A total of 8 monitoring well samples were collected during the Phase I RI. The locations of the monitoring wells are shown in Figure 2-4. The analytical results of the groundwater samples are listed in Tables 2-21 through 2-24.

All 8 groundwater samples were analyzed for TCL volatile organic compounds. The results of these analyses are shown in Table 2-21. Review of the table indicates that the NYSDEC Class GA Groundwater Standards/Guidelines for benzene (i.e., non-detected), 1,1-dichloroethene ($7.0E-05$ mg/l), and vinyl chloride (0.005 mg/l) are exceeded in all 8 groundwater samples. Further review of the

mcbaw/bos3

Table 2-19
Catch Basin Surface Water Results
Pesticides and PCB's

PESTICIDES/PCBs	BOCB1SW		BOCB3SW		BOCB5SW		NYSDEC Class A		NYSDEC Class C		NYSDEC Class D	
	6/27/90	(mg/l)	6/27/90	(mg/l)	6/27/90	(mg/l)	Surface Water	(mg/l)	Surface Water	(mg/l)	Surface Water	(mg/l)
gamma-Chlordane	0.00025	U	0.00063	U	0.00025	U	Std's/Guidelines		Std's/Guidelines		Std's/Guidelines	

QUALIFIERS

- J: compound is present below the detection limit
B: compound is found in the blank as well as the sample
U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
UB: reported concentration is 1/2 the sample detection limit

NOTES

- ☐ -value exceeds standard/guideline
☐ -sample detection limit exceeds standard/guideline

mcbsw/bos-3

Table 2-20
Catch Basin Surface Water
Mean Contaminant Concentrations

VOLATILES	Arith. Mean	Upper 95% Confidence
	(mg/l)	Arith. Mean (mg/l)
Acetone	0.009	0.012
Benzene	0.010	0.022
1,1-Dichloroethane	0.018	0.043
1,2-Dichloroethene (total)	0.092	0.234
Ethylbenzene	0.008	0.017
Toluene	0.031	0.077
Vinyl Chloride	0.110	0.278
Xylene (total)	0.030	0.074

mcbw/bos-3

Table 2-20 (cont.)
Catch Basin Surface Water
Mean Contaminant Concentrations

SEMIVOLATILES	Arith. Mean (mg/l)	Upper 95% Confidence Arith. Mean (mg/l)
Benzoic acid	0.015	0.023
Di-n-butylphthalate	0.001	0.002
2,4-Dimethylphenol	0.021	0.046
Fluoranthene	0.002	0.004
2-Methylphenol	0.006	0.011
4-Methylphenol	0.026	0.060
Di-n-octylphthalate	0.002	0.004

mcbsw/bos-3

Table 2-20 (cont.)
Catch Basin Surface Water Results
Mean Contaminant Concentrations

INORGANICS	Arith. Mean (mg/l)	Upper 95% Confidence Arith. Mean (mg/l)
Aluminum	0.296	0.443
Arsenic	0.004	0.008
Barium	0.184	0.319
Calcium	64.700	127.358
Chromium	0.005	0.007
Copper	0.024	0.039
Cyanide	0.011	0.017
Iron	2.056	2.952
Lead	0.008	0.013
Magnesium	13.057	29.015
Manganese	0.240	0.411
Nickel	0.005	0.006
Potassium	3.717	6.564
Sodium	122.333	292.531
Vanadium	0.004	0.006
Zinc	0.076	0.140

mcbsw/bos3

Table 2-20 (cont.)
Catch Basin Surface Water
Mean Contaminant Concentrations

PESTICIDES/PCBs	Arith. Mean	Upper 95% Confidence
	(mg/l)	Arith. Mean (mg/l)
gamma-Chlordane	0.0004	0.001

TABLE 2-21
Groundwater Results
Volatile Organic Compounds

VOLATILES																	NYSDEC Class GA	
BOMW1GW		BOMW2GW		BOMW4GW		BOMW5GW		BOMW6GW		BOMW7GW		BOMW8GW		BOMW9GW		Groundwater Stds/Guidelines		
7/31/90	(mg/l)	7/30/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/30/90	(mg/l)	(mg/l)		
Benzene	0.035	0.008		0.31	J	0.23	J	0.045	J	0.00070	J	0.009	J	0.044	J	ND		
Carbon Disulfide	0.0005	J	0.001	J	0.0025	U	1.25	U	0.0625	U	0.0025	U	0.0025	U	0.05	U	---	
Chloroform	0.009		0.001	J	0.36	J	1.25	U	0.0625	U	0.0025	U	0.0025	U	0.05	U	0.1	
1,1-Dichloroethane	0.081		0.14		1.8		1.3	J	0.098	J	0.14		0.0025	U	0.05	U	0.05	
1,1-Dichloroethene	0.028		0.002	J	0.6		1.25	U	0.0625	U	0.0025	U	0.0025	U	0.05	U	7E-05	
1,2-Dichloroethene (total)	0.73	E	0.2		62	E	64		2.9		0.049		0.0025	U	0.05	U	0.05	
Ethylbenzene	0.045		0.0025	U	0.27	J	0.75	J	0.0625	U	0.0025	U	0.013		0.05	U	0.05	
Methylene Chloride	0.0025	U	0.002	J	0.26	J	0.63	JB	0.057	J	0.0025	U	0.004	J	0.089	J	0.05	
4-Methyl-2-pentanone	0.005	U	0.0007	J	0.18	J	2.5	U	0.125	U	0.005	U	0.005	U	0.1	U	---	
Tetrachloroethene	0.032		0.002	J	1.2		2	J	0.0625	U	0.0025	U	0.0025	U	1.3		0.0007	
Toluene	0.099	B	0.0025	UB	4.1	B	2.2	JB	0.099	J	0.0025	U	0.004	J	0.14		0.05	
Trichloroethene	0.051		0.002	J	2		0.57	J	0.0625	U	0.004	J	0.0025	U	0.81		0.01	
1,1,1-Trichloroethane	0.0025	U	0.038		0.66		1.4	J	0.0625	U	0.0007	J	0.0025	U	0.05	U	0.05	
Vinyl Chloride	3	E	0.11		120	E	7.3	J	0.85		0.036		0.1		0.53		0.005	
Xylene (total)	0.07		0.006		1.1		4.7		0.076	J	0.0025	U	0.23		0.05	U	0.05	

QUALIFIERS

J: compound found below detection limit
 B: compound is found in the blank as well as the sample
 E: value exceeds instrument calibration range
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit

NOTES

----: Not available
 GV: Guidance Value
 ST: Standard
 [] -value exceeds standard/guideline
 [] -sample detection limit exceeds standard/guideline

table indicates that 4 of the exceedances noted for 1,1-dichloroethene are attributed to proxy concentrations estimated from sample detection limits which are above the guidance value. The remaining exceedances for these three compounds, however, are due to actual detected contaminant concentrations.

Seven out of 8 samples exceed the NYSDEC Class GA guidance value for 1,2-dichloroethene (0.05 mg/l), and 6 out of 8 groundwater samples exceed the guidance value for 1,1-dichloroethane (0.05 mg/l). Five out of the 8 groundwater samples exceed the Class GA guidance values for toluene (0.05 mg/l) and xylene (0.05 mg/l), and half of the groundwater samples analyzed exceed the Class GA guidance value for methylene chloride (0.05 mg/l). All of these exceedances are due to actual detected concentrations.

Five groundwater samples exceed the NYSDEC Class GA guidance value for tetrachloroethene (0.0007 mg/l) and 5 samples exceed the Class GA standard for trichloroethene (0.01 mg/l). Review of Table 2-21 indicates that, for each of these compounds, 4 of the 5 exceedances are due to actual detected contaminant concentrations, while the remaining exceedance is attributed to a proxy concentration.

BOS2REPa/bos-t2
February 26, 1991

Three groundwater samples exceed the NYSDEC Class GA guidance values for 1,1,1-trichloroethane (0.05 mg/l) and ethylbenzene (0.05 mg/l). Two groundwater samples exceed the Class GA standard for chloroform (0.1 mg/l). In each case, 1 of the exceedances is attributed to a proxy concentration estimated from a sample detection limit above the standard/guideline.

Table 2-22 lists the results of analyses for groundwater for TCL semivolatile organic compounds. Review of the table indicates that for 2,4-dimethylphenol and phenol, all 8 samples exceed the Class GA standard for total phenols (0.001 mg/l). Two of the exceedances for phenol and 3 of the exceedances for 2,4-dimethylphenol are due to actual detected contaminant levels. The remaining exceedances are due to proxy concentrations estimated from elevated sample detection limits. The Class GA groundwater standard for total phenols (0.001 mg/l) is also exceeded by 2-methylphenol and 4-methylphenol in 7 samples each. Review of the table indicates that, in each case, 3 of these exceedances are due to actual reported concentrations and 4 are due to proxy concentrations.

The Class GA guidance value for naphthalene (0.01 mg/l) is exceeded in 6 out of the 8 groundwater samples. The Class GA standard for phenanthrene (0.05 mg/l) is exceeded in 3 out of the

BOS2REPa/bos-t2
February 26, 1991

mgw/bos-3

TABLE 2-22
Groundwater Results
Semi-volatile Organic Compounds

SEMI-VOLATILES	BOMW1GW		BOMW2GW		BOMW4GW		BOMW5GW		BOMW6GW		BOMW7GW		BOMW8GW		BOMW9GW		NYSDEC CLASS GA GROUNDWATER STANDARDS/GUIDELINES
	7/31/90	(mg/l)	7/30/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/31/90	(mg/l)	7/30/90	(mg/l)	
2,4-Dimethylphenol	0.005 U		0.005 U		1.5		3.1		0.65		0.0055 U		0.0055 U		0.0555 U		0.001 ST
2-Methylnaphthalene	0.013		0.005 U		0.028 U		0.37 J		0.01 J		0.0055 U		0.0055 U		0.0555 U		0.001 ST
2-Methylphenol	0.005 U		0.005 U		0.16		2.8		0.28		0.0055 U		0.0055 U		0.0555 U		0.001 ST
4-Methylphenol	0.005 U		0.005 U		1.6		12		0.29		0.0055 U		0.0055 U		0.0555 U		0.001 ST
Naphthalene	0.007 J		0.005 U		0.061		0.4 J		0.011 J		0.0055 U		0.0055 U		0.0555 U		0.01 GV
Phenanthrene	0.005 U		0.005 U		0.028 U		0.073 J		0.011 U		0.0055 U		0.0055 U		0.0555 U		0.05 ST
Phenol	0.005 U		0.005 U		0.11		3.8		0.011 U		0.0055 U		0.0055 U		0.0555 U		0.001 ST*
Pyrene	0.005 U		0.005 U		0.028 U		0.016 J		0.011 U		0.0055 U		0.003 J		0.013 J		0.05 GV
Di-n-butylphthalate	0.005 U		0.005 U		0.028 U		0.278 U		0.011 U		0.0009 J		0.0055 U		3.2		0.77 ST

QUALIFIERS

- J: compound found below detection limit
- B: compound is found in the blank as well as the sample
- E: value exceeds instrument calibration range
- U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
- UB: reported concentration is 1/2 the sample detection limit

NOTES

- : Not available
- GV: Guidance Value
- ST: Standard
- *: value applies to total phenols
- value exceeds standard/guideline
- sample detection limit exceeds standard/guideline

8 groundwater samples. Four of the 6 exceedances for naphthalene and 1 of the 3 exceedances for phenanthrene are due to actual detected concentrations. The remaining exceedances for these compounds are due to proxy concentrations estimated from elevated sample detection limits. The standard for di-n-butylphthalate (0.77 mg/l) is exceeded in one sample. Review of Table 2-22 indicates that this elevated concentration is an actual detected value.

All 8 groundwater samples were analyzed for TCL inorganic compounds. The results of these analyses are listed in Table 2-23. Review of the table indicates that all 8 groundwater samples exceed the NYSDEC Class GA Standards/Guidelines for iron (0.3 mg/l), lead (0.025 mg/l), magnesium (35.0 mg/l) and manganese (0.3 mg/l). In addition, two samples each exceed the Class GA standards for arsenic (0.025 mg/l) and chromium (0.05 mg/l).

Table 2-24 lists the results of the TCL pesticide and PCB analyses of the groundwater samples collected at the Booth Oil Site. Review of the table indicates that groundwater standards and/or guidelines have not been established by NYSDEC for the compounds detected in the samples.

TABLE 2-23
Groundwater Results
Inorganic Compounds

INORGANICS	BOMW1GW		BOMW2GW		BOMW4GW		BOMW5GW		BOMW6GW		BOMW7GW		BOMW8GW		BOMW9GW		NYSDEC CLASS GA GROUNDWATER STANDARDS/GUIDELINES (mg/l)
	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	
Aluminum	41.7	28.6	0.0118	0.025	7.36	15.1	5.76	7.71	38.8	5.81	---	---	---	---	---	---	---
Arsenic	0.0287	0.0118	0.0118	0.025	7.36	0.0457	0.0161	0.0052	B	0.0163	0.025	ST	---	---	---	---	0.025 ST
Barium	0.378	0.196	B	0.66	0.66	0.301	0.476	0.236	0.912	0.498	1	ST	---	---	---	---	1 ST
Beryllium	0.002	B	0.0014	B	0.0011	B	0.001	U	0.0012	B	0.001	U	---	---	---	---	0.003 GV
Cadmium	0.0048	B	0.0017	B	0.0011	B	0.0038	B	0.0024	B	0.0016	B	0.0025	B	0.0013	B	0.01 ST
Calcium	339	213	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	408	191	---	---	---	---	---	---	---
Chromium	0.0388	0.0489	0.0077	B	0.0077	0.0252	0.0146	0.0156	0.0571	0.0288	0.05	ST	---	---	---	---	0.05 ST
Cobalt	0.0324	B	0.023	B	0.0054	B	0.0172	B	0.0067	B	0.0077	B	0.0327	B	0.007	B	---
Copper	0.177	0.175	0.022	B	0.022	0.0306	0.0329	0.0171	0.12	0.0475	1	ST	---	---	---	---	1 ST
Iron	71	42.4	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	---
Lead	0.168	0.0579	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	0.3 ST
Magnesium	138	95.7	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	0.025 ST
Manganese	2.3	1.52	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	35 GV
Nickel	0.0757	0.0697	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	0.3 ST
Potassium	13	15.3	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	---
Sodium	28.5	93.4	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	---
Vanadium	0.0775	0.0556	0.0077	0.0077	0.0077	0.0252	0.0146	0.0156	0.0327	B	0.0077	B	0.0327	B	0.007	B	---
Zinc	0.559	E	0.329	E	0.0857	E	0.265	E	0.134	E	0.0876	E	0.297	E	0.143	E	5 ST

QUALIFIERS

U: value is less than the instrument detection limit (IDL)
B: value is between IDL and contract required detection limit (CRDL)
E: value is estimated value due to interference

NOTES

---: not available
GV: Guidance Value
ST: Standard
-value exceeds standard/guideline
-sample detection limit exceeds standard/guideline

TABLE 2-24
Groundwater Results
PESTICIDES/PCBs

PESTICIDES/PCBs	BOMW1GW		BOMW2GW		BOMW4GW		BOMW5GW		BOMW6GW		BOMW7GW		BOMW8GW		BOMW9GW		NYSDEC CLASS GA GROUNDWATER STANDARDS/GUIDELINES (mg/l)
	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	7/31/90 (mg/l)	7/30/90 (mg/l)	
PCB - 1242	0.00025 U	0.00025 U	0.00025 U	0.00025 U	0.00025 U	0.00025 U	0.35	0.00025 U	0.00025 U	0.00025 U	0.00025 U	0.00025 U	0.16	0.00025 U	0.00025 U	0.00025 U	---
PCB - 1254	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0019	0.0005 U	0.0005 U	0.0005 U	0.034	0.0005 U	0.0005 U	0.0005 U	---
PCB - 1260	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.34	0.0005 U	0.0005 U	0.0005 U	0.0032	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	---

QUALIFIERS

J: compound found below detection limit
 B: compound is found in the blank as well as the sample
 E: value exceeds instrument calibration range
 U: compound analyzed for but not detected (reported conc. is 1/2 sample detection limit)
 UB: reported concentration is 1/2 the sample detection limit

NOTES

----: Not available
 GV: Guidance Value
 ST: Standard
 *: value applies to total phenols

Table 2-25 lists the arithmetic mean and 95% confidence arithmetic mean calculated for the groundwater samples collected at the Booth Oil Site.

BOS2REPa/bos-t2
February 26, 1991

mgw/bos-3

TABLE 2-25
Groundwater
Mean Contaminant Concentrations

VOLATILES	Arith. Mean (mg/l)	Upper 95% Confidence Arith. Mean (mg/l)
Benzene	0.085	0.161
Carbon Disulfide	0.171	0.454
Chloroform	0.217	0.499
1,1-Dichloroethane	0.451	0.9
1,1-Dichloroethene	0.250	0.543
1,2-Dichloroethene (total)	16.646	35.212
Ethylbenzene	0.149	0.317
Methylene Chloride	0.131	0.273
4-Methyl-2-pentanone	0.365	0.926
Tetrachloroethene	0.575	1.094
Toluene	0.831	1.816
Trichloroethene	0.438	0.893
1,1,1-Trichloroethane	0.277	0.605
Vinyl Chloride	16.491	43.649
Xylene (total)	0.779	1.833

mgw/bos-3

TABLE 2-25 (Cont.)
Groundwater
Mean Contaminant Concentrations

SEMIVOLATILES	Arith. Mean (mg/l)	Upper 95% Confidence Arith. Mean (mg/l)
2,4-Dimethylphenol	0.666	1.390
2-Methylnaphthalene	0.068	0.149
2-Methylphenol	0.415	1.043
4-Methylphenol	1.746	4.455
Naphthalene	0.075	0.162
Phenanthrene	0.025	0.041
Phenol	0.500	1.364
Pyrene	0.011	0.016
Di-n-butylphthalate	0.442	1.167

mgw/bos-3

TABLE 2-25 (Cont.)
Groundwater
Mean Contaminant Concentrations

INORGANICS	Arith. Mean	Upper 95% Confidence
	(mg/l)	Arith. Mean (mg/l)
Aluminum	18.605	28.378
Arsenic	0.021	0.029
Barium	0.457	0.611
Beryllium	0.001	0.001
Cadmium	0.002	0.003
Calcium	303.500	397.676
Chromium	0.032	0.045
Cobalt	0.017	0.024
Copper	0.078	0.122
Iron	37.875	54.056
Lead	0.143	0.219
Magnesium	101.525	129.914
Manganese	1.618	2.269
Nickel	0.051	0.066
Potassium	17.900	21.783
Sodium	169.488	260.556
Vanadium	0.039	0.057
Zinc	0.238	0.342

mgw/bos-3

TABLE 2-25 (Cont.)
Groundwater
Mean Contaminant Concentrations

PESTICIDES/PCBs	Arith. Mean	Upper 95% Confidence
	(mg/l)	Arith. Mean (mg/l)
PCB - 1242	0.064	0.147
PCB - 1254	0.005	0.013
PCB - 1260	0.043	0.121

Section 3

3.0 IDENTIFICATION OF INDICATOR CHEMICALS

3.1 Overview

In order to focus the human health risk assessment on the contaminants of greatest concern to public health, indicator chemicals are identified for each medium analyzed at the Booth Oil Site. Indicator chemicals are identified to represent the most toxic contaminants at the site, as well as those detected at the highest concentrations.

The contaminants identified in the analyses of each matrix are ranked according to the method described in Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (EPA, 1989c). Those contaminants having the highest indicator chemical scores are retained in the quantitative risk assessment. In addition, contaminants which exceed the relevant standards and/or guidelines are included in the quantitative assessment.

It must be noted that, for the purpose of this Preliminary Baseline Human Health Risk Assessment, all of the contaminants identified at the Booth Oil Site are retained in the quantitative assessment. Quantitative evaluation of all of these compounds will serve to confirm the results of the indicator chemical selection

BOS2REPa/bos-t2
February 26, 1991

process for the Final Baseline Human Health Risk Assessment. If, indeed, those contaminants having low indicator scores pose insignificant health risks, they will be eliminated from the final assessment.

3.2 Methods

The first step in identification of the indicator chemical scores consists of ranking the chemicals to identify those which pose the highest potential risk. Individual contaminant-specific risk factors are calculated for each medium based upon mean contaminant concentrations and published toxicity factors. The contaminant risk-factor is calculated by the formula (EPA, 1989c):

$$R_{ij} = C_{ij} \times T_{ij}$$

where:

- R_{ij} = risk factor for contaminant i in medium j
- C_{ij} = 95% confidence arithmetic mean concentration of contaminant i in medium j
- T_{ij} = toxicity value for contaminant i in medium j

The toxicity factors used in the calculation are derived for each environmental medium (i.e., air, water, soil), and for two

types of health effects (i.e., noncarcinogenic and carcinogenic) within each medium. The medium-specific toxicity factors for each contaminant, presented in Table 3-1, are obtained from the Health Effects Summary Tables (EPA, 1990). The basis for these toxicity factors are discussed in more detail in Section 5.0 of this report.

For each type of health effect (i.e., carcinogenic and noncarcinogenic), the contaminant-specific risk factors are used to calculate total risk factors for each medium by adding the individual contaminant risk factors (EPA, 1989c):

$$R_j = \sum_{i=1}^i R_{ij}$$

where:

R_j = total carcinogenic or noncarcinogenic risk factor
for medium j

R_{ij} = risk factor for contaminant i in medium j

The ratio of the contaminant-specific risk factor for each compound in a given medium to the total risk factor for that medium is calculated as the indicator score:

Table 3-1
EPA Reference Doses and Carcinogenic Slope Factors

	CHRONIC		CHRONIC		INHAL CSF		ORAL CSF		CHRONIC		DERMAL CSF	
	INH-AL RfD	UF	ORAL RfD	UF	1/(mg/kg-day)	1/(mg/kg-day)	1/(mg/kg-day)	1/(mg/kg-day)	DERMAL RfD	1/(mg/kg-day)	1/(mg/kg-day)	1/(mg/kg-day)
VOLATILES												
Acetone	ND	N/A	1.00E-01	1000	ND	N/A	ND	N/A	5.00E-02	ND	ND	N/A
Benzene	ND	N/A	ND	N/A	2.90E-02	A	2.90E-02	A	ND	2.61E-02	A	A
2-Butanone	9.00E-02	1000	5.00E-02	1000	ND	D	ND	D	2.50E-02	ND	D	D
Carbon Disulfide	3.00E-03	NR	1.00E-01	100	ND	N/A	ND	N/A	5.00E-02	ND	N/A	N/A
1,1-Dichloroethane	1.00E-01	1000	1.00E-01	1000	ND	C	ND	C	1.00E-01	ND	C	C
1,1-Dichloroethene	ND	N/A	9.00E-03	1000	1.20E+00	C	6.00E-01	C	4.50E-03	1.20E+00	C	C
1,2-Dichloroethane (total)	ND	N/A	2.00E-02	1000	ND	N/A	ND	N/A	1.00E-02	ND	N/A	N/A
trans-1,3-Dichloropropene	2.90E-03	100	3.00E-04	10000	1.30E-01	B2	1.80E-01	B2	1.50E-04	3.60E-01	B2	B2
Ethylbenzene	ND	N/A	1.00E-01	1000	ND	N/A	ND	N/A	1.00E-02	ND	N/A	N/A
2-Hexanone	ND	N/A	ND	N/A	ND	N/A	ND	N/A	ND	ND	N/A	N/A
Tetrachloroethene	ND	N/A	1.00E-02	1000	3.30E-03	B2	5.10E-02	B2	5.00E-03	1.00E-01	B2	B2
Toluene	5.70E-01	100	3.00E-01	100	ND	N/A	ND	N/A	1.80E-01	ND	N/A	N/A
Trichloroethene	ND	N/A	ND	N/A	1.70E-02	B2	1.10E-02	B2	ND	2.20E-02	B2	B2
1,1,1-Trichloroethane	3.00E-01	1000	9.00E-02	1000	ND	N/A	ND	N/A	4.50E-01	ND	N/A	N/A
Vinyl Chloride	ND	N/A	ND	N/A	2.95E-01	A	2.30E+00	A	ND	4.60E+00	A	A
Xylene (total)	3.00E-01	100	2.00E+00	100	ND	N/A	ND	N/A	1.80E+00	ND	N/A	N/A

RfD - Reference Dose
CSF - Carcinogenic Slope Factor
UF - Uncertainty Factor
N/A - Not Applicable
ND - Not Determined

CG - EPA Carcinogen Group
A - Human Carcinogen
B1 - Probable Human Carcinogen
B2 - Probable Human Carcinogen
C - Possible Human Carcinogen
D - Not Classified

Table 3-1 (cont'd)
EPA Reference Doses and Carcinogenic Slope Factors

	CHRONIC INHAL RID (mg/kg-day)	UF	CHRONIC ORAL RID (mg/kg-day)	UF	INHAL CSF 1/(mg/kg-day)	CG	ORAL CSF 1/(mg/kg-day)	CG	CHRONIC DERMAL RID (mg/kg-day)	DERMAL CSF 1/(mg/kg-day)	CG
SEMI-VOLATILES											
Acenaphthene	ND	N/A	6.00E-02	3000	ND	N/A	ND	N/A	1.20E-02	NR	N/A
Acenaphthylene	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	N/A
Anthracene	ND	N/A	3.00E-01	3000	ND	N/A	ND	N/A	6.00E-02	NR	N/A
Benzo(a)anthracene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Benzo(b)fluoranthene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Benzo(k)fluoranthene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Benzoic Acid	ND	N/A	4.00E+00	1	ND	N/A	ND	N/A	1.60E+00	NR	N/A
Benzo(e)pyrene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Butylbenzylphthalate	ND	N/A	2.00E+00	100	ND	N/A	ND	C	1.00E+00	NR	C
Chrysene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Dibenzo(ah)anthracene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
Di-n-butyl phthalate	ND	N/A	1.00E-01	1000	ND	N/A	ND	N/A	4.00E-02	NR	N/A
1,2-Dichlorobenzene	4.00E-02	1000	9.00E-02	1000	ND	N/A	ND	N/A	4.50E-02	NR	N/A
1,4-Dichlorobenzene	2.00E-01	100	N/A	N/A	ND	B2	2.40E-02	B2	NR	9.60E-03	B2
2,4-Dimethylphenol	ND	N/A	2.00E-02	3000	ND	N/A	ND	N/A	1.00E-02	NR	N/A
Di(2-ethylhexyl)phthalate	ND	N/A	2.00E-02	1000	ND	B2	1.40E-02	B2	1.50E-02	1.05E-02	B2
Fluoranthene	ND	N/A	4.00E-02	3000	ND	N/A	ND	N/A	8.00E-03	NR	N/A
Fluorene	ND	N/A	4.00E-02	3000	ND	N/A	ND	N/A	8.00E-03	NR	N/A
Indeno(1,2,3-cd)pyrene	ND	N/A	ND	N/A	6.10E+00	B2	1.15E+01	B2	NR	2.30E+00	B2
2-Methylnaphthalene	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	N/A
2-Methylphenol [o-cresol]	ND	N/A	5.00E-02	1000	ND	C	ND	C	2.50E-02	NR	C
4-Methylphenol [p-cresol]	ND	N/A	5.00E-02	1000	ND	C	ND	C	2.50E-02	NR	C
Naphthalene	ND	N/A	4.00E-03	10000	ND	N/A	ND	N/A	8.00E-04	NR	N/A
N-Nitrosodiphenylamine (1)	ND	N/A	ND	N/A	ND	B2	4.90E-03	B2	NR	9.80E-03	B2
Di-n-octylphthalate	ND	N/A	2.00E-02	1000	ND	N/A	ND	N/A	1.00E-02	NR	N/A
Phenanthrene	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	N/A
Phenol	ND	N/A	6.00E-01	100	ND	N/A	ND	N/A	2.40E-02	NR	N/A
Pyrene	ND	N/A	3.00E-02	3000	ND	N/A	ND	N/A	6.00E-03	NR	N/A
1,2,4-Trichlorobenzene	3.00E-03	1000	2.00E-02	1000	ND	N/A	ND	N/A	1.00E-02	NR	N/A

RID - Reference Dose
CSF - Carcinogenic Slope Factor
UF - Uncertainty Factor
N/A - Not Applicable
ND - Not Determined

CG - EPA Carcinogen Group
A - Human Carcinogen
B1 - Probable Human Carcinogen
B2 - Probable Human Carcinogen
C - Possible Human Carcinogen
D - Not Classified

Table 3-1 (cont'd)
EPA Reference Doses and Carcinogenic Slope Factors

	CHRONIC		CHRONIC		INHAL CSF		ORAL CSF		CHRONIC		DERMAL CSF	
	INH AL RfD (mg/kg-day)	UF	ORAL RfD (mg/kg-day)	UF	1/(mg/kg-day)	CG	1/(mg/kg-day)	CG	DERMAL RfD (mg/kg-day)	CG	1/(mg/kg-day)	CG
INORGANICS												
Aluminum	ND	N/A	4.00E-04	N/A	ND	N/A	ND	N/A	NR	N/A	NR	N/A
Antimony	ND	N/A	1.00E-03	1000	ND	N/A	ND	N/A	2.00E-05	NR	NR	N/A
Arsenic	ND	N/A	5.00E-02	1	5.00E+01	A	ND	A	3.00E-04	NR	NR	A
Barium	1.00E-04	1000	5.00E-02	100	ND	N/A	ND	N/A	5.00E-03	NR	NR	N/A
Beryllium	ND	N/A	5.00E-03	100	8.40E+00	B2	4.30E+00	B2	5.00E-05	4.30E-02	B2	B2
Cadmium	ND	N/A	1.00E-03	10	6.10E+00	B1	ND	N/A	6.00E-05	NR	NR	N/A
Calcium	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Chromium	ND	N/A	1.00E+00	1000	ND	N/A	ND	N/A	4.00E-03	NR	NR	N/A
Cobalt	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Copper	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Iron	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Lead (organic)	ND	N/A	1.00E-07	10000	ND	B2	ND	B2	8.00E-09	NR	NR	B2
Magnesium	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Manganese	3.00E-04	100	2.00E-01	100	ND	N/A	ND	N/A	2.00E-03	NR	NR	N/A
Mercury	8.60E-05	30	3.00E-04	1000	ND	N/A	ND	N/A	4.50E-05	NR	NR	N/A
Nickel	ND	N/A	2.00E-02	300	8.40E-01	A	ND	N/A	6.00E-04	NR	NR	N/A
Potassium	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Selenium	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Silver	ND	N/A	3.00E-03	2	ND	N/A	ND	N/A	6.30E-04	NR	NR	N/A
Sodium	ND	N/A	ND	N/A	ND	N/A	ND	N/A	NR	NR	NR	N/A
Thallium	ND	N/A	7.00E-05	3000	ND	N/A	ND	N/A	7.00E-05	NR	NR	N/A
Vanadium	ND	N/A	7.00E-03	100	ND	N/A	ND	N/A	1.40E-04	NR	NR	N/A
Zinc	ND	N/A	2.00E-01	10	ND	N/A	ND	N/A	5.00E-02	NR	NR	N/A
Cyanide	ND	N/A	2.00E-02	500	ND	N/A	ND	N/A	1.00E-02	NR	NR	N/A
Lead (inorganic)	ND	N/A	1.40E-03	NR	ND	B2	ND	B2	0.000	NR	NR	B2

RfD - Reference Dose
CSF - Carcinogenic Slope Factor
UF - Uncertainty Factor
N/A - Not Applicable
ND - Not Determined

CG - EPA Carcinogen Group
A - Human Carcinogen
B1 - Probable Human Carcinogen
B2 - Probable Human Carcinogen
C - Possible Human Carcinogen
D - Not Classified

Table 3-1 (cont'd)
EPA Reference Doses and Carcinogenic Slope Factors

PESTICIDES/PCBs	CHRONIC		CHRONIC		INHAL CSF		ORAL CSF		CHRONIC		DERMAL CSF	
	INHAL RfD (mg/kg-day)	UF	ORAL RfD (mg/kg-day)	UF	1/(mg/kg-day)	CG	1/(mg/kg-day)	CG	DERMAL RfD (mg/kg-day)	CG	1/(mg/kg-day)	CG
Aldrin	ND	N/A	3.00E-05	1000	1.70E+01	B2	1.70E+01	B2	3.00E-08		1.70E+00	B2
PCB - 1242	ND	N/A	ND	N/A	ND	B2	7.70E+00	B2	NR		6.93E+00	B2
PCB - 1254	ND	N/A	ND	N/A	ND	B2	7.70E+00	B2	NR		6.93E+00	B2
PCB - 1260	ND	N/A	ND	N/A	ND	B2	7.70E+00	B2	NR		6.93E+00	B2
PCB - 1248	ND	N/A	ND	N/A	ND	B2	7.70E+00	B2	NR		6.93E+00	B2
4,4'-DDD	ND	N/A	ND	N/A	ND	B2	2.40E-01	B2	NR		2.16E-01	B2
gamma-Chlordane	ND	N/A	6.00E-05	1000	ND	N/A	ND	N/A	3.00E-05		NR	N/A

RfD - Reference Dose
CSF - Carcinogenic Slope Factor
UF - Uncertainty Factor
N/A - Not Applicable
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CG - EPA Carcinogen Group
A - Human Carcinogen
B1 - Probable Human Carcinogen
B2 - Possible Human Carcinogen
C - Possible Human Carcinogen
D - Not Classified

$$S_{ij} = \frac{R_{ij}}{R_j}$$

- S_{ij} = carcinogenic or noncarcinogenic indicator score for contaminant i in medium j
- R_{ij} = risk factor for contaminant i in medium j
- R_j = total carcinogenic or noncarcinogenic risk factor for medium j

The indicator score approximates the relative carcinogenic or noncarcinogenic risk of a given contaminant for exposure to a given medium. Finally, a total indicator chemical score is calculated for each contaminant as the sum of the carcinogenic and noncarcinogenic indicator chemical scores.

It must be noted that EPA (1990) has recently classified lead as a "probable human carcinogen." However, EPA has not developed carcinogenic toxicity factors for lead. Accordingly, lead will be evaluated for noncarcinogenic effects in this assessment.

In addition, it must be noted that quantitative risk assessment is not feasible for several of the contaminants detected at the Booth Oil Site due to the lack of toxicological data accepted by EPA for these compounds. EPA has determined that

insufficient data has been collected to produce toxicity factors for 2-hexanone, acenaphthylene, 2-methylnaphthalene, phenanthrene, aluminum, calcium, cobalt, copper, iron, magnesium, potassium, selenium, and sodium (EPA, 1990). Therefore, quantitative risk assessment cannot be performed for these compounds. Table 3-2 presents a summary the mean concentrations of these compounds detected in each medium at the Booth Oil Site. The uncertainties associated with omission of these compounds from the risk assessment process is discussed in Section 6.0 of this report.

Compounds with relatively low indicator chemical scores are generally excluded from the quantitative risk assessment, as their contribution to the total health risk from the site is expected to be low (EPA, 1989c). Based upon the distribution of indicator chemical scores calculated for the contaminant at the Booth Oil Site, a minimum score of $1.0\text{E-}04$ is selected to identify the indicator chemicals for this assessment. Contaminants with indicator chemical scores less than $1.00\text{E-}04$ will not be included in the quantitative risk assessment for the Booth Oil Site. However, as noted earlier, all compounds detected in the Phase I RI will be retained in the quantitative evaluation in this Preliminary Baseline Human Health Risk Assessment. In this manner, the indicator chemical selection process may be confirmed for the Final Baseline Human Health Risk Assessment.

BOS2REPa/bos-t2
February 26, 1991

Table 3-2
Compounds Without EPA Reference Doses or Slope Factors

	SURFICIAL SOIL						SUBSURFACE SOIL				CATCH BASIN	
	Area A Arith Mean (mg/kg)	Area B Arith Mean (mg/kg)	Area C Arith Mean (mg/kg)	Area D Arith Mean (mg/kg)	Playground Arith Mean (mg/kg)		Area A Arith Mean (mg/kg)	Area B Arith Mean (mg/kg)	Area C Arith Mean (mg/kg)	Area D Arith Mean (mg/kg)	Catch Basin Sediment (mg/kg)	Catch Basin Surface Water (mg/l)
VOLATILES												
2-Hexanone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.09E+00	N/A
SEMI-VOLATILES												
Acenaphthylene	1.70E+00	1.67E+01	1.41E+00	1.40E-01	4.67E-01		N/A	N/A	N/A	N/A	N/A	N/A
2-Methylnaphthalene	6.77E+00	4.15E+00	1.10E+00	1.20E-01	2.09E-01		3.31E+01	1.72E+01	3.56E+00	1.67E+02	5.20E+00	N/A
Phenanthrene	3.43E+00	2.48E+00	1.70E+00	6.20E-01	2.32E+00		1.17E+01	2.02E+00	3.05E+00	6.40E+01	6.10E+00	N/A
INORGANICS												
Aluminum	1.12E+04	3.40E+04	1.33E+04	1.54E+04	1.71E+04		1.40E+04	1.98E+04	2.34E+04	1.23E+03	8.76E+03	4.43E-01
Calcium	1.11E+05	2.09E+05	7.33E+04	2.58E+04	1.46E+04		6.28E+04	1.24E+05	8.31E+04	9.07E+04	1.26E+05	1.27E+02
Cobalt	6.96E+00	1.33E+01	8.10E+00	1.54E+01	1.02E+01		1.12E+01	1.28E+01	1.55E+01	1.19E+01	3.80E+00	N/A
Copper	8.44E+01	6.35E+02	7.39E+01	8.99E+01	7.46E+01		1.07E+02	2.93E+01	1.24E+02	1.38E+03	7.69E+01	3.90E-02
Iron	2.86E+04	5.14E+04	2.38E+04	5.65E+04	3.55E+04		4.96E+04	2.87E+04	3.40E+04	3.33E+04	1.81E+04	2.95E+00
Magnesium	5.71E+04	6.55E+04	2.53E+04	1.24E+04	8.51E+03		2.68E+04	5.18E+04	3.67E+04	5.04E+04	3.33E+04	2.90E+01
Potassium	1.82E+03	2.55E+03	1.99E+03	2.42E+03	2.54E+03		1.99E+03	4.85E+03	5.41E+03	3.82E+03	1.30E+03	6.56E+00
Selenium	1.60E+00	2.18E+00	6.70E-01	1.50E+00	1.58E+00		1.68E+00	4.15E-01	1.39E+00	4.62E-01	9.10E-01	N/A
Sodium	4.79E+02	1.58E+03	3.01E+02	2.86E+02	2.81E+02		4.76E+02	6.88E+02	7.69E+02	1.76E+03	1.35E+03	2.93E+02

In addition, as discussed below, the concentrations of a number of the contaminants with calculated indicator scores above $1.00\text{E}-04$ are proxy concentrations estimated from the sample detection limits. These contaminants will be retained in the quantitative risk assessment. However, due to the conservative nature of the proxy concentrations, the significance of these compounds (i.e., the indicator scores) and subsequently, the risks calculated for these compounds may be overestimated.

3.3 Indicator Chemicals

The indicator chemical lists are divided according to individual media and locations of sampling, as follows:

Table 3-3	Surficial Soil - Area A
Table 3-4	Surficial Soil - Area B
Table 3-5	Surficial Soil - Area C
Table 3-6	Surficial Soil - Area D
Table 3-7	Surficial Soil - Entire Site
Table 3-8	Surficial Soil - Playground
Table 3-10	Subsurface Soil - Area A.
Table 3-11	Subsurface Soil - Area B
Table 3-12	Subsurface Soil - Area C

BOS2REPa/bos-t2
February 26, 1991

Table 3-13	Subsurface Soil - Area D
Table 3-14	Subsurface Soil - Entire Site
Table 3-16	Catch Basin Sediment
Table 3-18	Catch Basin Surface Water

It must be noted that indicator chemicals are not identified herein for groundwater or the underground pipe samples, as these media are not quantitatively assessed herein.

3.3.1 Surficial soil

Table 3-3 presents the indicator chemical scores calculated for the contaminants detected in the surficial soil samples collected in Area A. The following organic contaminants have indicator scores greater than $1.00\text{E-}04$ for surficial soil in Area A: benzo(a)anthracene ($1.40\text{E-}02$), benzo(b)fluoranthene ($1.43\text{E-}02$), benzo(k)fluoranthene ($1.52\text{E-}02$), benzo(a)pyrene ($1.42\text{E-}02$), chrysene ($1.22\text{E-}02$), dibenzo(ah)anthracene ($1.52\text{E-}02$), indeno(1,2,3-cd)pyrene ($1.52\text{E-}02$), PCB-1242 ($3.37\text{E-}03$), PCB-1254 ($9.44\text{E-}02$), PCB-1260 ($7.29\text{E-}02$), and PCB-1248 ($1.09\text{E-}01$). In addition, the following inorganic contaminants in Area A surficial soil have indicator scores greater than $1.00\text{E-}04$: arsenic ($6.00\text{E-}01$), beryllium ($8.27\text{E-}03$), cadmium ($4.50\text{E-}03$), lead (1.00), and nickel ($7.36\text{E-}03$). Of these contaminants, lead, arsenic and PCB-

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-3
Indicator Chemical Scores
Surficial Soil Area A

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	1.55E-05	1.55E-05
Carbon Disulfide	3.21E-10	0.00E+00	3.21E-10
1,1-Dichloroethane	1.53E-10	0.00E+00	1.53E-10
1,2-Dichloroethene (total)	2.35E-10	0.00E+00	2.35E-10
Ethylbenzene	5.30E-10	0.00E+00	5.30E-10
Tetrachloroethene	4.11E-10	1.14E-05	1.14E-05
Toluene	3.63E-11	0.00E+00	3.63E-11
Trichloroethene	0.00E+00	9.20E-06	9.20E-06
Xylene (total)	4.32E-10	0.00E+00	4.32E-10
SEMI-VOLATILES			
Acenaphthene	1.55E-09	0.00E+00	1.55E-09
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.83E-10	0.00E+00	2.83E-10
Benzo(a)anthracene	0.00E+00	1.40E-02	1.40E-02
Benzo(b)fluoranthene	0.00E+00	1.43E-02	1.43E-02
Benzo(k)fluoranthene	0.00E+00	1.52E-02	1.52E-02
Benzoic acid	6.01E-11	0.00E+00	6.01E-11
Benzo(a)pyrene	0.00E+00	1.42E-02	1.42E-02
Butylbenzylphthalate	1.02E-11	0.00E+00	1.02E-11
Chrysene	0.00E+00	1.22E-02	1.22E-02
Dibenzo(a,h)anthracene	0.00E+00	1.52E-02	1.52E-02
2,4-Dimethylphenol	2.16E-09	0.00E+00	2.16E-09
bis(2-Ethylhexyl)phthalate	2.91E-09	3.30E-05	3.30E-05
Fluoranthene	3.38E-09	0.00E+00	3.38E-09
Fluorene	2.16E-09	0.00E+00	2.16E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	1.52E-02	1.52E-02
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
2-Methylphenol	8.51E-10	0.00E+00	8.51E-10
4-Methylphenol	8.48E-10	0.00E+00	8.48E-10
Naphthalene	1.93E-08	0.00E+00	1.93E-08
Di-n-octylphthalate	2.18E-09	0.00E+00	2.18E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Phenol	6.14E-10	0.00E+00	6.14E-10
Pyrene	3.59E-09	0.00E+00	3.59E-09

Table No. 3-3 (cont.)
Indicator Chemical Scores
Surficial Soil Area A

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	2.94E-06	0.00E+00	2.94E-06
Arsenic	9.63E-07	6.00E-01	6.00E-01
Barium	1.70E-05	0.00E+00	1.70E-05
Beryllium	2.43E-07	8.27E-03	8.27E-03
Cadmium	2.42E-07	4.50E-03	4.50E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	4.86E-08	0.00E+00	4.86E-08
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	3.04E-05	0.00E+00	3.04E-05
Mercury	8.81E-08	0.00E+00	8.81E-08
Nickel	2.79E-07	7.36E-03	7.36E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	1.47E-08	0.00E+00	1.47E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	1.24E-07	0.00E+00	1.24E-07
Vanadium	1.39E-06	0.00E+00	1.39E-06
Zinc	7.33E-08	0.00E+00	7.33E-08
Cyanide	1.11E-08	0.00E+00	1.11E-08
PESTICIDES/PCBs			
PCB-1242	0.00E+00	3.37E-03	3.37E-03
PCB-1254	0.00E+00	9.44E-02	9.44E-02
PCB-1260	0.00E+00	7.29E-02	7.29E-02
PCB-1248	0.00E+00	1.09E-01	1.09E-01

1248 have the highest indicator scores, indicating that these compounds will contribute most significantly to the risks due to exposure to surficial soil in Area A.

Table 3-4 lists the carcinogenic, noncarcinogenic and total indicator chemical scores calculated for the contaminant detected in the surficial soil of Area B. A number of carcinogenic polycyclic aromatic hydrocarbons (CaPAHs), PCBs and inorganic contaminants in Area B surficial soil have indicator scores greater than $1.00\text{E}-04$. Specifically, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenzo(ah)anthracene and indeno(1,2,3-cd)pyrene all have indicator scores of $6.60\text{E}-02$. In addition, bis(2-ethylhexyl)phthalate ($2.18\text{E}-04$), arsenic ($1.38\text{E}-01$), beryllium ($1.59\text{E}-02$), cadmium ($1.13\text{E}-02$), lead (1.00), nickel ($7.64\text{E}-03$), PCB-1242 ($4.80\text{E}-02$), PCB-1254 ($1.11\text{E}-01$), PCB-1260 ($1.06\text{E}-01$), and PCB-1248 ($9.99\text{E}-02$) all have indicator scores greater than $1.00\text{E}-04$.

With the exception of arsenic, lead, PCB-1242 and PCB-1248, the indicator chemical scores calculated for Area B are greater than those calculated for Area A. However, review of Table 2-2 indicates that the elevated contaminant levels shown for the CaPAHs in Area B are due to proxy concentrations estimated from the sample

Table No. 3-4
Indicator Chemical Scores
Surficial Soil Area B

	Non Carc. Chem Score	Carc. Chem Score	Total Chem Score
VOLATILES			
Benzene	0.00E+00	7.35E-06	7.35E-06
Carbon Disulfide	4.26E-10	0.00E+00	4.26E-10
1,1-Dichloroethane	2.34E-11	0.00E+00	2.34E-11
1,2-Dichloroethene (total)	2.70E-10	0.00E+00	2.70E-10
Ethylbenzene	1.29E-10	0.00E+00	1.29E-10
Tetrachloroethene	1.40E-09	4.74E-05	4.74E-05
Toluene	1.25E-11	0.00E+00	1.25E-11
Trichloroethene	0.00E+00	2.72E-05	2.72E-05
Xylene (total)	5.14E-12	0.00E+00	5.14E-12
SEMI-VOLATILES			
Acenaphthene	5.06E-09	0.00E+00	5.06E-09
Acenaphthylene	0.00E+00	0.00E+(X)	0.00E+(X)
Anthracene	1.01E-09	0.00E+00	1.01E-09
Benzo(a)anthracene	0.00E+00	6.60E-02	6.60E-02
Benzo(b)fluoranthene	0.00E+00	6.60E-02	6.60E-02
Benzo(k)fluoranthene	0.00E+00	6.60E-02	6.60E-02
Benzoic acid	2.15E-10	0.00E+00	2.15E-10
Benzo(a)pyrene	0.00E+00	6.60E-02	6.60E-02
Butylbenzylphthalate	7.58E-11	0.00E+00	7.58E-11
Chrysene	0.00E+00	6.60E-02	6.60E-02
Dibenzo(a,h)anthracene	0.00E+00	6.60E-02	6.60E-02
2,4-Dimethylphenol	3.51E-08	0.00E+00	3.51E-08
bis(2-Ethylhexyl)phthalate	1.58E-08	2.18E-04	2.18E-04
Fluoranthene	7.58E-09	0.00E+00	7.58E-09
Fluorene	7.58E-09	0.00E+00	7.58E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	6.60E-02	6.60E-02
2-Methylnaphthalene	0.00E+00	0.00E+(X)	0.00E+(X)
2-Methylphenol	1.03E-08	0.00E+00	1.03E-08
4-Methylphenol	7.74E-08	0.00E+00	7.74E-08
Naphthalene	7.68E-08	0.00E+(X)	7.68E-08
Di-n-octylphthalate	7.46E-09	0.00E+00	7.46E-09
Phenanthrene	0.00E+00	0.00E+(X)	0.00E+(X)
Phenol	3.27E-08	0.00E+(X)	3.27E-08
Pyrene	9.93E-09	0.00E+(X)	9.93E-09

Table No. 3-4 (cont.)
Indicator Chemical Scores
Surficial Soil Area B

	Non Carc. Chem Score	Carc. Chem Score	Total Chem Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	2.94E-05	0.00E+00	2.94E-05
Arsenic	1.82E-07	1.38E-01	1.38E-01
Barium	9.37E-05	0.00E+00	9.37E-05
Beryllium	3.84E-07	1.59E-02	1.59E-02
Cadmium	4.98E-07	1.13E-02	1.13E-02
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.32E-07	0.00E+00	1.32E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	3.29E-05	0.00E+00	3.29E-05
Mercury	1.93E-08	0.00E+00	1.93E-08
Nickel	2.38E-07	7.64E-03	7.64E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	5.44E-09	0.00E+00	5.44E-09
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	6.05E-08	0.00E+00	6.05E-08
Vanadium	6.35E-07	0.00E+00	6.35E-07
Zinc	1.03E-07	0.00E+00	1.03E-07
Cyanide	2.81E-09	0.00E+00	2.81E-09
PESTICIDES/PCBs			
PCB-1242	0.00E+00	4.80E-02	4.80E-02
PCB-1254	0.00E+00	1.11E-01	1.11E-01
PCB-1260	0.00E+00	1.06E-01	1.06E-01
PCB-1248	0.00E+00	9.99E-02	9.99E-02

detection limits. Lead, arsenic, PCB-1254 and PCB-1260 have the highest indicator scores of the contaminants detected in the surficial soil in Area B. Accordingly, these contaminants are expected to contribute most significantly to the health risks due to exposure to surficial soil in Area B.

The indicator chemical scores calculated for contaminants detected in the surficial soil of Area C are listed in Table 3-5. As in Areas A and B, a number of CaPAHs have indicator chemical scores greater than $1.00\text{E-}04$. Specifically, the indicator chemical scores for benzo(a)anthracene ($1.03\text{E-}02$), benzo(b)fluoranthene ($1.32\text{E-}02$), benzo(k)fluoranthene ($5.96\text{E-}03$), benzo(a)pyrene ($1.03\text{E-}02$), chrysene ($8.09\text{E-}03$), dibenzo(ah)anthracene ($1.03\text{E-}02$), and indeno(1,2,3-cd)pyrene ($1.03\text{E-}02$) exceed $1.00\text{E-}04$ for surficial soil in Area C.

The following contaminants also result in indicator chemical scores greater than $1.00\text{E-}04$ for Area C: arsenic ($3.92\text{E-}01$), beryllium ($4.57\text{E-}03$), cadmium ($5.41\text{E-}03$), lead (1.00), nickel ($6.96\text{E-}03$), PCB-1242 ($7.86\text{E-}03$), PCB-1254 ($3.01\text{E-}01$), PCB-1260 ($3.37\text{E-}02$), and PCB-1248 ($1.80\text{E-}01$). As in Areas A and B, lead, arsenic, and PCBs result in the highest indicator chemical scores for surficial soil in Area C. Accordingly, these compounds are

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-5
Indicator Chemical Scores
Surficial Soil Area C

	Non Carc. Chem Score	Carc. Chem Score	Total Chem Score
VOLATILES			
Benzene	0.00E+00	1.24E-07	1.24E-07
Carbon Disulfide	1.81E-11	0.00E+00	1.81E-11
1,1-Dichloroethane	5.97E-13	0.00E+00	5.97E-13
1,2-Dichloroethene (total)	9.71E-11	0.00E+00	9.71E-11
Ethylbenzene	6.57E-12	0.00E+00	6.57E-12
Tetrachloroethene	2.09E-11	3.99E-07	3.99E-07
Toluene	1.48E-12	0.00E+00	1.48E-12
Trichloroethene	0.00E+00	3.51E-07	3.51E-07
Xylene (total)	1.57E-12	0.00E+00	1.57E-12
SEMI-VOLATILES			
Acenaphthene	1.40E-09	0.00E+00	1.40E-09
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.80E-10	0.00E+00	2.80E-10
Benzo(a)anthracene	0.00E+00	1.03E-02	1.03E-02
Benzo(b)fluoranthene	0.00E+00	1.32E-02	1.32E-02
Benzo(k)fluoranthene	0.00E+00	5.96E-03	5.96E-03
Benzoic acid	5.94E-11	0.00E+00	5.94E-11
Benzo(a)pyrene	0.00E+00	1.03E-02	1.03E-02
Butylbenzylphthalate	2.10E-11	0.00E+00	2.10E-11
Chrysene	0.00E+00	8.09E-03	8.09E-03
Dibenzo(a,h)anthracene	0.00E+00	1.03E-02	1.03E-02
2,4-Dimethylphenol	1.12E-09	0.00E+00	1.12E-09
bis(2-Ethylhexyl)phthalate	9.52E-09	7.43E-05	7.43E-05
Fluoranthene	2.24E-09	0.00E+00	2.24E-09
Fluorene	2.10E-09	0.00E+00	2.10E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	1.03E-02	1.03E-02
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
2-Methylphenol	8.40E-10	0.00E+00	8.40E-10
4-Methylphenol	8.40E-10	0.00E+00	8.40E-10
Naphthalene	2.10E-08	0.00E+00	2.10E-08
Di-n-octylphthalate	2.10E-09	0.00E+00	2.10E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Phenol	6.07E-10	0.00E+00	6.07E-10
Pyrene	3.78E-09	0.00E+00	3.78E-09

Table No. 3-5 (cont.)
Indicator Chemical Scores
Surficial Soil Area C

	Non Carc. Chem Score	Carc. Chem Score	Total Chem Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	2.51E-06	0.00E+00	2.51E-06
Arsenic	9.15E-07	3.92E-01	3.92E-01
Barium	2.41E-05	0.00E+00	2.41E-05
Beryllium	1.95E-07	4.57E-03	4.57E-03
Cadmium	4.22E-07	5.41E-03	5.41E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	7.42E-08	0.00E+00	7.42E-08
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	2.85E-05	0.00E+00	2.85E-05
Mercury	8.51E-08	0.00E+00	8.51E-08
Nickel	3.83E-07	6.96E-03	6.96E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	1.59E-08	0.00E+00	1.59E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	1.19E-07	0.00E+00	1.19E-07
Vanadium	1.57E-06	0.00E+00	1.57E-06
Zinc	8.54E-08	0.00E+00	8.54E-08
Cyanide	8.06E-10	0.00E+00	8.06E-10
PESTICIDES/PCBS			
PCB-1242	0.00E+00	7.86E-03	7.86E-03
PCB-1254	0.00E+00	3.01E-01	3.01E-01
PCB-1260	0.00E+00	3.37E-02	3.37E-02
PCB-1248	0.00E+00	1.80E-01	1.80E-01

expected to contribute most significantly to the risks due to exposure to surficial soil in this area.

Table 3-6 presents the indicator chemical scores calculated for contaminants detected in the surficial soil in Area D. Review of the table indicates that, as in the previous areas of the site, a number of CaPAHs, inorganics and PCBs result in indicator scores greater than $1.00\text{E-}04$. Specifically, the following CaPAHs have indicator scores greater than $1.00\text{E-}04$ for surficial soil in Area D: benzo(a)anthracene ($1.92\text{E-}03$), benzo(b)fluoranthene ($7.09\text{E-}03$), benzo(k)fluoranthene ($1.92\text{E-}03$), benzo(a)pyrene ($4.68\text{E-}03$), chrysene ($5.67\text{E-}03$), dibenzo(ah)anthracene ($5.67\text{E-}04$), and indeno(1,2,3-cd)pyrene ($4.26\text{E-}03$).

The following inorganic contaminants detected in the surficial soil in Area D also have indicator scores greater than $1.00\text{E-}04$: arsenic ($9.59\text{E-}01$), beryllium ($3.00\text{E-}03$), cadmium ($4.20\text{E-}03$), lead (1.00), and nickel ($5.79\text{E-}03$). In addition, the following PCBs have indicator scores greater than $1.00\text{E-}04$ for Area D surficial soil: PCB-1242 ($3.41\text{E-}04$), PCB-1254 ($6.88\text{E-}04$), PCB-1260 ($6.88\text{E-}04$) and PCB-1248 ($3.41\text{E-}04$). As with the previous areas, lead, arsenic and PCBs have the highest calculated indicator scores of the contaminants detected in Area D.

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-6
Indicator Chemical Scores
Surficial Soil Area D

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	6.00E-08	6.00E-08
Carbon Disulfide	1.72E-11	0.00E+00	1.72E-11
1,1-Dichloroethane	9.48E-13	0.00E+00	9.48E-13
1,2-Dichloroethene (total)	7.11E-12	0.00E+00	7.11E-12
Ethylbenzene	5.21E-12	0.00E+00	5.21E-12
Tetrachloroethene	1.42E-11	1.10E-07	1.10E-07
Toluene	5.04E-13	0.00E+00	5.04E-13
Trichloroethene	0.00E+00	3.56E-08	3.56E-08
Xylene (total)	2.08E-13	0.00E+00	2.08E-13
SEMI-VOLATILES			
Acenaphthene	6.41E-10	0.00E+00	6.41E-10
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00
Anthracene	2.75E-11	0.00E+00	2.75E-11
Benzo(a)anthracene	0.00E+00	1.92E-03	1.92E-03
Benzo(b)fluoranthene	0.00E+00	7.09E-03	7.09E-03
Benzo(k)fluoranthene	0.00E+00	1.92E-03	1.92E-03
Benzoic acid	2.76E-12	0.00E+00	2.76E-12
Benzo(a)pyrene	0.00E+00	4.68E-03	4.68E-03
Butylbenzylphthalate	9.62E-12	0.00E+00	9.62E-12
Chrysene	0.00E+00	5.67E-03	5.67E-03
Dibenzo(a,h)anthracene	0.00E+00	5.67E-04	5.67E-04
2,4-Dimethylphenol	9.62E-10	0.00E+00	9.62E-10
bis(2-Ethylhexyl)phthalate	6.08E-09	1.92E-05	1.92E-05
Fluoranthene	5.21E-09	0.00E+00	5.21E-09
Fluorene	9.62E-10	0.00E+00	9.62E-10
Indeno(1,2,3-cd)pyrene	0.00E+00	4.26E-03	4.26E-03
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
2-Methylphenol	3.85E-10	0.00E+00	3.85E-10
4-Methylphenol	3.85E-10	0.00E+00	3.85E-10
Naphthalene	1.61E-09	0.00E+00	1.61E-09
Di-n-octylphthalate	9.62E-10	0.00E+00	9.62E-10
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Phenol	2.78E-10	0.00E+00	2.78E-10
Pyrene	4.11E-09	0.00E+00	4.11E-09

Table No. 3-6 (cont.)
Indicator Chemical Scores
Surficial Soil Area D

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	3.48E-06	0.00E+00	3.48E-06
Arsenic	5.52E-06	9.59E-01	9.59E-01
Barium	4.54E-05	0.00E+00	4.54E-05
Beryllium	3.16E-07	3.00E-03	3.00E-03
Cadmium	8.09E-07	4.20E-03	4.20E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.24E-07	0.00E+00	1.24E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	4.55E-05	0.00E+00	4.55E-05
Mercury	1.82E-07	0.00E+00	1.82E-07
Nickel	7.86E-07	5.79E-03	5.79E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	2.82E-08	0.00E+00	2.82E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	2.80E-07	0.00E+00	2.80E-07
Vanadium	5.25E-06	0.00E+00	5.25E-06
Zinc	3.71E-07	0.00E+00	3.71E-07
Cyanide	1.78E-09	0.00E+00	1.78E-09
PESTICIDES/PCBS			
PCB-1242	0.00E+00	3.41E-04	3.41E-04
PCB-1254	0.00E+00	6.88E-04	6.88E-04
PCB-1260	0.00E+00	6.88E-04	6.88E-04
PCB-1248	0.00E+00	3.41E-04	3.41E-04

Table No. 3-7
Indicator Chemical Scores
Surficial Soil Entire Site

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	5.30E-06	5.30E-06
Carbon Disulfide	3.29E-10	0.00E+00	3.29E-10
1,1-Dichloroethane	4.54E-11	0.00E+00	4.54E-11
1,2-Dichloroethene (total)	2.13E-10	0.00E+00	2.13E-10
Ethylbenzene	1.74E-10	0.00E+00	1.74E-10
Tetrachloroethene	1.04E-09	2.48E-05	2.48E-05
Toluene	1.36E-11	0.00E+00	1.36E-11
Trichloroethene	0.00E+00	1.43E-05	1.43E-05
Xylene (total)	1.16E-10	0.00E+00	1.16E-10
SEMI-VOLATILES			
Acenaphthene	3.94E-09	0.00E+00	3.94E-09
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00
Anthracene	7.86E-10	0.00E+00	7.86E-10
Benzo(a)anthracene	0.00E+00	3.63E-02	3.63E-02
Benzo(b)fluoranthene	0.00E+00	3.66E-02	3.66E-02
Benzo(k)fluoranthene	0.00E+00	3.60E-02	3.60E-02
Benzoic acid	1.67E-10	0.00E+00	1.67E-10
Benzo(a)pyrene	0.00E+00	3.63E-02	3.63E-02
Butylbenzylphthalate	5.87E-11	0.00E+00	5.87E-11
Chrysene	0.00E+00	3.62E-02	3.62E-02
Dibenzo(a,h)anthracene	0.00E+00	3.61E-02	3.61E-02
2,4-Dimethylphenol	2.65E-08	0.00E+00	2.65E-08
bis(2-Ethylhexyl)phthalate	1.28E-08	1.24E-04	1.24E-04
Fluoranthene	6.03E-09	0.00E+00	6.03E-09
Fluorene	5.90E-09	0.00E+00	5.90E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	3.62E-02	3.62E-02
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
2-Methylphenol	7.67E-09	0.00E+00	7.67E-09
4-Methylphenol	5.71E-08	0.00E+00	5.71E-08
Naphthalene	5.87E-08	0.00E+00	5.87E-08
Di-n-octylphthalate	6.01E-09	0.00E+00	6.01E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Phenol	2.40E-08	0.00E+00	2.40E-08
Pyrene	8.10E-09	0.00E+00	8.10E-09

Table No. 3-7 (cont.)
Indicator Chemical Scores
Surficial Soil Entire Site

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	2.19E-05	0.00E+00	2.19E-05
Arsenic	1.04E-06	5.53E-01	5.53E-01
Barium	7.30E-05	0.00E+00	7.30E-05
Beryllium	3.34E-07	9.72E-03	9.73E-03
Cadmium	4.20E-07	6.70E-03	6.70E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.10E-07	0.00E+00	1.10E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	3.00E-05	0.00E+00	3.00E-05
Mercury	4.26E-08	0.00E+00	4.26E-08
Nickel	2.39E-07	5.41E-03	5.41E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	6.95E-09	0.00E+00	6.95E-09
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	7.19E-08	0.00E+00	7.19E-08
Vanadium	1.09E-06	0.00E+00	1.09E-06
Zinc	1.03E-07	0.00E+00	1.03E-07
Cyanide	3.83E-09	0.00E+00	3.83E-09
PESTICIDES/PCBs			
PCB-1242	0.00E+00	1.24E-02	1.24E-02
PCB-1254	0.00E+00	6.87E-02	6.87E-02
PCB-1260	0.00E+00	3.78E-02	3.78E-02
PCB-1248	0.00E+00	5.25E-02	5.25E-02

Table No. 3-8
Indicator Chemical Scores
Surficial Soil Playground

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	3.69E-07	3.69E-07
Carbon Disulfide	9.09E-11	0.00E+00	9.09E-11
1,1-Dichloroethane	5.00E-12	0.00E+00	5.00E-12
1,2-Dichloroethene (total)	3.75E-11	0.00E+00	3.75E-11
Ethylbenzene	2.75E-11	0.00E+00	2.75E-11
Tetrachloroethene	7.51E-11	6.76E-07	6.76E-07
Toluene	2.66E-12	0.00E+00	2.66E-12
Trichloroethene	0.00E+00	2.19E-07	2.19E-07
Xylene (total)	1.10E-12	0.00E+00	1.10E-12
SEMI-VOLATILES			
Acenaphthene	2.54E-09	0.00E+00	2.54E-09
Acenaphthylene	0.00E+00	0.00E+00	0.00E+00
Anthracene	5.00E-10	0.00E+00	5.00E-10
Benzo(a)anthracene	0.00E+00	1.32E-02	1.32E-02
Benzo(b)fluoranthene	0.00E+00	1.53E-02	1.53E-02
Benzo(k)fluoranthene	0.00E+00	1.53E-02	1.53E-02
Benzoic acid	6.12E-12	0.00E+00	6.12E-12
Benzo(a)pyrene	0.00E+00	1.37E-02	1.37E-02
Butylbenzylphthalate	3.30E-11	0.00E+00	3.30E-11
Chrysene	0.00E+00	2.01E-02	2.01E-02
Dibenzo(a,h)anthracene	0.00E+00	8.58E-03	8.58E-03
2,4-Dimethylphenol	3.30E-09	0.00E+00	3.30E-09
bis(2-Ethylhexyl)phthalate	2.56E-09	9.44E-06	9.44E-06
Fluoranthene	1.82E-08	0.00E+00	1.82E-08
Fluorene	3.62E-09	0.00E+00	3.62E-09
Indeno(1,2,3-cd)pyrene	0.00E+00	1.29E-02	1.29E-02
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
2-Methylphenol	1.32E-09	0.00E+00	1.32E-09
4-Methylphenol	1.32E-09	0.00E+00	1.32E-09
Naphthalene	8.72E-09	0.00E+00	8.72E-09
Di-n-octylphthalate	3.30E-09	0.00E+00	3.30E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Phenol	9.53E-10	0.00E+00	9.53E-10
Pyrene	1.71E-08	0.00E+00	1.71E-08

Table No. 3-8 (cont.)
Indicator Chemical Scores
Surficial Soil Playground

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	1.22E-05	0.00E+00	1.22E-05
Arsenic	4.19E-06	8.46E-01	8.46E-01
Barium	7.45E-05	0.00E+00	7.45E-05
Beryllium	1.24E-06	1.37E-02	1.37E-02
Cadmium	9.24E-07	5.59E-03	5.59E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	3.58E-07	0.00E+00	3.58E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.00E+00	0.00E+00	1.00E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	1.57E-04	0.00E+00	1.57E-04
Mercury	2.38E-07	0.00E+00	2.38E-07
Nickel	2.61E-06	2.24E-02	2.24E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	9.94E-08	0.00E+00	9.94E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	8.38E-07	0.00E+00	8.38E-07
Vanadium	1.52E-05	0.00E+00	1.52E-05
Zinc	3.89E-07	0.00E+00	3.89E-07
Cyanide	5.20E-09	0.00E+00	5.20E-09
PESTICIDES/PCBs			
PCB-1242	0.00E+00	2.11E-03	2.11E-03
PCB-1254	0.00E+00	4.33E-03	4.33E-03
PCB-1260	0.00E+00	4.33E-03	4.33E-03
PCB-1248	0.00E+00	2.11E-03	2.11E-03

contaminants identified as indicator chemicals for surficial soil on-site also result in indicator scores greater than $1.00\text{E-}04$ for the playground area. Specifically, the contaminants with indicator chemical scores greater than $1.00\text{E-}04$ in the playground are: benzo(a)anthracene ($1.32\text{E-}02$), benzo(b)fluoranthene ($1.53\text{E-}02$), benzo(k)fluoranthene ($1.53\text{E-}02$), benzo(a)pyrene ($1.37\text{E-}02$), chrysene ($2.01\text{E-}02$), dibenzo(ah)anthracene ($8.58\text{E-}03$), indeno(1,2,3-cd)pyrene ($1.29\text{E-}02$), arsenic ($8.46\text{E-}01$), beryllium ($1.37\text{E-}02$), cadmium ($5.59\text{E-}03$), lead (1.00), manganese ($1.57\text{E-}04$), nickel ($2.24\text{E-}02$), PCB-1242 ($2.11\text{E-}03$), PCB-1254 ($4.33\text{E-}03$), PCB-1260 ($4.33\text{E-}03$), and PCB-1248 ($2.11\text{E-}03$). Of these compounds, manganese was not identified as an indicator chemical for the on-site surficial soil samples collected during the Phase I RI.

Table 3-9 presents a summary of the compounds detected in the surficial soil at the Booth Oil Site which result in indicator chemicals scores greater than $1.00\text{E-}04$. The table also lists those compounds for which the mean contaminant concentrations encountered at the site exceed the preliminary cleanup guidelines. Although a number of these compounds do not result in elevated indicator scores as a result of toxicity, they will, however, be included in the quantitative health risk assessment. Inclusion of these compounds in the health risk assessment will facilitate development of alternate cleanup levels which may be considered with the

BOS2REPa/bos-t2
February 26, 1991

Table 3-9
Indicator Chemicals
Surficial Soil

icsum/bos

	Exceeds Standards	High Indicator Score
SURFICIAL SOIL	1,1-Dichloroethane Tetrachloroethene Trichloroethene Xylene	
	Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzoic Acid Chrysene 2,4-Dimethylphenol Indeno(1,2,3-cd)pyrene Naphthalene Phenol Arsenic Cadmium Chromium Copper Lead Zinc PCB's	Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Chrysene Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene Bis(2-ethylhexyl)phthalate Arsenic Beryllium Cadmium Lead Nickel PCB's

preliminary cleanup guidelines in the selection of remedial alternatives.

3.3.2 Subsurface soil

Table 3-10 presents the indicator scores calculated for contaminants detected in the subsurface soil in Area A. With the exception of aldrin and 1,1-dichloroethane, many of the contaminants listed in the table with indicator scores greater than $1.00\text{E-}04$ also resulted in elevated scores for surficial soil in Area A. The compounds with indicator scores greater than $1.00\text{E-}04$ for subsurface soil in Area A are: 1,1-dichloroethane ($5.52\text{E-}04$), benzo(a)anthracene ($1.07\text{E-}02$), benzo(b)fluoranthene ($2.00\text{E-}02$), benzo(k)fluoranthene ($1.25\text{E-}02$), chrysene ($1.70\text{E-}02$), arsenic ($7.56\text{E-}01$), beryllium ($4.78\text{E-}03$), cadmium ($3.34\text{E-}03$), lead (1.00), nickel ($8.35\text{E-}03$), aldrin ($3.67\text{E-}04$), PCB-1242 ($1.14\text{E-}01$), PCB-1254 ($2.82\text{E-}03$), PCB-1260 ($2.26\text{E-}02$), and PCB-1248 ($2.75\text{E-}02$). The highest indicator scores calculated for compounds detected in the subsurface soil in Area A are for lead, arsenic and PCB-1242. Accordingly, these compounds are expected to contribute most significantly to the risks due to exposures to this medium.

The indicator scores calculated for contaminants detected in the subsurface soil in Area B are listed in Table 3-11. The table

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-10
Indicator Chemical Scores
Subsurface Soil Area A

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	1.55E-05	1.55E-05
Carbon Disulfide	4.42E-09	0.00E+00	4.42E-09
1,1-Dichloroethane	3.85E-10	0.00E+00	3.85E-10
1,1-Dichloroethene	4.29E-09	5.52E-04	5.52E-04
1,2-Dichloroethene (total)	2.62E-09	0.00E+00	2.62E-09
Ethylbenzene	1.15E-08	0.00E+00	1.15E-08
Tetrachloroethene	3.85E-09	2.83E-05	2.83E-05
Toluene	1.37E-10	0.00E+00	1.37E-10
Trichloroethene	0.00E+00	7.20E-06	7.20E-06
1,1,1-Trichloroethane	4.71E-10	0.00E+00	4.71E-10
Xylene (total)	2.97E-09	0.00E+00	2.97E-09
SEMIVOLATILES			
Acenaphthene	1.96E-09	0.00E+00	1.96E-09
Anthracene	3.74E-10	0.00E+00	3.74E-10
Benzo(a)anthracene	0.00E+00	1.07E-02	1.07E-02
Benzo(b)fluoranthene	0.00E+00	2.00E-02	2.00E-02
Benzo(k)fluoranthene	0.00E+00	1.25E-02	1.25E-02
Butylbenzylphthalate	2.95E-11	0.00E+00	2.95E-11
Chrysene	0.00E+00	1.70E-02	1.70E-02
1,2-Dichlorobenzene	1.15E-09	0.00E+00	1.15E-09
1,4-Dichlorobenzene	9.82E-11	9.43E-06	9.43E-06
Fluoranthene	1.38E-08	0.00E+00	1.38E-08
Fluorene	1.52E-08	0.00E+00	1.52E-08
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	2.74E-09	0.00E+00	2.74E-09
Naphthalene	3.07E-07	0.00E+00	3.07E-07
N-Nitrosodiphenylamine (1)	0.00E+00	4.12E-06	4.12E-06
Di-n-octylphthalate	2.80E-09	0.00E+00	2.80E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	2.70E-08	0.00E+00	2.70E-08
1,2,4-Trichlorobenzene	9.49E-09	0.00E+00	9.49E-09

Table No. 3-10 (cont.)
Indicator Chemical Scores
Subsurface Soil Area A

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	5.48E-06	0.00E+00	5.48E-06
Arsenic	4.58E-06	7.56E-01	7.56E-01
Barium	3.56E-05	0.00E+00	3.56E-05
Beryllium	5.30E-07	4.78E-03	4.78E-03
Cadmium	6.78E-07	3.34E-03	3.34E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	2.98E-07	0.00E+00	2.98E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	7.05E-05	0.00E+00	7.05E-05
Mercury	1.75E-07	0.00E+00	1.75E-07
Nickel	1.19E-06	8.35E-03	8.35E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	4.41E-08	0.00E+00	4.41E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	5.12E-07	0.00E+00	5.12E-07
Vanadium	5.02E-06	0.00E+00	5.02E-06
Zinc	1.70E-07	0.00E+00	1.70E-07
Cyanide	1.40E-08	0.00E+00	1.40E-08
PESTICIDES/PCBS			
Aldrin	2.63E-07	3.66E-04	3.67E-04
PCB - 1242	0.00E+00	1.14E-01	1.14E-01
PCB - 1254	0.00E+00	2.82E-03	2.82E-03
PCB - 1260	0.00E+00	2.26E-02	2.26E-02
PCB - 1248	0.00E+00	2.75E-02	2.75E-02
4,4'-DDD	0.00E+00	9.54E-06	9.54E-06

Table No. 3-11
Indicator Chemical Scores
Subsurface Soil Area B

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	8.74E-05	8.74E-05
Carbon Disulfide	8.62E-09	0.00E+00	8.62E-09
1,1-Dichloroethane	7.55E-10	0.00E+00	7.55E-10
1,1-Dichloroethene	8.36E-09	3.10E-03	3.10E-03
1,2-Dichloroethene (total)	6.98E-08	0.00E+00	6.98E-08
Ethylbenzene	4.26E-08	0.00E+00	4.26E-08
Tetrachloroethene	2.89E-08	6.11E-04	6.11E-04
Toluene	4.57E-09	0.00E+00	4.57E-09
Trichloroethene	0.00E+00	5.17E-05	5.17E-05
1,1,1-Trichloroethane	2.43E-09	0.00E+00	2.43E-09
Xylene (total)	9.38E-09	0.00E+00	9.38E-09
SEMIVOLATILES			
Acenaphthene	4.16E-09	0.00E+00	4.16E-09
Anthracene	8.32E-10	0.00E+00	8.32E-10
Benzo(a)anthracene	0.00E+00	3.41E-02	3.41E-02
Benzo(b)fluoranthene	0.00E+00	3.41E-02	3.41E-02
Benzo(k)fluoranthene	0.00E+00	3.41E-02	3.41E-02
Butylbenzylphthalate	6.24E-11	0.00E+00	6.24E-11
Chrysene	0.00E+00	3.41E-02	3.41E-02
1,2-Dichlorobenzene	2.43E-09	0.00E+00	2.43E-09
1,4-Dichlorobenzene	2.08E-10	5.76E-05	5.76E-05
Fluoranthene	6.24E-09	0.00E+00	6.24E-09
Fluorene	1.03E-08	0.00E+00	1.03E-08
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	2.50E-09	0.00E+00	2.50E-09
Naphthalene	9.45E-07	0.00E+00	9.45E-07
N-Nitrosodiphenylamine (1)	0.00E+00	5.98E-05	5.98E-05
Di-n-octylphthalate	4.19E-09	0.00E+00	4.19E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	7.77E-09	0.00E+00	7.77E-09
1,2,4-Trichlorobenzene	2.95E-08	0.00E+00	2.95E-08

Table No. 3-11 (cont.)
Indicator Chemical Scores
Subsurface Soil Area B

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	1.44E-05	0.00E+00	1.44E-05
Arsenic	7.74E-07	3.68E-01	3.68E-01
Barium	8.06E-05	0.00E+00	8.06E-05
Beryllium	2.17E-06	5.65E-02	5.65E-02
Cadmium	7.67E-07	1.09E-02	1.09E-02
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	3.85E-07	0.00E+00	3.85E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	2.76E-04	0.00E+00	2.76E-04
Mercury	2.83E-07	0.00E+00	2.83E-07
Nickel	2.67E-06	5.38E-02	5.38E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	1.08E-07	0.00E+00	1.08E-07
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	3.60E-07	0.00E+00	3.60E-07
Vanadium	1.49E-05	0.00E+00	1.49E-05
Zinc	1.16E-07	0.00E+00	1.16E-07
Cyanide	1.90E-08	0.00E+00	1.90E-08
PESTICIDES/PCBS			
Aldrin	2.23E-07	8.96E-04	8.96E-04
PCB - 1242	0.00E+00	1.95E-01	1.95E-01
PCB - 1254	0.00E+00	4.41E-02	4.41E-02
PCB - 1260	0.00E+00	5.32E-02	5.32E-02
PCB - 1248	0.00E+00	7.72E-02	7.72E-02
4,4'-DDD	0.00E+00	2.52E-05	2.52E-05

indicates that 1,1-dichloroethene ($3.10\text{E-}03$) and tetrachloroethene ($6.11\text{E-}04$) are the only volatile organics in this data set which result in indicator chemical scores greater than $1.00\text{E-}04$. However, review of Table 2-6 indicates that 1,1-dichloroethene is not positively encountered above the sample detection limits in the subsurface soil samples collected in Area B. The concentrations used in this assessment for 1,1-dichloroethene in this area are proxy concentrations estimated from the sample detection limits.

The following semivolatiles encountered in the subsurface soil in Area B have indicator chemical scores above $1.00\text{E-}04$: benzo(a)anthracene ($3.41\text{E-}02$), benzo(b)fluoranthene ($3.41\text{E-}02$), benzo(k)fluoranthene ($3.41\text{E-}02$), and chrysene ($3.41\text{E-}02$). However, as for 1,1-dichloroethene, review of Table 2-7 indicates that none of these compounds were found above the detection limits in the subsurface soil in Area B. The concentrations used in this assessment for these compounds are proxy concentrations which are estimated from the sample detection limits.

The following inorganic compounds result in indicator chemical scores greater than $1.00\text{E-}04$ for the subsurface soil in Area B: arsenic ($3.68\text{E-}01$), beryllium ($5.65\text{E-}02$), cadmium ($1.09\text{E-}02$), lead (1.00), manganese ($2.76\text{E-}04$), and nickel ($5.38\text{E-}02$). Aldrin ($8.96\text{E-}04$), PCB-1242 ($1.95\text{E-}01$), PCB-1254 ($4.41\text{E-}02$), PCB-1260

BOS2REPa/bos-t2
February 26, 1991

(5.32E-02), and PCB-1248 (7.72E-02) also result in elevated indicator chemical scores. As in Area A, lead, arsenic and PCBs result in the highest indicator chemical scores for subsurface soil in Area B.

The indicator scores calculated for compounds detected in the subsurface soil in Area C are presented in Table 3-12. Of the volatile organic compounds encountered in the subsurface soil in Area C, only 1,1-dichloroethene (5.93E-04) results in an indicator score greater than 1.00E-04. However, review of Table 2-6 indicates that the concentrations used herein for 1,1-dichloroethene in the subsurface soil in Area C are proxy concentrations estimated from the sample detection limits.

As in Areas A and B, benzo(a)anthracene (1.87E-02), benzo(b)fluoranthene (1.87E-02), benzo(k)fluoranthene (1.87E-02), and chrysene (1.62E-02) result in indicator scores greater than 1.00E-04. However, as in Area B, Table 2-7 indicates that benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene are not positively encountered above the detection limits in the subsurface soil in Area C. In addition, chrysene is only positively identified above the detection limits in one subsurface sample in this area. The concentrations used for these compounds

Table No. 3-12
Indicator Chemical Scores
Subsurface Soil Area C

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	1.66E-05	1.66E-05
Carbon Disulfide	6.97E-10	0.00E+00	6.97E-10
1,1-Dichloroethane	6.11E-11	0.00E+00	6.11E-11
1,1-Dichloroethene	6.78E-10	5.93E-04	5.93E-04
1,2-Dichloroethene (total)	5.15E-10	0.00E+00	5.15E-10
Ethylbenzene	1.20E-10	0.00E+00	1.20E-10
Tetrachloroethene	6.39E-10	3.19E-05	3.19E-05
Toluene	1.73E-11	0.00E+00	1.73E-11
Trichloroethene	0.00E+00	1.00E-05	1.00E-05
1,1,1-Trichloroethane	7.46E-11	0.00E+00	7.46E-11
Xylene (total)	2.86E-11	0.00E+00	2.86E-11
SEMIVOLATILES			
Acenaphthene	9.65E-10	0.00E+00	9.65E-10
Anthracene	1.93E-10	0.00E+00	1.93E-10
Benzo(a)anthracene	0.00E+00	1.87E-02	1.87E-02
Benzo(b)fluoranthene	0.00E+00	1.87E-02	1.87E-02
Benzo(k)fluoranthene	0.00E+00	1.87E-02	1.87E-02
Butylbenzylphthalate	1.45E-11	0.00E+00	1.45E-11
Chrysene	0.00E+00	1.62E-02	1.62E-02
1,2-Dichlorobenzene	1.52E-10	0.00E+00	1.52E-10
1,4-Dichlorobenzene	9.90E-12	6.46E-06	6.46E-06
Fluoranthene	4.84E-10	0.00E+00	4.84E-10
Fluorene	1.45E-09	0.00E+00	1.45E-09
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	2.22E-10	0.00E+00	2.22E-10
Naphthalene	1.63E-08	0.00E+00	1.63E-08
N-Nitrosodiphenylamine (1)	0.00E+00	1.38E-05	1.38E-05
Di-n-octylphthalate	1.44E-09	0.00E+00	1.44E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	1.91E-09	0.00E+00	1.91E-09
1,2,4-Trichlorobenzene	4.67E-09	0.00E+00	4.67E-09

Table No. 3-12 (cont.)
Indicator Chemical Scores
Subsurface Soil Area C

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	3.15E-06	0.00E+00	3.15E-06
Arsenic	4.23E-07	4.74E-01	4.74E-01
Barium	3.46E-05	0.00E+00	3.46E-05
Beryllium	1.84E-07	1.13E-02	1.13E-02
Cadmium	2.40E-07	8.06E-03	8.06E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.22E-07	0.00E+00	1.22E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	1.87E-05	0.00E+00	1.87E-05
Mercury	3.34E-08	0.00E+00	3.34E-08
Nickel	3.49E-07	1.66E-02	1.66E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	1.03E-08	0.00E+00	1.03E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	8.46E-08	0.00E+00	8.46E-08
Vanadium	1.99E-06	0.00E+00	1.99E-06
Zinc	5.83E-08	0.00E+00	5.83E-08
Cyanide	6.70E-10	0.00E+00	6.70E-10
PESTICIDES/PCBS			
Aldrin	1.81E-07	1.71E-03	1.71E-03
PCB - 1242	0.00E+00	6.29E-03	6.29E-03
PCB - 1254	0.00E+00	1.38E-01	1.38E-01
PCB - 1260	0.00E+00	8.39E-02	8.39E-02
PCB - 1248	0.00E+00	1.87E-01	1.87E-01
4,4'-DDD	0.00E+00	4.54E-05	4.54E-05

in this assessment are proxy concentrations estimated from elevated sample detection limits.

The following inorganic compounds detected in the subsurface soil in Area C have indicator chemical scores greater than $1.00\text{E-}04$: arsenic ($4.74\text{E-}01$), beryllium ($1.13\text{E-}02$), cadmium ($8.06\text{E-}03$), lead (1.00), and nickel ($1.66\text{E-}02$). In addition, aldrin ($1.71\text{E-}03$), PCB-1242 ($6.29\text{E-}03$), PCB-1254 ($1.38\text{E-}01$), PCB-1260 ($8.39\text{E-}02$), and PCB-1248 ($1.87\text{E-}01$) also result in indicator scores above $1.00\text{E-}04$ for subsurface soil in Area C. However, review of Table 2-9 indicates that of these compounds, only PCB-1260 and PCB-1248 were encountered above the detection limits in the subsurface soil samples collected in Area C. The concentrations used herein for aldrin, PCB-1242 and PCB-1254 in Area C subsurface soil are estimated from elevated sample detection limits. As in Areas A and B, the highest indicator scores for Area C are calculated for lead, arsenic and PCBs.

Table 3-13 presents the indicator scores calculated for compounds detected in the subsurface soil in Area D. Review of the table indicates that the following organic compounds result in indicator scores greater than $1.00\text{E-}04$ for this area: 1,1-dichloroethene ($3.87\text{E-}03$), tetrachloroethene ($1.10\text{E-}02$), trichloroethene ($2.76\text{E-}03$), benzo(a)anthracene ($2.22\text{E-}02$),

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-13
Indicator Chemical Scores
Subsurface Soil Area D

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	8.20E-05	8.20E-05
Carbon Disulfide	3.65E-10	0.00E+00	3.65E-10
1,1-Dichloroethane	1.20E-10	0.00E+00	1.20E-10
1,1-Dichloroethene	3.54E-10	3.87E-03	3.87E-03
1,2-Dichloroethene (total)	6.42E-09	0.00E+00	6.42E-09
Ethylbenzene	2.21E-09	0.00E+00	2.21E-09
Tetrachloroethene	1.77E-08	1.10E-02	1.10E-02
Toluene	8.54E-10	0.00E+00	8.54E-10
Trichloroethene	0.00E+00	2.76E-03	2.76E-03
1,1,1-Trichloroethane	2.16E-10	0.00E+00	2.16E-10
Xylene (total)	4.58E-10	0.00E+00	4.58E-10
SEMIVOLATILES			
Acenaphthene	4.27E-10	0.00E+00	4.27E-10
Anthracene	1.85E-11	0.00E+00	1.85E-11
Benzo(a)anthracene	0.00E+00	2.22E-02	2.22E-02
Benzo(b)fluoranthene	0.00E+00	2.22E-02	2.22E-02
Benzo(k)fluoranthene	0.00E+00	2.22E-02	2.22E-02
Butylbenzylphthalate	3.95E-12	0.00E+00	3.95E-12
Chrysene	0.00E+00	4.37E-02	4.37E-02
1,2-Dichlorobenzene	1.01E-10	0.00E+00	1.01E-10
1,4-Dichlorobenzene	1.12E-12	9.14E-06	9.14E-06
Fluoranthene	2.37E-10	0.00E+00	2.37E-10
Fluorene	1.38E-10	0.00E+00	1.38E-10
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	9.63E-09	0.00E+00	9.63E-09
Naphthalene	3.05E-08	0.00E+00	3.05E-08
N-Nitrosodiphenylamine (1)	0.00E+00	1.55E-05	1.55E-05
Di-n-octylphthalate	1.38E-10	0.00E+00	1.38E-10
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	2.93E-09	0.00E+00	2.93E-09
1,2,4-Trichlorobenzene	4.43E-10	0.00E+00	4.43E-10

Table No. 3-13 (cont.)
Indicator Chemical Scores
Subsurface Soil Area D

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	1.39E-07	0.00E+00	1.39E-07
Arsenic	3.12E-08	4.38E-01	4.38E-01
Barium	8.45E-06	0.00E+00	8.45E-06
Beryllium	2.34E-09	1.80E-03	1.80E-03
Cadmium	9.08E-08	3.81E-02	3.81E-02
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.33E-08	0.00E+00	1.33E-08
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	5.16E-07	0.00E+00	5.16E-07
Mercury	1.67E-08	0.00E+00	1.67E-08
Nickel	8.25E-08	4.91E-02	4.91E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	9.61E-10	0.00E+00	9.61E-10
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	2.67E-09	0.00E+00	2.67E-09
Vanadium	3.56E-08	0.00E+00	3.56E-08
Zinc	2.02E-08	0.00E+00	2.02E-08
Cyanide	3.53E-10	0.00E+00	3.53E-10
PESTICIDES/PCBS			
Aldrin	2.76E-08	3.27E-03	3.27E-03
PCB - 1242	0.00E+00	4.31E-02	4.31E-02
PCB - 1254	0.00E+00	8.61E-02	8.61E-02
PCB - 1260	0.00E+00	2.94E-02	2.94E-02
PCB - 1248	0.00E+00	1.83E-01	1.83E-01
4,4'-DDD	0.00E+00	8.36E-05	8.36E-05

benzo(b)fluoranthene (2.22E-02), benzo(k)fluoranthene (2.22E-02), chrysene (4.37E-02), aldrin (3.27E-03), PCB-1242 (4.31E-02), PCB-1254 (8.61E-02), PCB-1260 (2.94E-02), and PCB-1248 (1.83E-01). Review of Table 2-6 indicates that of these compounds, the following contaminants are not detected above the sample detection limits in Area D subsurface soil: 1,1-dichloroethene, benzo(b)fluoranthene, and benzo(k)fluoranthene. The concentrations used herein for these compounds are proxy concentrations estimated from the sample detection limits.

Table 3-13 further indicates that the following inorganic contaminants detected in the subsurface soil in Area D result in indicator scores greater than 1.00E-04: arsenic (4.38E-01), beryllium (1.80E-03), cadmium (3.81E-02), lead (1.00), and nickel (4.91E-02). Lead, arsenic and PCBs result in the highest indicator scores for compounds detected in the subsurface soil in Area C.

As with surficial soil, indicator scores are also calculated for all subsurface soil samples collected at the site as a group. The results of these calculations are presented in Table 3-14. The compounds which resulted in indicator scores above 1.00E-04 for subsurface soil in the individual areas of the site are also expected to result in elevated indicator scores for the entire site, as a whole.

BOS2REPa/bos-t2
February 26, 1991

Review of Table 3-14 indicates that the following compounds result in indicator scores greater than $1.00\text{E-}04$ for subsurface soil at the Booth Oil Site: 1,1-dichloroethene ($2.01\text{E-}03$), tetrachloroethene ($5.05\text{E-}03$), trichloroethene ($1.26\text{E-}03$), benzo(a)anthracene ($1.63\text{E-}02$), benzo(b)fluoranthene ($1.85\text{E-}02$), benzo(k)fluoranthene ($1.66\text{E-}02$), chrysene ($2.68\text{E-}02$), arsenic ($5.33\text{E-}01$), beryllium ($9.21\text{E-}03$), cadmium ($1.99\text{E-}02$), lead (1.00), nickel ($2.91\text{E-}02$), aldrin ($2.49\text{E-}03$), PCB-1242 ($6.49\text{E-}02$), PCB-1254 ($7.34\text{E-}02$), PCB-1260 ($3.90\text{E-}02$), PCB-1248 ($1.42\text{E-}01$). As with surficial soil, the entire list of these compounds will be included as indicator chemicals for subsurface soil in each area of concern, regardless of the indicator scores for the individual areas. By using the same set of indicator chemicals for each area of the site, total risks calculated for these areas will be developed on equivalent scales later in the assessment.

Comparison of these compounds with the indicator chemical scores for surficial soil (see Table 3-7) indicates that, with the exception of benzo(a)pyrene, dibenzo(ah)anthracene, indeno(1,2,3-cd)pyrene, and bis(2-ethylhexyl)phthalate, each of the compounds with elevated indicator scores for surficial soil at the site also have elevated indicator scores for subsurface soil. In addition, 1,1-dichloroethene, tetrachloroethene, trichloroethene and aldrin result in elevated indicator scores for subsurface soil but not for

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-14
Indicator Chemical Scores
Subsurface Soil Entire Site

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Benzene	0.00E+00	4.45E-05	4.45E-05
Carbon Disulfide	4.06E-10	0.00E+00	4.06E-10
1,1-Dichloroethane	1.22E-10	0.00E+00	1.22E-10
1,1-Dichloroethene	3.94E-10	2.01E-03	2.01E-03
1,2-Dichloroethene (total)	6.41E-09	0.00E+00	6.41E-09
Ethylbenzene	2.29E-09	0.00E+00	2.29E-09
Tetrachloroethene	1.73E-08	5.05E-03	5.05E-03
Toluene	8.42E-10	0.00E+00	8.42E-10
Trichloroethene	0.00E+00	1.26E-03	1.26E-03
1,1,1-Trichloroethane	2.18E-10	0.00E+00	2.18E-10
Xylene (total)	4.77E-10	0.00E+00	4.77E-10
SEMIVOLATILES			
Acenaphthene	4.58E-10	0.00E+00	4.58E-10
Anthracene	2.66E-11	0.00E+00	2.66E-11
Benzo(a)anthracene	0.00E+00	1.63E-02	1.63E-02
Benzo(b)fluoranthene	0.00E+00	1.85E-02	1.85E-02
Benzo(k)fluoranthene	0.00E+00	1.66E-02	1.66E-02
Butylbenzylphthalate	4.50E-12	0.00E+00	4.50E-12
Chrysene	0.00E+00	2.68E-02	2.68E-02
1,2-Dichlorobenzene	1.17E-10	0.00E+00	1.17E-10
1,4-Dichlorobenzene	2.83E-12	1.08E-05	1.08E-05
Fluoranthene	3.43E-10	0.00E+00	3.43E-10
Fluorene	2.92E-10	0.00E+00	2.92E-10
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
4-Methylphenol	9.41E-09	0.00E+00	9.41E-09
Naphthalene	3.31E-08	0.00E+00	3.31E-08
N-Nitrosodiphenylamine (1)	0.00E+00	1.66E-05	1.66E-05
Di-n-octylphthalate	1.96E-10	0.00E+00	1.96E-10
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	3.06E-09	0.00E+00	3.06E-09
1,2,4-Trichlorobenzene	6.81E-10	0.00E+00	6.81E-10

Table No. 3-14 (cont.)
Indicator Chemical Scores
Subsurface Soil Entire Site

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	3.42E-07	0.00E+00	3.42E-07
Arsenic	8.14E-08	5.33E-01	5.33E-01
Barium	9.67E-06	0.00E+00	9.67E-06
Beryllium	2.57E-08	9.21E-03	9.21E-03
Cadmium	1.01E-07	1.99E-02	1.99E-02
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.87E-08	0.00E+00	1.87E-08
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	3.11E-06	0.00E+00	3.11E-06
Mercury	1.97E-08	0.00E+00	1.97E-08
Nickel	1.05E-07	2.91E-02	2.91E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	2.14E-09	0.00E+00	2.14E-09
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	1.22E-08	0.00E+00	1.22E-08
Vanadium	2.11E-07	0.00E+00	2.11E-07
Zinc	2.28E-08	0.00E+00	2.28E-08
Cyanide	4.91E-10	0.00E+00	4.91E-10
PESTICIDES/PCBS			
Aldrin	4.51E-08	2.49E-03	2.49E-03
PCB - 1242	0.00E+00	6.49E-02	6.49E-02
PCB - 1254	0.00E+00	7.34E-02	7.34E-02
PCB - 1260	0.00E+00	3.90E-02	3.90E-02
PCB - 1248	0.00E+00	1.42E-01	1.42E-01
4,4'-DDD	0.00E+00	6.45E-05	6.45E-05

surficial soil. Assuming the source of contamination in the surficial and subsurface soils is the same, the decrease in concentration and subsequent absence of these compounds from the indicator chemical list for surficial soil may be attributed to volatilization of these compounds over time from the surficial soil at the site.

Table 3-15 presents a summary of the compounds detected in the subsurface soil at the Booth Oil Site which result in indicator chemicals scores greater than $1.00E-04$. As for surficial soil, the table also lists those compounds for which the mean contaminant concentrations encountered at the site exceed the preliminary cleanup guidelines. Although a number of these compounds do not result in elevated indicator scores as a result of toxicity, they will, however, be included in the quantitative health risk assessment. Inclusion of these compounds in the health risk assessment will facilitate development of alternate cleanup levels which may be considered with the preliminary cleanup guidelines in the selection of remedial alternatives.

3.3.3 Catch basin sediment

Table 3-16 lists the indicator chemical scores calculated for contaminants detected in the catch basin sediment. The table

BOS2REPa/bos-t2
February 26, 1991

Table 3-15
Indicator Chemicals
Subsurface Soil

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	Exceeds Standards	High Indicator Score
SUBSURFACE SOIL	1,1-Dichloroethane	
		1,1-Dichloroethene
	Ethylbenzene	
	Tetrachloroethene	Tetrachloroethene
	Toluene	
	Trichloroethene	Trichloroethene
	1,1,1-Trichloroethane	
	Xylene	
	Acenaphthene	
	Benzo(a)anthracene	Benzo(a)anthracene
	Benzo(b)fluoranthene	Benzo(b)fluoranthene
	Benzo(k)fluoranthene	Benzo(k)fluoranthene
	Chrysene	Chrysene
	1,2-Dichlorobenzene	
	1,4-Dichlorobenzene	
	Naphthalene	
	1,2,4-Trichlorobenzene	
	Arsenic	Arsenic
		Beryllium
	Cadmium	Cadmium
	Chromium	
	Lead	Lead
	Mercury	
	Nickel	Nickel
	Zinc	
	PCB's	PCB's

Table No. 3-16
Indicator Chemical Scores
Catch Basin Sediment

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
2-Butanone	9.48E-10	0.00E+00	9.48E-10
1,1-Dichloroethane	5.09E-11	0.00E+00	5.09E-11
1,2-Dichloroethene (total)	2.55E-09	0.00E+00	2.55E-09
trans-1,3-Dichloropropene	7.07E-08	6.47E-04	6.48E-04
Ethylbenzene	1.60E-09	0.00E+00	1.60E-09
2-Hexanone	0.00E+00	0.00E+00	0.00E+00
Tetrachloroethene	2.05E-09	1.49E-04	1.49E-04
Toluene	1.94E-10	0.00E+00	1.94E-10
Vinyl Chloride	0.00E+00	1.05E-02	1.05E-02
Xylene (total)	1.76E-10	0.00E+00	1.76E-10
SEMIVOLATILES			
Benzo(a)anthracene	0.00E+00	6.82E-02	6.82E-02
Benzo(b)fluoranthene	0.00E+00	1.26E-01	1.26E-01
Benzo(k)fluoranthene	0.00E+00	3.31E-02	3.31E-02
Chrysene	0.00E+00	7.84E-02	7.84E-02
bis(2-Ethylhexyl)phthalate	1.39E-08	4.11E-04	4.11E-04
Fluoranthene	7.82E-09	0.00E+00	7.82E-09
2-Methylnaphthalene	0.00E+00	0.00E+00	0.00E+00
Di-n-octylphthalate	2.91E-09	0.00E+00	2.91E-09
Phenanthrene	0.00E+00	0.00E+00	0.00E+00
Pyrene	3.64E-09	0.00E+00	3.64E-09

Table No. 3-16 (cont.)
Indicator Chemical Scores
Catch Basin Sediment

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Antimony	3.56E-06	0.00E+00	3.56E-06
Arsenic	3.73E-07	6.08E-01	6.08E-01
Barium	1.71E-05	0.00E+00	1.71E-05
Beryllium	2.45E-07	2.18E-02	2.18E-02
Cadmium	5.78E-07	2.82E-02	2.82E-02
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	1.96E-07	0.00E+00	1.96E-07
Cobalt	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	1.000E+00	0.00E+00	1.000E+00
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	3.26E-05	0.00E+00	3.26E-05
Mercury	6.31E-08	0.00E+00	6.31E-08
Nickel	3.50E-07	2.42E-02	2.42E-02
Potassium	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00
Silver	2.79E-08	0.00E+00	2.79E-08
Sodium	0.00E+00	0.00E+00	0.00E+00
Thallium	2.18E-07	0.00E+00	2.18E-07
Vanadium	1.48E-06	0.00E+00	1.48E-06
Zinc	1.18E-07	0.00E+00	1.18E-07
Cyanide	2.73E-09	0.00E+00	2.73E-09
PESTICIDES/PCBS *			
PCB-1242	0.00E+00	3.24E-01	3.24E-01
PCB-1254	0.00E+00	5.43E-01	5.43E-01
PCB-1260	0.00E+00	2.40E+00	2.40E+00

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

indicates that the following contaminants result in indicator scores above 1.00E-04 for the catch basin sediment: trans-1,3-dichloropropene (6.38E-04), tetrachloroethene (1.49E-04), vinyl chloride (1.05E-02), benzo(a)anthracene (6.82E-02), benzo(b)fluoranthene (1.26E-01), benzo(k)fluoranthene (3.31E-02), chrysene (7.84E-02), bis(2-ethylhexyl)phthalate (4.11E-04), arsenic (6.08E-01), beryllium (2.81E-02), cadmium (2.82E-02), lead (1.00), nickel (2.42E-02), PCB-1242 (3.24E-01), PCB-1254 (5.43E-01), and PCB-1260 (2.40). Review of Tables 2-11 through 2-14 indicates that, of these compounds, trans-1,3-dichloropropene, tetrachloroethene, and benzo(k)fluoranthene were not found above the sample detection limits in the catch basin sediment. The concentrations used herein for these compounds are proxy concentrations estimated from the sample detection limits. PCB-1260 and lead have the highest indicator scores of the compounds detected in the catch basin sediment, and are expected to contribute most significantly to the effects of exposure to this medium.

Table 3-17 presents a summary of the compounds detected in the catch basin sediment which result in indicator chemicals scores greater than 1.00E-04. As for surficial and subsurface soil, the table also lists those compounds for which the mean contaminant concentrations encountered at the site exceed the preliminary

BOS2REPa/bos-t2
February 26, 1991

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Table 3-17
Indicator Chemicals
Catch Basin Sediment

	Exceeds Standards	High Indicator Score
CATCH BASIN SEDIMENT	1,2-Dichloroethane 1,2-Dichloroethene (total) trans-1,3-Dichloropropene Ethylbenzene Tetrachloroethene Toluene Vinyl chloride Xylene Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene Lead Zinc PCB's	trans-1,3-Dichloropropene Vinyl chloride Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene bis(2-Ethylhexyl)phthalate Arsenic Beryllium Cadmium Nickel PCB's

cleanup guidelines. Although a number of these compounds do not result in elevated indicator scores as a result of toxicity, they will, however, be included in the quantitative health risk assessment. Inclusion of these compounds in the health risk assessment will facilitate development of alternate cleanup levels which may be considered with the preliminary cleanup guidelines in the selection of remedial alternatives.

3.3.4 Catch basin surface water

The indicator chemical scores for compounds detected in the catch basin surface water are listed in Table 3-18. The table indicates that the following compounds have calculated indicator scores greater than $1.00\text{E-}04$ for catch basin surface water: benzene ($7.69\text{E-}04$), vinyl chloride ($8.31\text{E-}01$), arsenic ($1.66\text{E-}01$), barium ($1.85\text{E-}03$), lead ($9.97\text{E-}01$), manganese ($8.96\text{E-}04$), and nickel ($2.10\text{E-}03$). Review of Tables 2-16 through 2-19 indicates that the concentrations of these compounds in the catch basin surface water are based upon reported concentrations as well as proxy concentrations estimated from the sample detection limits. Lead, arsenic and vinyl chloride have the highest indicator scores of the compounds detected in the catch basin surface water. These compounds are predicted to contribute most significantly to the risks due to exposure to this medium.

BOS2REPa/bos-t2
February 26, 1991

Table No. 3-18
Indicator Chemical Scores
Catch Basin Surface Water

	Non Carc. Chem. Score	Carc. Chem. Score	Total Chem. Score
VOLATILES			
Acetone	2.05E-07	0.00E+00	2.05E-07
Benzene	0.00E+00	7.69E-04	7.69E-04
1,1-Dichloroethane	7.33E-07	0.00E+00	7.33E-07
1,2-Dichloroethene (total)	1.99E-05	0.00E+00	1.99E-05
Ethylbenzene	1.06E-06	0.00E+00	1.06E-06
Toluene	4.66E-07	0.00E+00	4.66E-07
Vinyl Chloride	0.00E+00	8.31E-01	8.31E-01
Xylene (total)	1.85E-07	0.00E+00	1.85E-07
SEMIVOLATILES			
Benzoic acid	1.14E-08	0.00E+00	1.14E-08
Di-n-butylphthalate	3.98E-08	0.00E+00	3.98E-08
2,4-Dimethylphenol	3.92E-06	0.00E+00	3.92E-06
Fluoranthene	3.41E-07	0.00E+00	3.41E-07
2-Methylphenol	3.75E-07	0.00E+00	3.75E-07
4-Methylphenol	2.05E-06	0.00E+00	2.05E-06
INORGANICS			
Aluminum	0.00E+00	0.00E+00	0.00E+00
Arsenic	1.97E-05	1.66E-01	1.66E-01
Barium	1.85E-03	0.00E+00	1.85E-03
Calcium	0.00E+00	0.00E+00	0.00E+00
Chromium	9.98E-07	0.00E+00	9.98E-07
Copper	0.00E+00	0.00E+00	0.00E+00
Iron	0.00E+00	0.00E+00	0.00E+00
Lead	9.97E-01	0.00E+00	9.97E-01
Magnesium	0.00E+00	0.00E+00	0.00E+00
Manganese	8.96E-04	0.00E+00	8.96E-04
Nickel	5.85E-06	2.09E-03	2.10E-03
Potassium	0.00E+00	0.00E+00	0.00E+00
Sodium	0.00E+00	0.00E+00	0.00E+00
Vanadium	4.92E-05	0.00E+00	4.92E-05
Zinc	1.99E-06	0.00E+00	1.99E-06
Cyanide	1.45E-06	0.00E+00	1.45E-06
PESTICIDES/PCBs			
gamma-Chlordane	2.84E-05	0.00E+00	2.84E-05

Table 3-19 presents a summary of the compounds detected in the catch basin surface water which result in indicator chemicals scores greater than $1.00\text{E}-04$. As for the previous scenarios, the table also lists those compounds for which the mean contaminant concentrations encountered at the site exceed the preliminary cleanup guidelines. Although many of these compounds do not result in elevated indicator scores as a result of toxicity, they will, however, be included in the quantitative health risk assessment.

3.4 Summary

Table 3-20 presents a summary of the contaminants with the highest indicator scores for each area and medium. Review of the table indicates that arsenic and lead consistently have the highest indicator scores for each medium and area. In addition, PCBs have high indicator scores for each medium, with the exception of catch basin surface water. The table indicates that, relative to the compounds detected at the site, arsenic, lead and PCBs are of greatest concern for exposures to surficial and subsurface soil. These contaminants, as well as benzo(b)fluoranthene, are also of relatively high concern for exposures to the catch basin sediment. Similarly, arsenic, lead and vinyl chloride are of highest concern relative to the contaminants detected in the catch basin surface water.

Table 3-19
Indicator Chemicals
Catch Basin Water

	Exceeds Standards	High Indicator Score
CATCH BASIN WATER		Benzene
	1,2-Dichloroethene (total)	
	Toluene	Vinyl chloride
	Xylene	
	Di-n-butyl phthalate	
	2,4-Dimethylphenol	
	2-Methylphenol	
	4-Methylphenol	
		Arsenic
		Barium
	Lead	Lead
	Manganese	Manganese
		Nickel
	Zinc	
	Cyanide	

TABLE 3-20

Summary of Highest Indicator Chemical Scores for Each Area and Medium

Medium	Location	Compound	Indicator Score
Surficial Soil	Area A	Arsenic Lead PCB-1248	6.00E-01 1.00E+00 1.09E-01
	Area B	Arsenic Lead PCB-1254 PCB-1260	1.38E-01 1.00E+00 1.11E-01 1.06E-01
	Area C	Arsenic Lead PCB-1254 PCB-1260	3.92E-01 1.00E+00 3.01E-01 1.80E-01
	Area D	Arsenic Lead	9.59E-01 1.00E+00
	Entire Site	Arsenic Lead	5.53E-01 1.00E+00
	Playground	Arsenic Lead	8.46E-01 1.00E+00

TABLE 3-20 (cont'd)

Summary of Highest Indicator Chemical Scores for Each Area and Medium

Medium	Location	Compound	Indicator Score
Subsurface Soil	Area A	Arsenic Lead PCB-1242	7.56E-01 1.00E+00 1.14E-01
	Area B	Arsenic Lead PCB-1242	3.68E-01 1.00E+00 1.95E-01
	Area C	Arsenic Lead PCB-1242 PCB-1248	4.74E-01 1.00E+00 1.38E-01 1.87E-01
	Entire Site	Arsenic Lead PCB-1248	5.33E-01 1.00E+00
Catch Basin Sediment		Benzo(b)fluoranthene Arsenic Lead PCB-1242 PCB-1254	1.26E-01 6.08E-01 1.00E+00 3.24E-01 5.43E-01
Catch Basin Surface Water		Vinyl Chloride Arsenic Lead	8.31E-01 1.66E-01 9.97E-01

It must be noted that the identification and scoring of indicator chemicals for the Booth Oil Site are site- and situation-specific. The calculation of indicator scores is not intended to define the toxicity or exposure values of the chemicals. Similarly, the relative scoring of contaminants within each area and medium does not indicate whether a significant risk is posed by exposure to the sampled matrix. Rather, the indicator scoring process identifies the relative contribution of each contaminant to any health threat posed by exposure to the sampled matrix, without regard to the magnitude of the health threat involved.

BOS2REPa/bos-t2
February 26, 1991

Section 4

4.0 EXPOSURE ASSESSMENT

4.1 Identification of Exposed Populations

The Phase I RI Report provides a description of wildlife and fish which have been observed or are expected to inhabit the site. The hazards posed to the plant and animal populations by the current levels of contamination on-site are discussed in the Environmental Assessment prepared for the Booth Oil Site. The potential risks posed to consumers of fish from the Little River, due to contamination emanating from the site, are discussed in Section 6.0 of this report.

Table 4-1 lists the various media analyzed during the Phase I RI, as discussed in Section 2.0 of this document, potential exposure routes and potentially exposed populations. The table indicates that the following potential human receptors are identified for the Booth Oil Site:

- (a) children playing on-site;
- (b) children playing in the playground;
- (c) nearby residential and commercial populations; and
- (d) unprotected construction workers on-site during remediation.

BOS2REPa/bos-t2
February 26, 1991

Table 4--1
Booth Oil Site
Exposure Scenarios - Preliminary Baseline Health Risk Assessment

MEDIUM	EXPOSURE ROUTE	EXPOSED POPULATION
SURFICIAL SOIL	Ingestion	Children
	Inhalation (construction)	Commercial Populations, Construction Workers, Residents
	Inhalation (long term)	Children, Commercial Populations, Residents
	Dermal Contact	Children, Construction Workers
SUBSURFACE SOIL	Dermal Contact	Construction Workers
CATCH BASIN SURFACE WATER	Ingestion of fish	Residents

Children playing on-site and in the playground may be exposed to contamination at and/or emanating from the site through ingestion of surficial soil, inhalation of fugitive dust and volatilized contaminants, and dermal contact with surficial soil. Children between the ages of 10 and 18 years are assumed to visit the site and playground. Exposures are not evaluated for children younger than 10 years old, as they are assumed to be subject to closer parental supervision and, therefore, will have limited direct exposures to the site.

The number of days per year that children visit the site and playground is assumed to be a function of the number of precipitation free non-school and after-school days per year. In order to estimate the number of excursions to the site by children on an annual basis, it is first assumed that children attend school from September through May (i.e., 0.75 year) and are in summer recess from June through August (i.e., 0.25 year). Second, it is assumed that exposures are not of concern on rainy and snow-covered days. Rainy and snow-covered days for Buffalo, NY comprise 205 days/year (EPA, 1988a; NCDC, verbal communication, 8/27/90). It further is assumed that children visit the site and playground at a frequency of 3 days/week for an average of 3 hours/day during the school year, and 4 days/week for an average of 4 hours/day during the summer recess. Based upon the above assumptions, children are

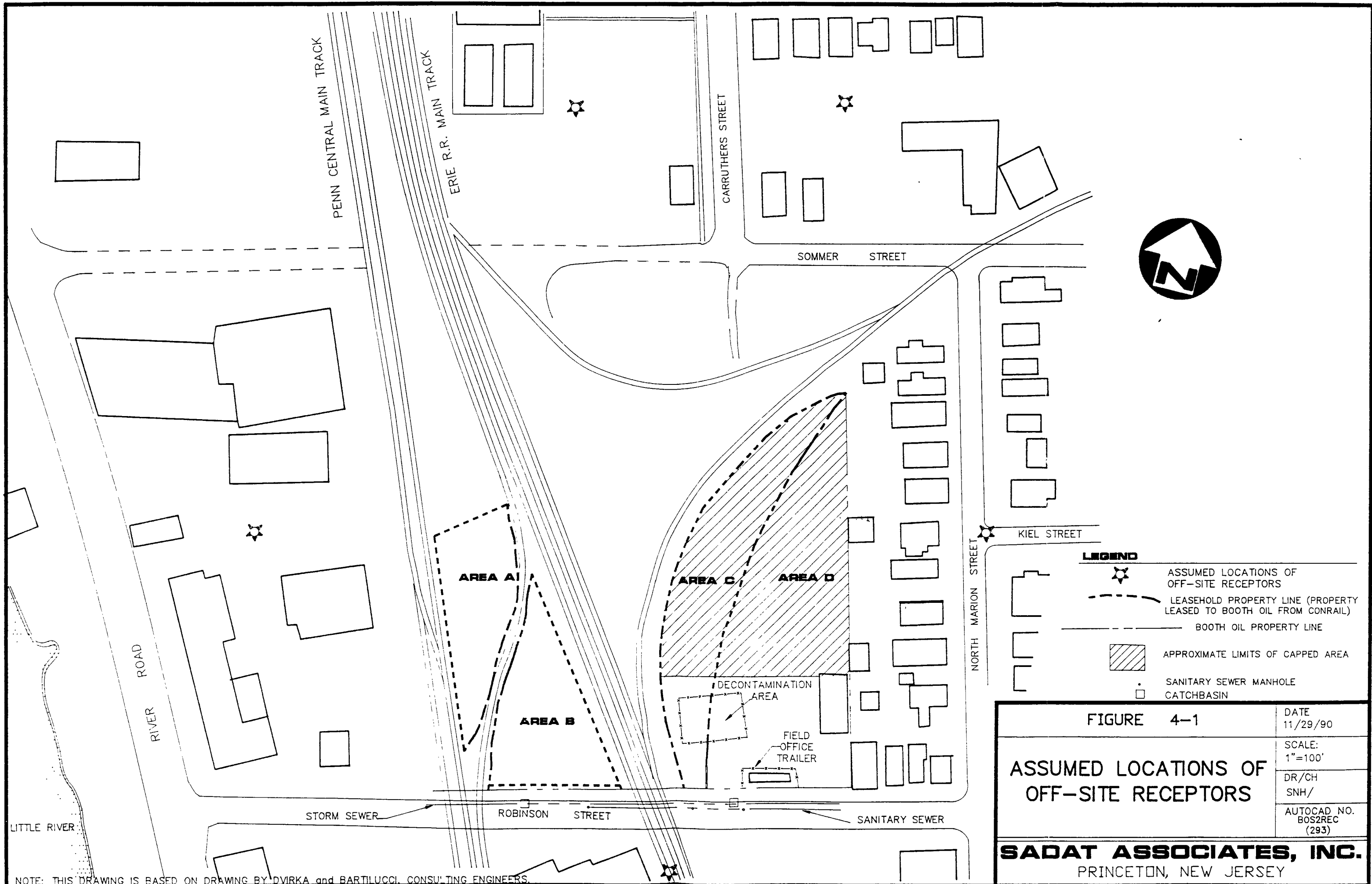
BOS2REPa/bos-t2
February 26, 1991

assumed to visit the site and playground a total of 74 days/year for a total of 245 hours/year.

Nearby residential and commercial populations may be exposed to fugitive dust and volatile emissions from the site. These populations are not expected to be directly exposed to the site. Residential and commercial populations are assumed to consist of individuals between the ages of 18 and 70 years, since children are assessed as a distinct population group. Individuals are expected to reside in the area for 30 years (i.e., upper 95% confidence mean residence time) (EPA, 1989c). Residents are assumed to spend 15.37 hours/day at home (EPA, 1989b). Commercial populations are expected to work in the area for a period of 40 years at 8.0 hours/day and 250 days/year.

For the purpose of the inhalation exposure scenarios, off-site populations are defined in terms of wind direction from the site. Figure 4-1 shows the assumed central location of each of the following potentially exposed populations: children at the playground, the commercial and residential populations at Sommer Street, the residential population at North Marion Street, the commercial population at Robinson Street, and the commercial population at River Road.

BOS2REPa/bos-t2
February 26, 1991



Unprotected construction workers are assumed to be exposed to the site for 8.0 hours/day for 250 days/year for a period of 1 year during remediation. This population may be exposed through inhalation of fugitive dust and volatilized contaminants, as well as through direct exposure to contaminated soil. It is assumed that construction workers will take preventative measures to limit exposures through ingestion. Therefore, ingestion exposure of construction workers is not evaluated herein.

It is the intent of this baseline risk assessment to provide data regarding the potential exposures to on-site workers and other individuals who have access to the property or undertake activities in the vicinity of the site. However, exposures of personnel during field investigations and the protective measures associated with such activities are addressed in the Health and Safety Report.

The results of the Phase I RI are used directly to calculate exposure point concentrations and doses for each exposure scenario, with the exception of inhalation exposures. Airborne exposure point contaminant concentrations are estimated using contaminant fate transport of fugitive dust and volatilized contaminants. The screening methods used in the evaluation are described in the following sections of this report.

BOS2REPa/bos-t2
February 26, 1991

4.2 Estimation of Exposure Point Concentrations

Contaminants in the soil may enter the atmosphere by either volatilization from the soil or by emissions of fugitive dusts. In the exposure assessment, calculated volatilization and fugitive dust emission rates are used with mean contaminant concentrations encountered in the soil to estimate airborne contaminant concentrations at the receptor points.

4.2.1 Volatile emissions

A compound in the soil may be partitioned between the soil water, soil air and the soil constituents. Lyman et al. (1982) state,

The rate of volatilization of an organic molecule from a sorption site on the solid phase in the soil ... to the vapor phase in the soil air and then to the atmosphere is dependent on many physical and chemical properties of both the chemical and the soil and on the process of moving from one phase to another.

The three main distribution (or transport) processes, as described by Lyman et al. (1982), are:

- Compound in soil <--> Compound in soil water
- Compound in soil water <--> Compound in soil air
- Compound in soil air <--> Compound in atmosphere

BOS2REPa/bos-t2
February 26, 1991

There are several physical constants used to describe the distribution and partitioning of contaminants in the soil system. The adsorption coefficient, K_{oc} , is a measure of the extent to which an organic chemical partitions itself between the soil and soil water. K_{oc} is defined as the ratio of the amount of chemical absorbed per unit weight of organic carbon (oc) in the soil to the concentration of the chemical in the soil water at equilibrium. Values of K_{oc} may range from 1.0 ml/g to 1.0×10^7 ml/g, with higher values indicating greater sorption potential (Lyman et al., 1982; EPA, 1986).

Henry's Law Constant (H) is an indicator of the rate of volatilization of compounds from the soil water to the soil air and atmosphere. Lyman et al. (1982) state that compounds with H values less than $1.00E-07$ atm-m³/mol may be considered "essentially non-volatile," and that in the range of $1.00E-07$ to $1.00E-05$ atm-m³/mol, compounds volatilize very slowly at a rate controlled by slow molecular diffusion through air. The organic compounds which exhibit the most significant volatilization are those with H values greater than $1.00E-03$ atm-m³/mol (Lyman et al., 1982).

The values for H and K_{oc} for the organic indicator chemicals in the surficial soil are listed in Table 4-2. The table indicates that all of the volatile organic indicator chemicals have H values

Table 4-2
Henry's Law Constant and Organic Carbon
Partition Coefficients for the Organic
Indicator Chemicals

	HENRY'S LAW CONSTANT (atm*m ^ 3/mol)	Koc (ml/g)
VOLATILES		
Acetone	2.06E-05	2.20E+00
Benzene	5.59E-03	8.30E+01
2-Butanone	2.74E-05	4.50E+00
Carbon Disulfide	1.23E-02	5.40E+01
1,1-Dichloroethane	4.31E-03	3.00E+01
1,1-Dichloroethene	3.40E-02	6.50E+01
1,2-Dichloroethene (total)	6.56E-03	5.90E+01
trans-1,3-Dichloropropene	1.30E-03	4.80E+01
Ethylbenzene	6.43E-03	1.10E+03
2-Hexanone	NR	NR
Tetrachloroethene	2.59E-02	3.64E+02
Toluene	6.37E-03	3.00E+02
Trichloroethene	9.10E-03	1.26E+02
1,1,1-Trichloroethane	1.44E-02	1.52E+02
Vinyl Chloride	8.19E-02	5.70E+01
Xylene (total)	7.04E-03	2.40E+02
SEMIVOLATILES		
Acenaphthene	9.20E-05	4.60E+03
Acenaphthylene	1.48E-03	2.50E+03
Anthracene	1.02E-03	1.40E+04
Benzo(a)anthracene	1.16E-06	1.38E+06
Benzo(b)fluoranthene	1.19E-05	5.50E+05
Benzo(k)fluoranthene	3.94E-05	5.50E+05
Benzoic Acid	7.02E-08	9.86E-01 C
Benzo(a)pyrene	1.55E-06	5.50E+06
Butylbenzylphthalate	NR	2.68E+05 C
Chrysene	1.05E-06	2.00E+05
Dibenzo(ah)anthracene	7.33E-08	3.30E+06
Di-n-butyl phthalate	2.82E-07	1.70E+05
1,2-Dichlorobenzene	1.93E-03	1.70E+03
1,4-Dichlorobenzene	2.89E-03	1.70E+03
2,4-Dimethylphenol	2.52E-06	2.17E+02 C
bis(2-ethylhexyl)phthalate	5.00E-07	1.49E+08 C
Fluoranthene	6.46E-06	3.80E+04
Fluorene	6.42E-05	7.30E+03
Indeno(1,2,3-cd)pyrene	6.86E-08	1.60E+06
2-Methylnaphthalene	NR	9.67E+03 C
2-Methylphenol [o-cresol]	1.10E-06	5.00E+02
4-Methylphenol [p-cresol]	1.10E-06	5.00E+02
Naphthalene	3.60E-04	1.42E+03 C
N-Nitrosodiphenylamine (1)	5.00E-06	8.45E+02 C
Di-n-octylphthalate	NR	4.12E+08 C
Phenanthrene	3.90E-05	1.40E+04
Phenol	4.54E-07	1.42E+01
Pyrene	5.04E-06	3.80E+04
1,2,4-Trichlorobenzene	2.31E-03	9.20E+03

in the range of $1.00\text{E}-02$ to $1.00\text{E}-04$ atm- m^3/mol and K_{oc} values which are generally less than $1.00\text{E}+02$ ml/g. Ethylbenzene ($1.10\text{E}+03$ ml/g), tetrachloroethene ($3.64\text{E}+02$ ml/g), toluene ($3.00\text{E}+02$ ml/g), trichloroethene ($1.26\text{E}+02$ ml/g) and xylene ($2.40\text{E}+02$ ml/g) have K_{oc} values greater than $1.00\text{E}+02$ and are expected to result in somewhat less significant volatilization due to adsorption to the organic carbon in the soil.

Of the semivolatile indicator chemicals, only acenaphthylene has a value for H within an order of magnitude of $1.00\text{E}-03$ atm- m^3/mol . However, acenaphthylene has a K_{oc} of $2.50\text{E}+03$, and therefore, partitioning of this compound in the soil matrix is expected to be strongly influenced by adsorption to the organic carbon in the soil. Similarly, PCB-1254, PCB-1260 and PCB-1248 have H values within an order of magnitude of $1.00\text{E}-03$ atm- m^3/mol , but have K_{oc} values of $5.30\text{E}+05$. Accordingly, the partitioning of these compounds in the soil matrix are expected to be controlled by adsorption to the organic carbon in the soil.

Based upon the above analysis, the volatilization contaminant transport pathway is only evaluated herein for the volatile organic indicator chemicals identified for surficial soil. Assuming that these volatile organic contaminants do not exist in a free-liquid

BOS2REPa/bos-t2
February 26, 1991

state in the soil matrix, volatilization from soil is calculated by the formula (EPA, 1988a):

$$E_{vi} = \frac{D_i \times C_{vi} \times A \times P_t^{4/3} \times C_{si} \times a}{d_{sc}}$$

where:

- E_{vi} = volatilization emission rate of component i (g/sec)
- D_i = diffusion coefficient of contaminant i in air (cm²/sec)
- C_{vi} = saturation vapor concentration of contaminant i in air (g/cm³)
- A = exposed surface area (cm²)
- P_t = total soil porosity (dimensionless)
- C_{si} = upper 95% confidence arithmetic mean weight fraction of contaminant i in soil (mg/kg)
- a = conversion factor (10⁻⁶ kg/mg)
- d_{sc} = effective depth of soil cover (cm)

It must be noted that use of this formula is conservative, in that it does not consider biodegradation, transport in water, or adsorption. It also assumes that there is a sufficient mass of contamination in the soil so that depletion of the contaminant will

BOS2REPa/bos-t2
February 26, 1991

not reduce the emission rate. In addition, the following assumptions are used in the calculation:

- The mean annual temperature for Buffalo, NY is 47° F. For the purpose of identifying diffusion coefficients (D_i) for the contaminants in air, it is assumed that the average temperature is 10° C (i.e., 50° F). Diffusion coefficients used in the calculation are listed in Table 4-3.
- The exposed surface areas (A) for the four areas of the site are shown in Figure 4-1. It must be noted that portions of Areas C and D of the site are capped (see Figure 4-1). These capped areas are not considered in the calculations. The exposed surface areas used in the calculations are as follows:

<u>Location</u>	<u>Surface Area (A) (cm²)</u>
Area A	1.59E+07
Area B	1.95E+07
Area C	5.72E+06
Area D	1.97E+07

- The total soil porosity (P_t) is 0.55 for dry, non-compact soils and 0.35 for compact soils (EPA, 1988a). For the

BOS2REPa/bos-t2
February 26, 1991

purpose of this assessment, an average value of $P_t = 0.45$ is selected for the calculation.

- The effective depth of soil cover (d_{sc}) is estimated from the sample depths as noted in the Phase I RI Report. It is conservatively assumed that the effective depth of soil cover is equal to 1/2 the depth of the first contaminated sample encountered below the soil surface in each area of the site. The following effective depths of soil cover are estimated for the Booth Oil Site:

<u>Location</u>	<u>Depth of soil (d_{sc}) (cm)</u>
Area A	15.24
Area B	30.48
Area C	15.24
Area D	45.72

The saturation vapor concentration (C_{vi}) for each contaminant, used in the above formula, is estimated by the equation (EPA, 1988a):

$$C_{vi} = \frac{\rho_i \times MW_i}{R \times T}$$

BOS2REPa/bos-t2
February 26, 1991

where:

- C_{vi} = saturation vapor concentration of contaminant i
(g/cm³)
- p_i = vapor pressure of contaminant i (mm Hg)
- MW_i = molecular weight of contaminant i (g/mole)
- R = gas constant (62361 mm Hg-cm³/mole-K°)
- T = absolute temperature (K°)

The vapor pressures and molecular weights of the indicator chemicals are listed in Table 4-3. The absolute temperature, based upon the Buffalo mean annual temperature of 47° F, is 281.2° K. The calculated saturation vapor concentrations for the indicator chemicals are presented in Table 4-3.

Table 4-3 presents the calculated emission rates for the volatile organic indicator chemicals in the surficial soil of Area A. The table indicates that the calculated emission rates for these compounds in Area A range from 2.94E-12 g/sec for 1,1-dichloroethane to 5.58E-14 g/sec for ethylbenzene.

The calculated emission rates for the volatile organic indicator chemicals in Area B surficial soil are presented in Table 4-4. Review of the table indicates that the volatile emission rates calculated for Area B range from 2.09E-12 g/sec for 1,2-

BOS2REPa/bos-t2
February 26, 1991

Table 4-3
Volatilization Emission Rates
Surficial Soil - Area A

Upper 95% Confidence		Molecular Weight (g/mole)	Vapor Pressure (mm Hg)	Diffusion Coefficient (cm2/sec)	Saturation Vapor Concentration (g/cm3)	Emission Rate (g/sec)
Area A	Arith Mean (mg/kg)					
VOLATILES						
Benzene	0.413	78	95.2	0.08195	4.23E-04	5.15E-13
Carbon Disulfide	0.107	76	360.0	0.08465	1.56E-03	5.08E-13
1,1-Dichloroethane	0.930	99	182.0	0.08557	1.03E-03	2.94E-12
1,2-Dichloroethene	0.190	97	336.0	0.08557	1.86E-03	1.09E-12
Ethylbenzene	0.584	106	7.0	0.06274	4.23E-05	5.58E-14
Tetrachloroethene	0.166	166	17.8	0.06968	1.68E-04	7.37E-14
Toluene	0.413	92	28.1	0.07367	1.47E-04	1.70E-13
Trichloroethene	0.413	131	57.9	0.07638	4.32E-04	5.17E-13
Xylene (total)	11.929	106	10.0	0.06742	6.04E-05	1.84E-12

Table 4-4
Volatilization Emission Rates
Surficial Soil - Area B

Upper 95% Confidence						
	Area B Arith Mean (mg/kg)	Molecular Weight (g/mole)	Vapor Pressure (mm Hg)	Diffusion Coefficient (cm2/sec)	Saturation Vapor Concentration (g/cm3)	Emission Rate (g/sec)
VOLATILES						
Benzene	0.441	78	95.2	0.08195	4.23E-04	3.37E-13
Carbon Disulfide	0.388	76	360.0	0.08465	1.56E-03	1.13E-12
1,1-Dichloroethane	0.388	99	182.0	0.08557	1.03E-03	7.52E-13
1,2-Dichloroethene	0.595	97	336.0	0.08557	1.86E-03	2.09E-12
Ethylbenzene	0.388	106	7.0	0.06274	4.23E-05	2.27E-14
Tetrachloroethene	1.550	166	17.8	0.06968	1.68E-04	4.18E-13
Toluene	0.388	92	28.1	0.07367	1.47E-04	9.70E-14
Trichloroethene	2.743	131	57.9	0.07638	4.32E-04	2.09E-12
Xylene (total)	0.388	106	10.0	0.06742	6.04E-05	3.64E-14

dichloroethene and trichloroethene to $2.27\text{E-}14$ g/sec for ethylbenzene.

Table 4-5 presents the calculated volatile emission rates for surficial soil in Area C. The table indicates that the calculated emission rates for these compounds in Area C surficial soil range from $1.34\text{E-}12$ g/sec for 1,2-dichloroethene to $2.06\text{E-}15$ for ethylbenzene. Review of the table indicates that, with the exception of 1,2-dichloroethene, the emission rates calculated for the volatile organic indicator chemicals in Area C are 1 to 2 orders of magnitude lower than those calculated for Areas A and B. This is due to the lower concentrations of these compounds detected in Area C.

The volatile emission rates calculated for the surficial soil in Area D are presented in Table 4-6. Review of the table indicates that the emission rates calculated for these compounds in Area D range from $1.54\text{E-}15$ for trichloroethene for $5.45\text{E-}16$ for tetrachloroethene. Comparison of the volatile emission rates presented in Table 4-6 with the emission rates calculated for Areas A, B and C indicates that the emission rates calculated for Area D are generally 2 to 3 orders of magnitude lower than those calculated for the other areas of the site. This is due to the lower contaminant concentrations reported for Area D. In fact,

BOS2REPa/bos-t2
February 26, 1991

Table 4-5
Volatilization Emission Rates
Surificial Soil - Area C

	Area C Soil Concentration (mg/kg)	Molecular Weight (g/mole)	Vapor Pressure (mm Hg)	Diffusion Coefficient (cm ² /sec)	Saturation Vapor Concentration (g/cm ³)	Emission Rate (g/sec)
VOLATILES						
Benzene	0.004	78	95.2	0.08195	4.23E-04	1.80E-14
Carbon Disulfide	0.005	76	360.0	0.08465	1.56E-03	8.54E-14
1,1-Dichloroethane	0.003	99	182.0	0.08557	1.03E-03	3.41E-14
1,2-Dichloroethene	0.065	97	336.0	0.08557	1.86E-03	1.34E-12
Ethylbenzene	0.006	106	7.0	0.06274	4.23E-05	2.06E-15
Tetrachloroethene	0.007	166	17.8	0.06968	1.68E-04	1.06E-14
Toluene	0.014	92	28.1	0.07367	1.47E-04	2.00E-14
Trichloroethene	0.019	131	57.9	0.07638	4.32E-04	8.24E-14
Xylene (total)	0.036	106	10.0	0.06742	6.04E-05	1.93E-14

Table 4-6
Volatilization Emission Rates
Surficial Soil - Area D

	Area D Soil Concentration (mg/kg)	Molecular Weight (g/mole)	Vapor Pressure (mm Hg)	Diffusion Coefficient (cm ² /sec)	Saturation Vapor Concentration (g/cm ³)	Emission Rate (g/sec)
VOLATILES						
Benzene	0.003	78	95.2	0.08195	4.23E-04	1.55E-15
Carbon Disulfide	0.003	76	360.0	0.08465	1.56E-03	5.88E-15
1,1-Dichloroethane	0.003	99	182.0	0.08557	1.03E-03	3.92E-15
1,2-Dichloroethene	0.003	97	336.0	0.08557	1.86E-03	7.08E-15
Ethylbenzene	0.003	106	7.0	0.06274	4.23E-05	1.18E-16
Tetrachloroethene	0.003	166	17.8	0.06968	1.68E-04	5.45E-16
Toluene	0.003	92	28.1	0.07367	1.47E-04	5.05E-16
Trichloroethene	0.003	131	57.9	0.07638	4.32E-04	1.54E-15
Xylene (total)	0.003	106	10.0	0.06742	6.04E-05	1.89E-16

review of Table 2-1 indicates that none of the volatile organic indicator chemicals were positively detected in Area D. The contaminant concentrations listed in Table 4-6 for the volatile organic compounds are proxy concentrations estimated from the sample detection limits.

A simplified air dispersion model, entitled "SCREEN" (EPA, 1988b), is used to estimate mean airborne contaminant concentrations at the receptor points. The SCREEN model requires the following inputs for area sources, such as the areas of the Booth Oil Site:

- Emission rate (g/sec): This value is obtained from the above calculations for each area of the site (see Tables 4-3 through 4-6).
- Source release height (m): As the source of the volatilization is the soil, the release height is 0 m.
- Length of one side of the area source (m): For the SCREEN model, the area source is assumed to be a simple square, with the length of one side equal to the square root of the total area. The length of the sides of the area sources for the Booth Oil Site are as follows:

BOS2REPa/bos-t2
February 26, 1991

<u>Location</u>	<u>Area (m²)</u>	<u>Side length (m)</u>
Area A	1588.74	39.86
Area B	1945.67	44.12
Area C	572.21	23.92
Area D	1968.73	44.37

Note that the areas and side lengths presented for Areas C and D correspond to the uncapped areas (see Figure 4-1), as the cap is assumed to provide an effective barrier to volatilization from the underlying soil.

- Receptor elevation (m): It is assumed that the receptor is standing at ground level. Therefore, the receptor elevation is equal to 0 m.
- Stability class: For the purpose of this assessment, the neutral stability class D is selected to represent average conditions at the Booth Oil Site.
- Wind speed (m/sec): In accordance with EPA (1988a), a mean wind speed of 3 m/sec is used to represent mean wind speeds in the analysis.

BOS2REPa/bos-t2
February 26, 1991

- Distance to receptor (m): The assumed locations of downwind receptors are shown in Figure 4-1. The distances to each receptor from each area of the site, measured from this figure are listed in Table 4-7.

The results of the SCREEN model are multiplied by the percent frequency of the wind direction toward each receptor point (obtained from NCDC, 1980) to arrive at mean airborne contaminant vapor concentrations. Table 4-7 lists the wind directions and frequencies for each area of the site and each receptor point.

Table 4-8 presents the airborne contaminant concentrations at each receptor point due to volatilization from the surficial soil in Area A. As expected, the highest contaminant concentrations are calculated for on-site receptors ($6.08\text{E-}10 \text{ mg/m}^3$). In descending order of concentration, the total off-site contaminant concentrations from volatilization in Area A are: River Road ($1.33\text{E-}13 \text{ mg/m}^3$), North Marion Street ($1.31\text{E-}13 \text{ mg/m}^3$), the playground ($1.06\text{E-}13 \text{ mg/m}^3$), Robinson Street ($7.55\text{E-}14 \text{ mg/m}^3$), and Sommer Street ($5.62\text{E-}14 \text{ mg/m}^3$).

The airborne contaminant concentrations at each receptor point due to volatilization from the surficial soil in Area B are presented in Table 4-9. Review of the table indicates that, as

Table 4-7
Distances and Directions to Downwind Receptors

Source	Receptor	Distance (m)	Wind Direction	Wind Frequency (%)
Area A	Playground	183.0	S	11.93
	North Marion St.	183.0	SW	14.77
	Robinson St.	122.0	NW	4.32
	River Road	82.0	E	4.05
	Sommer St.	229.0	SSW	9.29
Area B	Playground	218.0	S	11.93
	North Marion St.	171.0	SW	14.77
	Robinson St.	76.0	NW	4.32
	River Road	122.0	SE	2.41
	Sommer St.	186.0	SSW	9.29
Area C	Playground	229.0	SSE	4.56
	North Marion St.	128.0	SW	14.77
	Robinson St.	52.0	N	4.44
	River Road	171.0	SE	2.41
	Sommer St.	235.0	S	11.93
Area D	Playground	235.0	SSE	4.56
	North Marion St.	101.0	SW	14.77
	Robinson St.	67.0	NNE	2.99
	River Road	201.0	SE	2.41
	Sommer St.	229.0	S	11.93

Table 4-8

Airborne Contaminant Concentrations
Due to Volatilization from
Surficial Soil in Area A

	On-site (mg/m3)	Playground (mg/m3)	N. Marion St. (mg/m3)	Robinson St. (mg/m3)	River Road (mg/m3)	Sommer St. (mg/m3)
VOLATILES						
Benzene	4.06E-11	7.08E-15	8.76E-15	5.04E-15	8.91E-15	3.76E-15
Carbon Disulfide	4.00E-11	6.98E-15	8.65E-15	4.97E-15	8.79E-15	3.70E-15
1,1-Dichloroethane	2.32E-10	4.04E-14	5.00E-14	2.88E-14	5.09E-14	2.14E-14
1,2-Dichloroethene	8.59E-11	1.50E-14	1.86E-14	1.07E-14	1.89E-14	7.95E-15
Ethylbenzene	4.40E-12	7.67E-16	9.50E-16	5.46E-16	9.66E-16	4.07E-16
Tetrachloroethene	5.81E-12	1.01E-15	1.25E-15	7.21E-16	1.28E-15	5.38E-16
Toluene	1.34E-11	2.34E-15	2.89E-15	1.66E-15	2.94E-15	1.24E-15
Trichloroethene	4.07E-11	7.11E-15	8.80E-15	5.06E-15	8.95E-15	3.77E-15
Xylene (total)	1.45E-10	2.53E-14	3.13E-14	1.80E-14	3.18E-14	1.34E-14
TOTAL	6.08E-10	1.06E-13	1.31E-13	7.55E-14	1.33E-13	5.62E-14

Table 4-9

Airborne Contaminant Concentrations
Due to Volatilization from
Surficial Soil in Area B

	On-site (mg/m3)	Playground (mg/m3)	N. Marion St. (mg/m3)	Robinson St. (mg/m3)	River Road (mg/m3)	Sommer St. (mg/m3)
VOLATILES						
Benzene	2.40E-11	3.36E-15	6.27E-15	6.69E-15	1.78E-15	3.42E-15
Carbon Disulfide	8.06E-11	1.13E-14	2.10E-14	2.24E-14	5.97E-15	1.15E-14
1,1-Dichloroethane	5.36E-11	7.50E-15	1.40E-14	1.49E-14	3.97E-15	7.64E-15
1,2-Dichloroethene	1.49E-10	2.09E-14	3.89E-14	4.15E-14	1.10E-14	2.12E-14
Ethylbenzene	1.62E-12	2.26E-16	4.22E-16	4.51E-16	1.20E-16	2.31E-16
Tetrachloroethene	2.98E-11	4.17E-15	7.77E-15	8.30E-15	2.21E-15	4.25E-15
Toluene	6.92E-12	9.68E-16	1.80E-15	1.93E-15	5.12E-16	9.86E-16
Trichloroethene	1.49E-10	2.09E-14	3.89E-14	4.15E-14	1.10E-14	2.12E-14
Xylene (total)	2.60E-12	3.63E-16	6.77E-16	7.23E-16	1.92E-16	3.70E-16
TOTAL	4.97E-10	6.96E-14	1.30E-13	1.38E-13	3.68E-14	7.09E-14

expected, the highest contaminant concentrations are calculated for on-site receptors ($4.97\text{E-}10 \text{ mg/m}^3$). The total off-site contaminant concentrations from volatilization in Area B are, in descending order of concentration: Robinson Street ($1.38\text{E-}13 \text{ mg/m}^3$), North Marion Street ($1.30\text{E-}13 \text{ mg/m}^3$), Sommer Street ($7.09\text{E-}14 \text{ mg/m}^3$), the playground ($6.96\text{E-}14 \text{ mg/m}^3$), and River Road ($3.68\text{E-}14 \text{ mg/m}^3$).

Comparison of Tables 4-8 and 4-9 indicates that the off-site contaminant concentrations follow somewhat different sequences. Since the wind directions toward each receptor from Areas A and B are the same, with the exception of the receptors at River Road (see Table 4-7), it appears that the different order of off-site contaminant concentrations is due to different distances to the receptor points. For example, Robinson Street has the highest off-site contaminant concentrations for volatilization from Area B, but River Road has highest concentrations for volatilization from Area A. Review of Table 4-7 indicates that Robinson Street is the closest off-site receptor point to Area B (76.0 m) and River Road is the closest off-site receptor to Area A (82.0 m).

Table 4-10 presents the calculated airborne contaminant concentrations at the receptor points due to volatilization from Area C. Review of the table indicates that the total airborne contaminant concentrations from volatilization in Area C, in

Table 4-10
Airborne Contaminant Concentrations
Due to Volatilization from
Surficial Soil in Area C

	On-site (mg/m3)	Playground (mg/m3)	N. Marlon St. (mg/m3)	Robinson St. (mg/m3)	River Road (mg/m3)	Sommer St. (mg/m3)
VOLATILES						
Benzene	2.34E-12	6.99E-17	6.35E-16	8.58E-16	6.22E-17	1.75E-16
Carbon Disulfide	1.11E-11	3.32E-16	3.01E-15	4.07E-15	2.95E-16	8.28E-16
1,1-Dichloroethane	4.43E-12	1.32E-16	1.20E-15	1.63E-15	1.18E-16	3.31E-16
1,2-Dichloroethene	1.74E-10	5.20E-15	4.72E-14	6.38E-14	4.63E-15	1.30E-14
Ethylbenzene	2.68E-13	8.00E-18	7.26E-17	9.82E-17	7.12E-18	2.00E-17
Tetrachloroethene	1.38E-12	4.12E-17	3.74E-16	5.05E-16	3.66E-17	1.03E-16
Toluene	2.60E-12	7.77E-17	7.05E-16	9.53E-16	6.91E-17	1.94E-16
Trichloroethene	1.07E-11	3.20E-16	2.91E-15	3.93E-15	2.85E-16	7.99E-16
Xylene (total)	2.51E-12	7.50E-17	6.81E-16	9.20E-16	6.67E-17	1.87E-16
TOTAL	2.09E-10	6.26E-15	5.68E-14	7.68E-14	5.57E-15	1.56E-14

descending order of concentration are as follows: on-site ($2.09\text{E-}10 \text{ mg/m}^3$), Robinson Street ($7.68\text{E-}14 \text{ mg/m}^3$), North Marion Street ($5.68\text{E-}14 \text{ mg/m}^3$), Sommer Street ($1.56\text{E-}14 \text{ mg/m}^3$), the playground ($6.26\text{E-}15 \text{ mg/m}^3$), and River Road ($5.57\text{E-}15 \text{ mg/m}^3$).

Table 4-11 presents the calculated airborne contaminant concentrations at the receptor points due to volatilization from surficial soil in Area D. As expected, the highest contaminant concentrations are calculated for on-site receptors ($1.51\text{E-}12 \text{ mg/m}^3$). The total off-site contaminant concentrations from volatilization in Area D are, in descending order of concentration: North Marion Street ($9.31\text{E-}16 \text{ mg/m}^3$), Robinson Street ($3.53\text{E-}16 \text{ mg/m}^3$), Sommer Street ($1.95\text{E-}16 \text{ mg/m}^3$), the playground ($7.15\text{E-}17 \text{ mg/m}^3$), and River Road ($4.93\text{E-}17 \text{ mg/m}^3$).

Review of Tables 4-8 through 4-11 indicates that the airborne contaminant concentrations calculated for Areas C and D are 1 to 4 orders of magnitude lower than those calculated for Areas A and B. This is due to the lower volatile emission rates calculated for Areas C and D than for Areas A and B, as well as the greater distances to many of the receptor points from Areas C and D (see Tables 4-3 through 4-6, and Table 4-7).

Table 4-11
Airborne Contaminant Concentrations
Due to Volatilization from
Surficial Soil in Area D

	On-site (mg/m3)	Playground (mg/m3)	N. Marion St. (mg/m3)	Robinson St. (mg/m3)	River Road (mg/m3)	Sommer St. (mg/m3)
VOLATILES						
Benzene	1.10E-13	5.19E-18	6.77E-17	2.57E-17	3.58E-18	1.42E-17
Carbon Disulfide	4.17E-13	1.97E-17	2.57E-16	9.74E-17	1.36E-17	5.39E-17
1,1-Dichloroethane	2.78E-13	1.31E-17	1.71E-16	6.49E-17	9.05E-18	3.59E-17
1,2-Dichloroethene	5.02E-13	2.37E-17	3.09E-16	1.17E-16	1.64E-17	6.49E-17
Ethylbenzene	8.37E-15	3.95E-19	5.15E-18	1.95E-18	2.73E-19	1.08E-18
Tetrachloroethene	3.87E-14	1.83E-18	2.38E-17	9.02E-18	1.26E-18	4.99E-18
Toluene	3.58E-14	1.69E-18	2.21E-17	8.36E-18	1.17E-18	4.63E-18
Trichloroethene	1.09E-13	5.16E-18	6.72E-17	2.55E-17	3.56E-18	1.41E-17
Xylene (total)	1.34E-14	6.33E-19	8.25E-18	3.13E-18	4.36E-19	1.73E-18
TOTAL	1.51E-12	7.15E-17	9.31E-16	3.53E-16	4.93E-17	1.95E-16

The volatile contaminant concentrations at the receptor point, calculated above, are used in Section 4.4 to estimate intake doses due to inhalation for each receptor point.

4.2.2 Fugitive dust emissions

Emission of contaminated fugitive dust from the Booth Oil site can result from wind erosion, construction and recreational traffic over unpaved and uncapped areas, and construction activities during remediation. Wind erosion is generally not a significant source of soil erosion in the eastern United States, particularly in developed areas. In fact, soil loss due to wind erosion in Niagara County, New York generally accounts for less than 1 ton of soil lost per acre per year (Niagara County Soil Conservation Service, verbal communication, 10/02/90). Therefore, based upon this information and the fact that the Booth Oil Site is located in a developed area, with shelter provided by adjacent structures, wind erosion is assumed to be an insignificant source of fugitive dust emission from the site, and is not evaluated herein.

4.2.2.1 Emissions from traffic on-site

During remediation, construction vehicles will travel across the site. In addition, nearby commercial populations use a portion

BOS2REPa/bos-t2
February 26, 1991

of Area B for parking on work days. Further, access to the site by children is not limited. Accordingly, children may ride bicycles and motor bikes on the site. Emissions of fugitive dust from these sources may result in off-site, as well as on-site, inhalation exposures.

Fugitive dust release by vehicular traffic over unpaved areas is estimated by the formula (EPA, 1988a):

$$E_{VT} = k \times 1.7 \times \frac{S}{12} \times \frac{S_p}{48} \times \left(\frac{W}{2.7}\right)^{0.7} \times \left(\frac{w}{4}\right)^{0.5} \times \left(\frac{365 - D_p}{365}\right)$$

where:

- E_{VT} = respirable soil emission rate for vehicular traffic over unpaved areas (kg/km traveled)
- k = 0.45 = particle size multiplier for particles <10 um in diameter (EPA, 1988a)
- s = silt content of soil surface material (dimensionless)
- S_p = mean vehicle speed (kph)
- W = mean vehicle weight (Mg)
- w = mean number of wheels (dimensionless)
- D_p = 160 = number of days with at least 0.254 mm precipitation (EPA, 1988a)

BOS2REPa/bos-t2
February 26, 1991

The following assumptions are used in the calculations:

- Site soils consist of Canandaigua silt loam (CaA), Raynham silt loam (RaA) and Rhinebeck silt loam (RbA). The silt content of these soils is 70% to 80% (Niagara County Soil Conservation Service, verbal communication, 10/26/90). For the purpose of this assessment, the silt content of the soil surface materials is assumed to be 75%.
- The mean speed for recreational vehicles (i.e., motor bikes and bicycles) is assumed to be 44.26 km/hr. This assumption represents an average speed of 72.42 km/hr for motor bikes and 16.09 km/hr for bicycles, assuming an equal number of bicycles and motor bikes are used at the site.
- The mean speed for construction vehicles is assumed to be 42 km/hr (EPA, 1989a).
- The mean speed of vehicles parking in Area B is 8.0 km/hr.
- The mean weight of recreational vehicles (bike plus rider) is assumed to be 0.065 Mg ($1 \text{ Mg} = 10^6 \text{ g}$). This represents an average weight of 0.091 Mg for motor bikes and 0.039 Mg for

BOS2REPa/bos-t2
February 26, 1991

bicycles, assuming an equal number of bicycles and motor bikes are used at the site.

- The mean weight of construction vehicles is assumed to be 28 Mg (EPA, 1989a).
- The mean weight of vehicles parking in Area B is assumed to be 2.6 Mg (EPA, 1989a).
- The mean number of wheels for recreational vehicles is 2.
- The mean number of wheels for construction vehicles is 20 (EPA, 1989a).
- The mean number of wheels for vehicles parking in Area B is 4.

Based upon the above assumptions, the total calculated emission rates for vehicular traffic over unpaved areas at the site are as follows: $1.29\text{E-}03$ kg per km traveled by recreational traffic (i.e., motor bikes and bicycles) on-site, $4.10\text{E-}01$ kg per km traveled by construction traffic on-site, and $4.36\text{E-}03$ kg per km traveled by passenger vehicles parking on Area B.

BOS2REPa/bos-t2
February 26, 1991

Total annual quantities of respirable dust emitted by vehicular traffic on each area of the site are calculated by the formula (EPA, 1988a):

$$E_t = E_{vt} \times d$$

where:

- E_t = respirable fraction of average annual fugitive dust emissions due to vehicular traffic (kg/yr)
- E_{vt} = respirable soil emission rate for vehicular traffic over unpaved areas (kg/km traveled)
- d = distance traveled per year (km/yr)

The following assumptions are used in the calculations:

- Children will ride motor bikes and bicycles on-site at a rate of 74 days/year.
- Particulate emission from construction and parking traffic is not of concern on wet and snow-covered days or on non-working days (i.e., weekends and holidays). The number of wet days is 160 days/year (EPA, 1988a) (i.e., 0.45 year), and the number of snow-covered days is 40 days/year (NCDC, verbal communication, 08/27/90) (i.e., 0.11 year). Assuming the

BOS2REPa/bos-t2
February 26, 1991

number of working days is 250 days/year, the number of days where dust emission is a concern is 110 days/year.

- Assuming an average of 9 recreation vehicles make 2 round trips across the longest unpaved length of the site per day (i.e., 0.0762 km), the total distance traveled by recreational vehicles on-site is 2.7432 km/day. Assuming that the distance traveled on-site will be equally averaged over the 4 areas of concern, the total distance traveled by recreational traffic on each area of the site is equal to 0.6858 km/day.
- Assuming that 5 construction vehicles make 1 round trip across the longest unpaved length of the site per day (i.e., 0.0762 km), the total distance traveled by construction vehicles on-site is 0.762 km/day. Assuming that the distance traveled on-site will be equally averaged over the 4 areas of concern, the total distance traveled by construction traffic across each area is equal to 0.1095 km/day.
- The aerial photograph of the site shows 18 cars parked in Area B of the Booth Oil Site. Visual interpretation of the photograph indicates that perhaps up to twice this number of cars could park in this area. Therefore, it is conservatively assumed that 36 cars park in Area B each working day.

BOS2REPa/bos-t2
February 26, 1991

- Assuming that vehicles parking in Area B of the site travel an average of 1/2 the distance across this area, passenger vehicles travel a total of 0.7942 km/day in Area B.

Based upon the above assumptions the total annual fugitive dust emission rates calculated for the Booth Oil Site are as follows: 6.55E-02 kg/yr for recreational traffic on each area of the site, 8.59 kg/yr for construction traffic on each area of the site, and 3.81E-01 kg/yr for vehicles parking on Area B. Comparison of these emission rates with those calculated for volatilization from soil (see Tables 4-3 through 4-6) indicate that the release rates of fugitive dusts from each area of the site are 10 to 16 orders of magnitude greater than the volatilization release rates. Accordingly, exposures to fugitive dusts released from the site are expected to pose significantly higher risks than exposures to volatilized contaminants.

As discussed in Section 4.2.1, a simplified air dispersion model, entitled "SCREEN" (EPA, 1988b), is used to estimate mean airborne contaminant concentrations at the receptor points. The inputs for SCREEN model, with the exception of emission rates, remain the same as for volatilization (see Section 4.2.1).

As for volatilization emissions, the results of the SCREEN model for fugitive dust emissions are multiplied by the percent frequency of the wind direction toward each receptor point (obtained from NCDC, 1980) to arrive at mean airborne dust concentrations. Table 4-7 lists the wind directions and frequencies for each area of the site and each receptor point.

The calculated airborne dust levels at the receptor points are presented in Table 4-12. Review of the table indicates that construction emissions consistently result in the highest dust concentrations for each receptor point from each area of the site. Conversely, parking in Area B and recreational traffic consistently result in the lowest airborne dust concentrations at each receptor point from each area of the site.

The airborne dust levels presented in Table 4-12 are multiplied by the mean soil contaminant concentrations calculated for each area of the site to estimate airborne contaminant concentrations at the receptor points due to fugitive dust releases on-site. Table 4-13 lists the upper 95% confidence arithmetic mean contaminant concentrations detected in the surficial soil of Area A and the calculated airborne contaminant concentrations at the receptor points due to fugitive dust releases from recreational traffic in Area A. As expected, the table indicates that the

BOS2REPa/bos-t2
February 26, 1991

Table 4-12
Airborne Fugitive Dust Levels
At the Receptor Points

Receptor	RECREATIONAL TRAFFIC EMISSIONS				CONSTRUCTION TRAFFIC EMISSIONS			
	Area A (mg/m ³)	Area B (mg/m ³)	Area C (mg/m ³)	Area D (mg/m ³)	Area A (mg/m ³)	Area B (mg/m ³)	Area C (mg/m ³)	Area D (mg/m ³)
On-site	1.64E-04	1.48E-04	2.70E-04	1.47E-03	2.14E-02	1.94E-02	3.53E-02	1.93E-02
Playground	2.86E-08	2.07E-08	8.08E-09	6.97E-09	3.74E-06	2.71E-06	1.06E-06	9.12E-07
N. Marion St.	3.54E-08	3.87E-08	7.33E-08	9.08E-08	4.63E-06	5.06E-06	9.59E-06	1.19E-05
Robinson St.	2.04E-08	4.13E-08	9.91E-08	3.44E-08	2.66E-06	5.40E-06	1.30E-05	4.50E-06
River Rd.	3.60E-08	1.10E-08	7.19E-09	4.81E-09	4.71E-06	1.44E-06	9.40E-07	6.28E-07
Sommer St.	1.52E-08	2.11E-08	2.02E-08	1.91E-08	1.98E-06	2.76E-06	2.64E-06	2.49E-06
Receptor	PARKING TRAFFIC EMISSIONS				CONSTRUCTION EMISSIONS			
	Area A (mg/m ³)	Area B (mg/m ³)	Area C (mg/m ³)	Area D (mg/m ³)	Area A (mg/m ³)	Area B (mg/m ³)	Area C (mg/m ³)	Area D (mg/m ³)
On-site	N/A	8.70E-04	N/A	N/A	4.59E+01	4.16E+01	7.57E+01	4.13E+01
Playground	N/A	1.22E-07	N/A	N/A	8.01E-03	5.82E-03	2.26E-03	1.95E-03
N. Marion St.	N/A	2.27E-07	N/A	N/A	9.92E-03	1.08E-02	2.06E-02	2.54E-02
Robinson St.	N/A	2.42E-07	N/A	N/A	5.71E-03	1.16E-02	2.78E-02	9.65E-03
River Rd.	N/A	6.44E-08	N/A	N/A	1.01E-02	3.08E-03	2.02E-03	1.35E-03
Sommer St.	N/A	1.24E-07	N/A	N/A	4.25E-03	5.92E-03	5.65E-03	5.34E-03

Table 4-13
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-site
- Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Conc. (mg/m ³)	Playground Airborne Conc. (mg/m ³)	N Marion St Airborne Conc. (mg/m ³)	Robinson St Airborne Conc. (mg/m ³)	River Road Airborne Conc. (mg/m ³)	Sommer Street Airborne Conc. (mg/m ³)
VOLATILES							
Benzene	0.413	6.77E-11	1.18E-14	1.46E-14	8.41E-15	1.49E-14	6.27E-15
Carbon Disulfide	0.107	1.75E-11	3.06E-15	3.79E-15	2.18E-15	3.85E-15	1.62E-15
1,1-Dichloroethane	0.930	1.52E-10	2.66E-14	3.29E-14	1.89E-14	3.35E-14	1.41E-14
1,2-Dichloroethene (total)	0.190	3.12E-11	5.43E-15	6.73E-15	3.87E-15	6.84E-15	2.88E-15
Ethylbenzene	0.584	9.57E-11	1.67E-14	2.07E-14	1.19E-14	2.10E-14	8.86E-15
Tetrachloroethene	0.166	2.72E-11	4.75E-15	5.88E-15	3.38E-15	5.98E-15	2.52E-15
Toluene	0.413	6.77E-11	1.18E-14	1.46E-14	8.41E-15	1.49E-14	6.27E-15
Trichloroethene	0.413	6.77E-11	1.18E-14	1.46E-14	8.41E-15	1.49E-14	6.27E-15
Xylene (total)	11.929	1.96E-09	3.41E-13	4.22E-13	2.43E-13	4.29E-13	1.81E-13
SEMI-VOLATILES							
Acenaphthene	1.876	3.08E-10	5.36E-14	6.64E-14	3.82E-14	6.75E-14	2.85E-14
Acenaphthylene	1.703	2.79E-10	4.87E-14	6.03E-14	3.47E-14	6.13E-14	2.58E-14
Anthracene	1.715	2.81E-10	4.90E-14	6.07E-14	3.49E-14	6.17E-14	2.60E-14
Benzo(a)anthracene	1.580	2.59E-10	4.52E-14	5.59E-14	3.22E-14	5.69E-14	2.40E-14
Benzo(b)fluoranthene	1.619	2.65E-10	4.63E-14	5.73E-14	3.30E-14	5.83E-14	2.46E-14
Benzo(k)fluoranthene	1.718	2.82E-10	4.91E-14	6.08E-14	3.50E-14	6.18E-14	2.61E-14
Benzoic acid	8.327	1.37E-09	2.38E-13	2.95E-13	1.70E-13	3.00E-13	1.26E-13
Benzo(a)pyrene	1.599	2.62E-10	4.57E-14	5.66E-14	3.26E-14	5.76E-14	2.43E-14
Butylbenzylphthalate	0.821	1.35E-10	2.35E-14	2.91E-14	1.67E-14	2.96E-14	1.25E-14
Chrysene	1.375	2.25E-10	3.93E-14	4.87E-14	2.80E-14	4.95E-14	2.09E-14
Dibenzo(a,h)anthracene	1.718	2.82E-10	4.91E-14	6.08E-14	3.50E-14	6.18E-14	2.61E-14
2,4-Dimethylphenol	1.746	2.86E-10	4.99E-14	6.18E-14	3.56E-14	6.29E-14	2.65E-14
bis(2-Ethylhexyl)phthalate	3.028	4.96E-10	8.66E-14	1.07E-13	6.17E-14	1.09E-13	4.59E-14
Fluoranthene	2.732	4.48E-10	7.81E-14	9.67E-14	5.56E-14	9.84E-14	4.14E-14
Fluorene	1.749	2.87E-10	5.00E-14	6.19E-14	3.56E-14	6.30E-14	2.65E-14
Indeno(1,2,3-cd)pyrene	1.711	2.81E-10	4.89E-14	6.06E-14	3.48E-14	6.16E-14	2.60E-14
2-Methylnaphthalene	6.772	1.11E-09	1.94E-13	2.40E-13	1.38E-13	2.44E-13	1.03E-13
2-Methylphenol	1.718	2.82E-10	4.91E-14	6.08E-14	3.50E-14	6.18E-14	2.61E-14
4-Methylphenol	1.713	2.81E-10	4.90E-14	6.06E-14	3.49E-14	6.17E-14	2.60E-14
Naphthalene	1.560	2.56E-10	4.46E-14	5.52E-14	3.18E-14	5.62E-14	2.37E-14
Di-n-octylphthalate	1.763	2.89E-10	5.04E-14	6.24E-14	3.59E-14	6.35E-14	2.67E-14
Phenanthrene	3.428	5.62E-10	9.80E-14	1.21E-13	6.98E-14	1.23E-13	5.20E-14
Phenol	1.718	2.82E-10	4.91E-14	6.08E-14	3.50E-14	6.18E-14	2.61E-14
Pyrene	2.174	3.56E-10	6.22E-14	7.70E-14	4.43E-14	7.83E-14	3.30E-14

Table 4-13 (cont'd)
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-site
Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	11157.889	1.83E-06	3.19E-10	3.95E-10	2.27E-10	4.02E-10	1.69E-10
Antimony	6.793	1.11E-09	1.94E-13	2.40E-13	1.38E-13	2.45E-13	1.03E-13
Arsenic	26.933	4.42E-09	7.70E-13	9.54E-13	5.48E-13	9.70E-13	4.09E-13
Barium	201.508	3.30E-08	5.76E-12	7.13E-12	4.10E-12	7.25E-12	3.06E-12
Beryllium	1.458	2.39E-10	4.17E-14	5.16E-14	2.97E-14	5.25E-14	2.21E-14
Cadmium	1.658	2.72E-10	4.74E-14	5.87E-14	3.38E-14	5.97E-14	2.52E-14
Calcium	111206.629	1.82E-05	3.18E-09	3.94E-09	2.26E-09	4.00E-09	1.69E-09
Chromium	23.463	3.85E-09	6.71E-13	8.31E-13	4.78E-13	8.45E-13	3.56E-13
Cobalt	6.958	1.14E-09	1.99E-13	2.46E-13	1.42E-13	2.50E-13	1.06E-13
Copper	84.428	1.38E-08	2.41E-12	2.99E-12	1.72E-12	3.04E-12	1.28E-12
Iron	28550.854	4.68E-06	8.16E-10	1.01E-09	5.81E-10	1.03E-09	4.33E-10
Lead	897.675	1.47E-07	2.57E-11	3.18E-11	1.83E-11	3.23E-11	1.36E-11
Magnesium	57110.045	9.36E-06	1.63E-09	2.02E-09	1.16E-09	2.06E-09	8.66E-10
Manganese	959.508	1.57E-07	2.74E-11	3.40E-11	1.95E-11	3.45E-11	1.46E-11
Mercury	0.287	4.71E-11	8.21E-15	1.02E-14	5.84E-15	1.03E-14	4.35E-15
Nickel	19.663	3.22E-09	5.62E-13	6.96E-13	4.00E-13	7.08E-13	2.98E-13
Potassium	1818.764	2.98E-07	5.20E-11	6.44E-11	3.70E-11	6.55E-11	2.76E-11
Selenium	1.596	2.62E-10	4.56E-14	5.65E-14	3.25E-14	5.75E-14	2.42E-14
Silver	0.927	1.52E-10	2.65E-14	3.28E-14	1.89E-14	3.34E-14	1.41E-14
Sodium	478.789	7.85E-08	1.37E-11	1.70E-11	9.75E-12	1.72E-11	7.26E-12
Thallium	0.524	8.59E-11	1.50E-14	1.86E-14	1.07E-14	1.89E-14	7.95E-15
Vanadium	23.079	3.78E-09	6.60E-13	8.17E-13	4.70E-13	8.31E-13	3.50E-13
Zinc	355.489	5.83E-08	1.02E-11	1.26E-11	7.24E-12	1.28E-11	5.39E-12
Cyanide	8.951	1.47E-09	2.56E-13	3.17E-13	1.82E-13	3.22E-13	1.36E-13
PESTICIDES/PCBs							
PCB-1242	0.517	8.48E-11	1.48E-14	1.83E-14	1.05E-14	1.86E-14	7.84E-15
PCB-1254	14.483	2.37E-09	4.14E-13	5.13E-13	2.95E-13	5.21E-13	2.20E-13
PCB-1260	11.193	1.84E-09	3.20E-13	3.96E-13	2.28E-13	4.03E-13	1.70E-13
PCB-1248	16.752	2.75E-09	4.79E-13	5.93E-13	3.41E-13	6.03E-13	2.54E-13
TOTAL	2.13E+05	3.49E-05	6.09E-09	7.54E-09	4.34E-09	7.67E-09	3.23E-09

highest total airborne contaminant concentration is calculated for on-site receptors. In descending order of concentration, the total off-site airborne contaminant concentrations at the receptor points resulting from recreational traffic emissions of fugitive dust from Area A are as follows: $7.67\text{E-}09 \text{ mg/m}^3$ at River Road, $7.54\text{E-}09 \text{ mg/m}^3$ at North Marion Street, $6.09\text{E-}09 \text{ mg/m}^3$ at the playground, $4.34\text{E-}09 \text{ mg/m}^3$ at Robinson Street, and $3.23\text{E-}09$ at Sommer Street. Review of Table 4-8 indicates that these concentrations follow the same order as the total airborne contaminant concentrations calculated for volatilized contaminants emitted from Area A.

Table 4-14 lists the upper 95% confidence arithmetic mean contaminant concentrations detected in the surficial soil of Area B and the calculated airborne contaminant concentrations at the receptor points due to fugitive dust releases from recreational traffic in Area B. As expected, the table indicates that the highest total airborne contaminant concentration is calculated for on-site receptors. In descending order of concentration, the total off-site airborne contaminant concentrations at the receptor points resulting from recreational traffic emissions of fugitive dust from Area B are as follows: $1.55\text{E-}08 \text{ mg/m}^3$ at Robinson Street, $1.45\text{E-}08 \text{ mg/m}^3$ at North Marion Street, $7.95\text{E-}09 \text{ mg/m}^3$ at Sommer Street, $7.80\text{E-}09 \text{ mg/m}^3$ at the playground, and $4.13\text{E-}09$ at River Road. Comparison of Tables 4-14 and 4-9 indicates that these

Table 4-14
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-Site
Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	0.441	6.54E-11	9.15E-15	1.71E-14	1.82E-14	4.85E-15	9.32E-15
Carbon Disulfide	0.388	5.76E-11	8.05E-15	1.50E-14	1.60E-14	4.26E-15	8.20E-15
1,1-Dichloroethane	0.388	5.76E-11	8.05E-15	1.50E-14	1.60E-14	4.26E-15	8.20E-15
1,2-Dichloroethene (total)	0.595	8.83E-11	1.23E-14	2.30E-14	2.46E-14	6.54E-15	1.26E-14
Ethylbenzene	0.388	5.76E-11	8.05E-15	1.50E-14	1.60E-14	4.26E-15	8.20E-15
Tetrachloroethene	1.550	2.30E-10	3.22E-14	6.00E-14	6.40E-14	1.70E-14	3.28E-14
Toluene	0.388	5.76E-11	8.05E-15	1.50E-14	1.60E-14	4.26E-15	8.20E-15
Trichloroethene	2.743	4.07E-10	5.69E-14	1.06E-13	1.13E-13	3.01E-14	5.80E-14
Xylene (total)	0.388	5.76E-11	8.05E-15	1.50E-14	1.60E-14	4.26E-15	8.20E-15
SEMI-VOLATILES							
Acenaphthene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Acenaphthylene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Anthracene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Benzo(a)anthracene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Benzo(b)fluoranthene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Benzo(k)fluoranthene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Benzoic acid	81.155	1.20E-08	1.68E-12	3.14E-12	3.35E-12	8.92E-13	1.72E-12
Benzo(a)pyrene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Butylbenzylphthalate	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Chrysene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Dibenzo(a,h)anthracene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
2,4-Dimethylphenol	77.559	1.15E-08	1.61E-12	3.00E-12	3.20E-12	8.52E-13	1.64E-12
bis(2-Ethylhexyl)phthalate	44.943	6.67E-09	9.32E-13	1.74E-12	1.86E-12	4.94E-13	9.50E-13
Fluoranthene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Fluorene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
Indeno(1,2,3-cd)pyrene	16.738	2.48E-09	3.47E-13	6.47E-13	6.91E-13	1.84E-13	3.54E-13
2-Methylnaphthalene	4.147	6.15E-10	8.60E-14	1.60E-13	1.71E-13	4.56E-14	8.76E-14
2-Methylphenol	56.883	8.44E-09	1.18E-12	2.20E-12	2.35E-12	6.25E-13	1.20E-12
4-Methylphenol	426.959	6.33E-08	8.86E-12	1.65E-11	1.76E-11	4.69E-12	9.02E-12
Naphthalene	16.941	2.51E-09	3.51E-13	6.55E-13	7.00E-13	1.86E-13	3.58E-13
Di-n-octylphthalate	16.461	2.44E-09	3.42E-13	6.37E-13	6.80E-13	1.81E-13	3.48E-13
Phenanthrene	2.484	3.69E-10	5.15E-14	9.61E-14	1.03E-13	2.73E-14	5.25E-14
Phenol	250.144	3.71E-08	5.19E-12	9.68E-12	1.03E-11	2.75E-12	5.29E-12
Pyrene	16.441	2.44E-09	3.41E-13	6.36E-13	6.79E-13	1.81E-13	3.47E-13

Table 4-14 (cont'd)
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-Site
Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	33973.465	5.04E-06	7.05E-10	1.31E-09	1.40E-09	3.73E-10	7.18E-10
Antimony	185.389	2.75E-08	3.85E-12	7.17E-12	7.66E-12	2.04E-12	3.92E-12
Arsenic	13.882	2.06E-09	2.88E-13	5.37E-13	5.73E-13	1.53E-13	2.93E-13
Barium	3035.135	4.50E-07	6.30E-11	1.17E-10	1.25E-10	3.33E-11	6.41E-11
Beryllium	6.295	9.34E-10	1.31E-13	2.44E-13	2.60E-13	6.92E-14	1.33E-13
Cadmium	9.331	1.38E-09	1.94E-13	3.61E-13	3.85E-13	1.03E-13	1.97E-13
Calcium	208882.191	3.10E-05	4.33E-09	8.08E-09	8.63E-09	2.30E-09	4.41E-09
Chromium	173.651	2.58E-08	3.60E-12	6.72E-12	7.17E-12	1.91E-12	3.67E-12
Cobalt	13.298	1.97E-09	2.76E-13	5.14E-13	5.49E-13	1.46E-13	2.81E-13
Copper	634.839	9.42E-08	1.32E-11	2.46E-11	2.62E-11	6.98E-12	1.34E-11
Iron	51397.683	7.63E-06	1.07E-09	1.99E-09	2.12E-09	5.65E-10	1.09E-09
Lead	2451.739	3.64E-07	5.09E-11	9.48E-11	1.01E-10	2.69E-11	5.18E-11
Magnesium	65474.666	9.71E-06	1.36E-09	2.53E-09	2.70E-09	7.19E-10	1.38E-09
Manganese	2841.377	4.22E-07	5.89E-11	1.10E-10	1.17E-10	3.12E-11	6.01E-11
Mercury	0.172	2.55E-11	3.57E-15	6.65E-15	7.10E-15	1.89E-15	3.64E-15
Nickel	45.908	6.81E-09	9.52E-13	1.78E-12	1.90E-12	5.04E-13	9.70E-13
Potassium	2554.020	3.79E-07	5.30E-11	9.88E-11	1.05E-10	2.81E-11	5.40E-11
Selenium	2.178	3.23E-10	4.52E-14	8.43E-14	8.99E-14	2.39E-14	4.60E-14
Silver	0.937	1.39E-10	1.94E-14	3.62E-14	3.87E-14	1.03E-14	1.98E-14
Sodium	1576.426	2.34E-07	3.27E-11	6.10E-11	6.51E-11	1.73E-11	3.33E-11
Thallium	0.701	1.04E-10	1.45E-14	2.71E-14	2.90E-14	7.70E-15	1.48E-14
Vanadium	28.851	4.28E-09	5.99E-13	1.12E-12	1.19E-12	3.17E-13	6.10E-13
Zinc	1362.476	2.02E-07	2.83E-11	5.27E-11	5.63E-11	1.50E-11	2.88E-11
Cyanide	6.195	9.19E-10	1.29E-13	2.40E-13	2.56E-13	6.81E-14	1.31E-13
PESTICIDES/PCBs							
PCB-1242	16.563	2.46E-09	3.44E-13	6.41E-13	6.84E-13	1.82E-13	3.50E-13
PCB-1254	38.314	5.68E-09	7.95E-13	1.48E-12	1.58E-12	4.21E-13	8.10E-13
PCB-1260	36.631	5.44E-09	7.60E-13	1.42E-12	1.51E-12	4.02E-13	7.74E-13
PCB-1248	34.446	5.11E-09	7.15E-13	1.33E-12	1.42E-12	3.78E-13	7.28E-13
TOTAL	3.76E+05	5.58E-05	7.80E-09	1.45E-08	1.55E-08	4.13E-09	7.95E-09

concentrations follow the same order as the total airborne contaminant concentrations calculated for volatilized contaminants emitted from Area B.

Table 4-15 presents the calculated airborne contaminant concentrations at the receptor points due to fugitive dust releases from recreational traffic in Area C. In descending order of concentration, the total airborne contaminant concentrations at the receptor points resulting from recreational traffic emissions of fugitive dust from Area C are as follows: $3.79\text{E-}05 \text{ mg/m}^3$ for on-site receptors, $1.39\text{E-}08 \text{ mg/m}^3$ at Robinson Street, $1.39\text{E-}08 \text{ mg/m}^3$ at North Marion Street, $2.83\text{E-}09 \text{ mg/m}^3$ at Sommer Street, $1.13\text{E-}09 \text{ mg/m}^3$ at the playground, and $1.01\text{E-}09$ at River Road. Comparison of Tables 4-15 and 4-10 indicates that these concentrations follow the same order as the total airborne contaminant concentrations calculated for volatilized contaminants emitted from Area C.

Table 4-16 presents the calculated airborne contaminant concentrations at the receptor points due to fugitive dust releases from recreational traffic in Area D. In descending order of concentration, the total airborne contaminant concentrations at the receptor points resulting from recreational traffic emissions of fugitive dust from Area D are as follows: $1.70\text{E-}04 \text{ mg/m}^3$ for on-site receptors, $1.05\text{E-}08 \text{ mg/m}^3$ at North Marion Street, $3.98\text{E-}09$

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February 26, 1991

Table 4-15
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-site
Area C - Surficial Soil

	Soil Conc. (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	0.004	1.08E-12	3.23E-17	2.93E-16	3.96E-16	2.88E-17	8.07E-17
Carbon Disulfide	0.005	1.35E-12	4.04E-17	3.67E-16	4.96E-16	3.59E-17	1.01E-16
1,1-Dichloroethane	0.003	8.10E-13	2.42E-17	2.20E-16	2.97E-16	2.16E-17	6.05E-17
1,2-Dichloroethene (total)	0.065	1.76E-11	5.25E-16	4.77E-15	6.44E-15	4.67E-16	1.31E-15
Ethylbenzene	0.006	1.62E-12	4.85E-17	4.40E-16	5.95E-16	4.31E-17	1.21E-16
Tetrachloroethene	0.007	1.89E-12	5.65E-17	5.13E-16	6.94E-16	5.03E-17	1.41E-16
Toluene	0.014	3.78E-12	1.13E-16	1.03E-15	1.39E-15	1.01E-16	2.82E-16
Trichloroethene	0.019	5.13E-12	1.53E-16	1.39E-15	1.88E-15	1.37E-16	3.83E-16
Xylene (total)	0.036	9.72E-12	2.91E-16	2.64E-15	3.57E-15	2.59E-16	7.26E-16
SEMI-VOLATILES							
Acenaphthene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Acenaphthylene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Anthracene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Benzo(a)anthracene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Benzo(b)fluoranthene	1.800	4.86E-10	1.45E-14	1.32E-13	1.78E-13	1.29E-14	3.63E-14
Benzo(k)fluoranthene	0.810	2.19E-10	6.54E-15	5.94E-14	8.03E-14	5.82E-15	1.63E-14
Benzoic acid	6.816	1.84E-09	5.50E-14	5.00E-13	6.75E-13	4.90E-14	1.38E-13
Benzo(a)pyrene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Butylbenzylphthalate	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Chrysene	1.100	2.97E-10	8.88E-15	8.07E-14	1.09E-13	7.91E-15	2.22E-14
Dibenzo(a,h)anthracene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
2,4-Dimethylphenol	0.750	2.03E-10	6.06E-15	5.50E-14	7.43E-14	5.39E-15	1.51E-14
bis(2-Ethylhexyl)phthalate	8.200	2.21E-09	6.62E-14	6.01E-13	8.13E-13	5.90E-14	1.65E-13
Fluoranthene	1.500	4.05E-10	1.21E-14	1.10E-13	1.49E-13	1.08E-14	3.03E-14
Fluorene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Indeno(1,2,3-cd)pyrene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
2-Methylnaphthalene	1.100	2.97E-10	8.88E-15	8.07E-14	1.09E-13	7.91E-15	2.22E-14
2-Methylphenol	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
4-Methylphenol	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Naphthalene	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Di-n-octylphthalate	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Phenanthrene	1.700	4.59E-10	1.37E-14	1.25E-13	1.68E-13	1.22E-14	3.43E-14
Phenol	1.406	3.80E-10	1.14E-14	1.03E-13	1.39E-13	1.01E-14	2.84E-14
Pyrene	1.900	5.13E-10	1.53E-14	1.39E-13	1.88E-13	1.37E-14	3.83E-14

Table 4-15 (cont'd)
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Recreational Traffic On-site
Area C - Surficial Soil

	Soil Conc. (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	13300.000	3.59E-06	1.07E-10	9.76E-10	1.32E-09	9.56E-11	2.68E-10
Antimony	4.800	1.30E-09	3.88E-14	3.52E-13	4.76E-13	3.45E-14	9.68E-14
Arsenic	21.200	5.73E-09	1.71E-13	1.55E-12	2.10E-12	1.52E-13	4.28E-13
Barium	237.000	6.40E-08	1.91E-12	1.74E-11	2.35E-11	1.70E-12	4.78E-12
Beryllium	0.970	2.62E-10	7.83E-15	7.11E-14	9.61E-14	6.97E-15	1.96E-14
Cadmium	2.400	6.48E-10	1.94E-14	1.76E-13	2.38E-13	1.73E-14	4.84E-14
Calcium	73300.000	1.98E-05	5.92E-10	5.38E-09	7.26E-09	5.27E-10	1.48E-09
Chromium	29.700	8.02E-09	2.40E-13	2.18E-12	2.94E-12	2.14E-13	5.99E-13
Cobalt	8.100	2.19E-09	6.54E-14	5.94E-13	8.03E-13	5.82E-14	1.63E-13
Copper	73.900	2.00E-08	5.97E-13	5.42E-12	7.32E-12	5.31E-13	1.49E-12
Iron	23800.000	6.43E-06	1.92E-10	1.75E-09	2.36E-09	1.71E-10	4.80E-10
Lead	744.000	2.01E-07	6.01E-12	5.46E-11	7.37E-11	5.35E-12	1.50E-11
Magnesium	25300.000	6.83E-06	2.04E-10	1.86E-09	2.51E-09	1.82E-10	5.10E-10
Manganese	745.000	2.01E-07	6.02E-12	5.46E-11	7.38E-11	5.36E-12	1.50E-11
Mercury	0.230	6.21E-11	1.86E-15	1.69E-14	2.28E-14	1.65E-15	4.64E-15
Nickel	22.400	6.05E-09	1.81E-13	1.64E-12	2.22E-12	1.61E-13	4.52E-13
Potassium	1990.000	5.37E-07	1.61E-11	1.46E-10	1.97E-10	1.43E-11	4.01E-11
Selenium	0.670	1.81E-10	5.41E-15	4.91E-14	6.64E-14	4.82E-15	1.35E-14
Silver	0.830	2.24E-10	6.70E-15	6.09E-14	8.23E-14	5.97E-15	1.67E-14
Sodium	301.000	8.13E-08	2.43E-12	2.21E-11	2.98E-11	2.16E-12	6.07E-12
Thallium	0.420	1.13E-10	3.39E-15	3.08E-14	4.16E-14	3.02E-15	8.47E-15
Vanadium	21.700	5.86E-09	1.75E-13	1.59E-12	2.15E-12	1.56E-13	4.38E-13
Zinc	343.000	9.26E-08	2.77E-12	2.52E-11	3.40E-11	2.47E-12	6.92E-12
Cyanide	0.540	1.46E-10	4.36E-15	3.96E-14	5.35E-14	3.88E-15	1.09E-14
PESTICIDES/PCBS *							
PCB-1242	1.454	3.93E-10	1.17E-14	1.07E-13	1.44E-13	1.05E-14	2.93E-14
PCB-1254	55.693	1.50E-08	4.50E-13	4.08E-12	5.52E-12	4.00E-13	1.12E-12
PCB-1260	6.225	1.68E-09	5.03E-14	4.57E-13	6.17E-13	4.48E-14	1.26E-13
PCB-1248	33.218	8.97E-09	2.68E-13	2.44E-12	3.29E-12	2.39E-13	6.70E-13
TOTAL	1.40E+05	3.79E-05	1.13E-09	1.03E-08	1.39E-08	1.01E-09	2.83E-09

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

Table 4-16
Airborne Contaminant Concentrations
Due To Fugitive Dust Releases From
Recreational Traffic On-site
Area D - Surficial Soil

	Soil Conc. (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Carbon Disulfide	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
1,1-Dichloroethane	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
1,2-Dichloroethene (total)	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Ethylbenzene	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Tetrachloroethene	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Toluene	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Trichloroethene	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
Xylene (total)	0.003	4.42E-12	2.09E-17	2.72E-16	1.03E-16	1.44E-17	5.72E-17
SEMI-VOLATILES							
Acenaphthene	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Acenaphthylene	0.140	2.06E-10	9.76E-16	1.27E-14	4.82E-15	6.73E-16	2.67E-15
Anthracene	0.087	1.28E-10	6.07E-16	7.90E-15	3.00E-15	4.18E-16	1.66E-15
Benzo(a)anthracene	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Benzo(b)fluoranthene	1.500	2.21E-09	1.05E-14	1.36E-13	5.17E-14	7.21E-15	2.86E-14
Benzo(k)fluoranthene	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Benzoic acid	0.200	2.95E-10	1.39E-15	1.82E-14	6.89E-15	9.61E-16	3.81E-15
Benzo(a)pyrene	0.990	1.46E-09	6.90E-15	8.99E-14	3.41E-14	4.76E-15	1.89E-14
Butylbenzylphthalate	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Chrysene	1.200	1.77E-09	8.37E-15	1.09E-13	4.13E-14	5.77E-15	2.29E-14
Dibenzo(a,h)anthracene	0.120	1.77E-10	8.37E-16	1.09E-14	4.13E-15	5.77E-16	2.29E-15
2,4-Dimethylphenol	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
bis(2-Ethylhexyl)phthalate	3.300	4.87E-09	2.30E-14	3.00E-13	1.14E-13	1.59E-14	6.29E-14
Fluoranthene	2.200	3.24E-09	1.53E-14	2.00E-13	7.58E-14	1.06E-14	4.19E-14
Fluorene	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Indeno(1,2,3-cd)pyrene	0.900	1.33E-09	6.28E-15	8.17E-14	3.10E-14	4.32E-15	1.72E-14
2-Methylnaphthalene	0.120	1.77E-10	8.37E-16	1.09E-14	4.13E-15	5.77E-16	2.29E-15
2-Methylphenol	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
4-Methylphenol	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Naphthalene	0.068	1.00E-10	4.74E-16	6.17E-15	2.34E-15	3.27E-16	1.30E-15
Di-n-octylphthalate	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Phenanthrene	0.620	9.14E-10	4.32E-15	5.63E-14	2.14E-14	2.98E-15	1.18E-14
Phenol	0.406	5.99E-10	2.83E-15	3.69E-14	1.40E-14	1.95E-15	7.74E-15
Pyrene	1.300	1.92E-09	9.06E-15	1.18E-13	4.48E-14	6.25E-15	2.48E-14

Table 4-16 (cont'd)
Airborne Contaminant Concentrations
Due To Fugitive Dust Releases From
Recreational Traffic On-site
Area D - Surficial Soil

	Soil Conc. (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	15400.000	2.27E-05	1.07E-10	1.40E-09	5.30E-10	7.40E-11	2.94E-10
Antimony	4.200	6.19E-09	2.93E-14	3.81E-13	1.45E-13	2.02E-14	8.01E-14
Arsenic	80.700	1.19E-07	5.63E-13	7.33E-12	2.78E-12	3.88E-13	1.54E-12
Barium	281.000	4.14E-07	1.96E-12	2.55E-11	9.68E-12	1.35E-12	5.36E-12
Beryllium	0.990	1.46E-09	6.90E-15	8.99E-14	3.41E-14	4.76E-15	1.89E-14
Cadmium	2.900	4.28E-09	2.02E-14	2.63E-13	9.99E-14	1.39E-14	5.53E-14
Calcium	25800.000	3.81E-05	1.80E-10	2.34E-09	8.89E-10	1.24E-10	4.92E-10
Chromium	31.200	4.60E-08	2.18E-13	2.83E-12	1.07E-12	1.50E-13	5.95E-13
Cobalt	15.400	2.27E-08	1.07E-13	1.40E-12	5.30E-13	7.40E-14	2.94E-13
Copper	89.900	1.33E-07	6.27E-13	8.16E-12	3.10E-12	4.32E-13	1.71E-12
Iron	56500.000	8.33E-05	3.94E-10	5.13E-09	1.95E-09	2.72E-10	1.08E-09
Lead	469.000	6.92E-07	3.27E-12	4.26E-11	1.62E-11	2.25E-12	8.94E-12
Magnesium	12400.000	1.83E-05	8.65E-11	1.13E-09	4.27E-10	5.96E-11	2.36E-10
Manganese	751.000	1.11E-06	5.24E-12	6.82E-11	2.59E-11	3.61E-12	1.43E-11
Mercury	0.310	4.57E-10	2.16E-15	2.81E-14	1.07E-14	1.49E-15	5.91E-15
Nickel	29.000	4.28E-08	2.02E-13	2.63E-12	9.99E-13	1.39E-13	5.53E-13
Potassium	2420.000	3.57E-06	1.69E-11	2.20E-10	8.34E-11	1.16E-11	4.61E-11
Selenium	1.500	2.21E-09	1.05E-14	1.36E-13	5.17E-14	7.21E-15	2.86E-14
Silver	0.930	1.37E-09	6.48E-15	8.44E-14	3.20E-14	4.47E-15	1.77E-14
Sodium	286.000	4.22E-07	1.99E-12	2.60E-11	9.85E-12	1.37E-12	5.45E-12
Thallium	0.620	9.14E-10	4.32E-15	5.63E-14	2.14E-14	2.98E-15	1.18E-14
Vanadium	45.600	6.73E-08	3.18E-13	4.14E-12	1.57E-12	2.19E-13	8.69E-13
Zinc	940.000	1.39E-06	6.55E-12	8.54E-11	3.24E-11	4.52E-12	1.79E-11
Cyanide	0.750	1.11E-09	5.23E-15	6.81E-14	2.58E-14	3.60E-15	1.43E-14
PESTICIDES/PCBS *							
PCB-1242	0.098	1.45E-10	6.83E-16	8.90E-15	3.38E-15	4.71E-16	1.87E-15
PCB-1254	0.198	2.92E-10	1.38E-15	1.80E-14	6.82E-15	9.51E-16	3.77E-15
PCB-1260	0.198	2.92E-10	1.38E-15	1.80E-14	6.82E-15	9.51E-16	3.77E-15
PCB-1248	0.098	1.45E-10	6.83E-16	8.90E-15	3.38E-15	4.71E-16	1.87E-15
TOTAL	1.16E+05	1.70E-04	8.06E-10	1.05E-08	3.98E-09	5.55E-10	2.20E-09

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

mg/m³ at Robinson Street, 2.20E-09 at Sommer Street, 8.06E-10 mg/m³ at the playground, and 5.55E-10 mg/m³ at River Road. Comparison of Tables 4-16 and 4-11 indicates that these concentrations follow the a same sequence of the total airborne contaminant concentrations as calculated for volatilized contaminants emitted from Area D.

Comparison of Tables 4-13 through 4-16 indicates that the highest on-site airborne contaminant concentrations are calculated from fugitive dust releases from recreational traffic in Area D. However, the highest airborne contaminant concentrations at the receptor points, with the exception of River Road, are calculated for fugitive dust releases from Area B, which has the highest total mean soil contaminant concentration. The highest airborne contaminant concentration for River Road results from fugitive dust emissions from Area A, which has the second highest total mean contaminant concentration and is located closest to River Road.

Table 4-17 presents the calculated airborne contaminant concentrations at the receptor points due to fugitive dust emissions from vehicles parking on Area B. As expected, the highest total airborne contaminant concentration, 3.27E-04 mg/m³, is calculated for on-site receptors. In descending order of concentration, the total airborne contaminant concentrations at the off-site receptor points from vehicles parking on Area B are as

BOS2REPa/bos-t2
February 26, 1991

Table 4-17
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Parking On-site
Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Conc. (mg/m ³)	Playground Airborne Conc. (mg/m ³)	N.Marion St. Airborne Conc. (mg/m ³)	Robinson St. Airborne Conc. (mg/m ³)	River Road Airborne Conc. (mg/m ³)	Sommer St. Airborne Conc. (mg/m ³)
VOLATILES							
Benzene	4.41E-01	3.84E-10	5.37E-14	1.00E-13	1.07E-13	2.84E-14	5.47E-14
Carbon Disulfide	3.88E-01	3.38E-10	4.72E-14	8.80E-14	9.40E-14	2.50E-14	4.81E-14
1,1-Dichloroethane	3.88E-01	3.38E-10	4.72E-14	8.80E-14	9.40E-14	2.50E-14	4.81E-14
1,2-Dichloroethene (total)	5.95E-01	5.18E-10	7.24E-14	1.35E-13	1.44E-13	3.83E-14	7.37E-14
Ethylbenzene	3.88E-01	3.38E-10	4.72E-14	8.80E-14	9.40E-14	2.50E-14	4.81E-14
Tetrachloroethene	1.55E+00	1.35E-09	1.89E-13	3.52E-13	3.75E-13	9.99E-14	1.92E-13
Toluene	3.88E-01	3.38E-10	4.72E-14	8.80E-14	9.40E-14	2.50E-14	4.81E-14
Trichloroethene	2.74E+00	2.39E-09	3.34E-13	6.22E-13	6.64E-13	1.77E-13	3.40E-13
Xylene (total)	3.88E-01	3.38E-10	4.72E-14	8.80E-14	9.40E-14	2.50E-14	4.81E-14
SEMI-VOLATILES							
Acenaphthene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Acenaphthylene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Anthracene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Benzo(a)anthracene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Benzo(b)fluoranthene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Benzo(k)fluoranthene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Benzoic acid	8.12E+01	7.06E-08	9.88E-12	1.84E-11	1.97E-11	5.23E-12	1.01E-11
Benzo(a)pyrene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Butylbenzylphthalate	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Chrysene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Dibenzo(a,h)anthracene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
2,4-Dimethylphenol	7.76E+01	6.75E-08	9.44E-12	1.76E-11	1.88E-11	5.00E-12	9.61E-12
bis(2-Ethylhexyl)phthalate	4.49E+01	3.91E-08	5.47E-12	1.02E-11	1.09E-11	2.90E-12	5.57E-12
Fluoranthene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Fluorene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
Indeno(1,2,3-cd)pyrene	1.67E+01	1.46E-08	2.04E-12	3.80E-12	4.05E-12	1.08E-12	2.07E-12
2-Methylnaphthalene	4.15E+00	3.61E-09	5.05E-13	9.41E-13	1.00E-12	2.67E-13	5.14E-13
2-Methylphenol	5.69E+01	4.95E-08	6.92E-12	1.29E-11	1.38E-11	3.67E-12	7.05E-12
4-Methylphenol	4.27E+02	3.71E-07	5.20E-11	9.69E-11	1.03E-10	2.75E-11	5.29E-11
Naphthalene	1.69E+01	1.47E-08	2.06E-12	3.84E-12	4.10E-12	1.09E-12	2.10E-12
Di-n-octylphthalate	1.65E+01	1.43E-08	2.00E-12	3.73E-12	3.99E-12	1.06E-12	2.04E-12
Phenanthrene	2.48E+00	2.16E-09	3.02E-13	5.64E-13	6.02E-13	1.60E-13	3.08E-13
Phenol	2.50E+02	2.18E-07	3.04E-11	5.67E-11	6.06E-11	1.61E-11	3.10E-11
Pyrene	1.64E+01	1.43E-08	2.00E-12	3.73E-12	3.98E-12	1.06E-12	2.04E-12

Table 4-17 (cont'd)
 Airborne Contaminant Concentrations
 Due to Fugitive Dust Releases From
 Parking On-site
 Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Conc. (mg/m ³)	Playground Airborne Conc. (mg/m ³)	N.Marion St. Airborne Conc. (mg/m ³)	Robinson St. Airborne Conc. (mg/m ³)	River Road Airborne Conc. (mg/m ³)	Sommer St. Airborne Conc. (mg/m ³)
INORGANICS							
Aluminum	3.40E+04	2.96E-05	4.13E-09	7.71E-09	8.23E-09	2.19E-09	4.21E-09
Antimony	1.85E+02	1.61E-07	2.26E-11	4.21E-11	4.49E-11	1.19E-11	2.30E-11
Arsenic	1.39E+01	1.21E-08	1.69E-12	3.15E-12	3.36E-12	8.95E-13	1.72E-12
Barium	3.04E+03	2.64E-06	3.69E-10	6.89E-10	7.35E-10	1.96E-10	3.76E-10
Beryllium	6.30E+00	5.48E-09	7.66E-13	1.43E-12	1.52E-12	4.06E-13	7.80E-13
Cadmium	9.33E+00	8.12E-09	1.14E-12	2.12E-12	2.26E-12	6.01E-13	1.16E-12
Calcium	2.09E+05	1.82E-04	2.54E-08	4.74E-08	5.06E-08	1.35E-08	2.59E-08
Chromium	1.74E+02	1.51E-07	2.11E-11	3.94E-11	4.21E-11	1.12E-11	2.15E-11
Cobalt	1.33E+01	1.16E-08	1.62E-12	3.02E-12	3.22E-12	8.57E-13	1.65E-12
Copper	6.35E+02	5.52E-07	7.73E-11	1.44E-10	1.54E-10	4.09E-11	7.87E-11
Iron	5.14E+04	4.47E-05	6.25E-09	1.17E-08	1.24E-08	3.31E-09	6.37E-09
Lead	2.45E+03	2.13E-06	2.98E-10	5.56E-10	5.94E-10	1.58E-10	3.04E-10
Magnesium	6.55E+04	5.70E-05	7.97E-09	1.49E-08	1.59E-08	4.22E-09	8.11E-09
Manganese	2.84E+03	2.47E-06	3.46E-10	6.45E-10	6.88E-10	1.83E-10	3.52E-10
Mercury	1.72E-01	1.50E-10	2.09E-14	3.90E-14	4.17E-14	1.11E-14	2.13E-14
Nickel	4.59E+01	3.99E-08	5.59E-12	1.04E-11	1.11E-11	2.96E-12	5.69E-12
Potassium	2.55E+03	2.22E-06	3.11E-10	5.79E-10	6.19E-10	1.65E-10	3.17E-10
Selenium	2.18E+00	1.89E-09	2.65E-13	4.94E-13	5.28E-13	1.40E-13	2.70E-13
Silver	9.37E-01	8.15E-10	1.14E-13	2.13E-13	2.27E-13	6.04E-14	1.16E-13
Sodium	1.58E+03	1.37E-06	1.92E-10	3.58E-10	3.82E-10	1.02E-10	1.95E-10
Thallium	7.01E-01	6.10E-10	8.53E-14	1.59E-13	1.70E-13	4.52E-14	8.69E-14
Vanadium	2.89E+01	2.51E-08	3.51E-12	6.55E-12	6.99E-12	1.86E-12	3.58E-12
Zinc	1.36E+03	1.19E-06	1.66E-10	3.09E-10	3.30E-10	8.78E-11	1.69E-10
Cyanide	6.20E+00	5.39E-09	7.54E-13	1.41E-12	1.50E-12	3.99E-13	7.68E-13
PESTICIDES/PCBs							
PCB-1242	1.66E+01	1.44E-08	2.02E-12	3.76E-12	4.01E-12	1.07E-12	2.05E-12
PCB-1254	3.83E+01	3.33E-08	4.66E-12	8.69E-12	9.28E-12	2.47E-12	4.75E-12
PCB-1260	3.66E+01	3.19E-08	4.46E-12	8.31E-12	8.87E-12	2.36E-12	4.54E-12
PCB-1248	3.44E+01	3.00E-08	4.19E-12	7.81E-12	8.34E-12	2.22E-12	4.27E-12
TOTAL	3.76E+05	3.27E-04	4.58E-08	8.53E-08	9.11E-08	2.42E-08	4.66E-08

follows: $9.11\text{E-}08 \text{ mg/m}^3$ at Robinson Street, $8.53\text{E-}08 \text{ mg/m}^3$ at North Marion Street, $4.66\text{E-}08 \text{ mg/m}^3$ at Sommer Street, $4.58\text{E-}08 \text{ mg/m}^3$ at the playground, and $2.42\text{E-}08 \text{ mg/m}^3$ at River Road.

Comparison of Tables 4-17, 4-14 and 4-9 indicate that the total airborne contaminant concentrations calculated for fugitive dust emissions due to vehicles parking in Area B follow the same order as for fugitive dust emissions due to recreational traffic and volatilization from Area B. In addition, the total airborne contaminant concentrations at the receptor points from fugitive dust due to vehicles parking on Area B are up to 1 order of magnitude higher than those calculated for fugitive dusts due to recreational traffic on Area B, and approximately 6 orders of magnitude greater than those calculated for volatilization from this area.

Tables 4-18 through 4-21 present the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic on-site. Table 4-18 presents the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area A. The total airborne contaminant concentrations presented in Table 4-18 range from $1.83\text{E-}02 \text{ mg/m}^3$ for on-site receptors to $1.69\text{E-}06 \text{ mg/m}^3$ for receptors at Sommer Street. Comparison of Tables 4-18 and 4-13

BOS2REPa/bos-t2
February 26, 1991

Table 4-18
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Traffic On-Site
Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.13E-01	8.85E-09	1.54E-12	1.91E-12	1.10E-12	1.94E-12	8.19E-13
Carbon Disulfide	1.07E-01	2.29E-09	4.00E-13	4.95E-13	2.85E-13	5.04E-13	2.12E-13
1,1-Dichloroethane	9.30E-01	1.99E-08	3.48E-12	4.30E-12	2.48E-12	4.38E-12	1.84E-12
1,2-Dichloroethene (total)	1.90E-01	4.07E-09	7.10E-13	8.79E-13	5.06E-13	8.94E-13	3.77E-13
Ethylbenzene	5.84E-01	1.25E-08	2.18E-12	2.70E-12	1.56E-12	2.75E-12	1.16E-12
Tetrachloroethene	1.66E-01	3.56E-09	6.21E-13	7.68E-13	4.42E-13	7.81E-13	3.29E-13
Toluene	4.13E-01	8.85E-09	1.54E-12	1.91E-12	1.10E-12	1.94E-12	8.19E-13
Trichloroethene	4.13E-01	8.85E-09	1.54E-12	1.91E-12	1.10E-12	1.94E-12	8.19E-13
Xylene (total)	1.19E+01	2.56E-07	4.46E-11	5.52E-11	3.18E-11	5.61E-11	2.37E-11
SEMI-VOLATILES							
Acenaphthene	1.88E+00	4.02E-08	7.01E-12	8.68E-12	5.00E-12	8.83E-12	3.72E-12
Acenaphthylene	1.70E+00	3.65E-08	6.37E-12	7.88E-12	4.54E-12	8.01E-12	3.38E-12
Anthracene	1.72E+00	3.68E-08	6.41E-12	7.94E-12	4.57E-12	8.07E-12	3.40E-12
Benzo(a)anthracene	1.58E+00	3.39E-08	5.91E-12	7.31E-12	4.21E-12	7.44E-12	3.13E-12
Benzo(b)fluoranthene	1.62E+00	3.47E-08	6.05E-12	7.49E-12	4.31E-12	7.62E-12	3.21E-12
Benzo(k)fluoranthene	1.72E+00	3.68E-08	6.42E-12	7.95E-12	4.58E-12	8.09E-12	3.41E-12
Benzoic acid	8.33E+00	1.78E-07	3.11E-11	3.85E-11	2.22E-11	3.92E-11	1.65E-11
Benzo(a)pyrene	1.60E+00	3.43E-08	5.98E-12	7.40E-12	4.26E-12	7.53E-12	3.17E-12
Butylbenzylphthalate	8.21E-01	1.76E-08	3.07E-12	3.80E-12	2.19E-12	3.86E-12	1.63E-12
Chrysene	1.38E+00	2.95E-08	5.14E-12	6.36E-12	3.66E-12	6.47E-12	2.73E-12
Dibenzo(a,h)anthracene	1.72E+00	3.68E-08	6.42E-12	7.95E-12	4.58E-12	8.09E-12	3.41E-12
2,4-Dimethylphenol	1.75E+00	3.74E-08	6.53E-12	8.08E-12	4.65E-12	8.22E-12	3.46E-12
bis(2-Ethylhexyl)phthalate	3.03E+00	6.49E-08	1.13E-11	1.40E-11	8.06E-12	1.43E-11	6.01E-12
Fluoranthene	2.73E+00	5.86E-08	1.02E-11	1.26E-11	7.28E-12	1.29E-11	5.42E-12
Fluorene	1.75E+00	3.75E-08	6.54E-12	8.10E-12	4.66E-12	8.23E-12	3.47E-12
Indeno(1,2,3-cd)pyrene	1.71E+00	3.67E-08	6.40E-12	7.92E-12	4.56E-12	8.05E-12	3.39E-12
2-Methylnaphthalene	6.77E+00	1.45E-07	2.53E-11	3.13E-11	1.80E-11	3.19E-11	1.34E-11
2-Methylphenol	1.72E+00	3.68E-08	6.42E-12	7.95E-12	4.58E-12	8.09E-12	3.41E-12
4-Methylphenol	1.71E+00	3.67E-08	6.40E-12	7.93E-12	4.56E-12	8.06E-12	3.40E-12
Naphthalene	1.56E+00	3.34E-08	5.83E-12	7.22E-12	4.15E-12	7.34E-12	3.09E-12
Di-n-octylphthalate	1.76E+00	3.78E-08	6.59E-12	8.16E-12	4.70E-12	8.30E-12	3.50E-12
Phenanthrene	3.43E+00	7.35E-08	1.28E-11	1.59E-11	9.13E-12	1.61E-11	6.80E-12
Phenol	1.72E+00	3.68E-08	6.42E-12	7.95E-12	4.58E-12	8.09E-12	3.41E-12
Pyrene	2.17E+00	4.66E-08	8.13E-12	1.01E-11	5.79E-12	1.02E-11	4.31E-12

Table 4-18 (cont'd)

Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Traffic On-Site
Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.12E+04	2.39E-04	4.17E-08	5.16E-08	2.97E-08	5.25E-08	2.21E-08
Antimony	6.79E+00	1.46E-07	2.54E-11	3.14E-11	1.81E-11	3.20E-11	1.35E-11
Arsenic	2.69E+01	5.77E-07	1.01E-10	1.25E-10	7.17E-11	1.27E-10	5.34E-11
Barium	2.02E+02	4.32E-06	7.53E-10	9.33E-10	5.37E-10	9.48E-10	4.00E-10
Beryllium	1.46E+00	3.12E-08	5.45E-12	6.75E-12	3.88E-12	6.86E-12	2.89E-12
Cadmium	1.66E+00	3.55E-08	6.20E-12	7.67E-12	4.42E-12	7.80E-12	3.29E-12
Calcium	1.11E+05	2.38E-03	4.16E-07	5.15E-07	2.96E-07	5.23E-07	2.21E-07
Chromium	2.35E+01	5.03E-07	8.77E-11	1.09E-10	6.25E-11	1.10E-10	4.65E-11
Cobalt	6.96E+00	1.49E-07	2.60E-11	3.22E-11	1.85E-11	3.27E-11	1.38E-11
Copper	8.44E+01	1.81E-06	3.16E-10	3.91E-10	2.25E-10	3.97E-10	1.67E-10
Iron	2.86E+04	6.12E-04	1.07E-07	1.32E-07	7.60E-08	1.34E-07	5.66E-08
Lead	8.98E+02	1.92E-05	3.36E-09	4.16E-09	2.39E-09	4.22E-09	1.78E-09
Magnesium	5.71E+04	1.22E-03	2.14E-07	2.64E-07	1.52E-07	2.69E-07	1.13E-07
Manganese	9.60E+02	2.06E-05	3.59E-09	4.44E-09	2.56E-09	4.52E-09	1.90E-09
Mercury	2.87E-01	6.15E-09	1.07E-12	1.33E-12	7.64E-13	1.35E-12	5.69E-13
Nickel	1.97E+01	4.21E-07	7.35E-11	9.10E-11	5.24E-11	9.25E-11	3.90E-11
Potassium	1.82E+03	3.90E-05	6.80E-09	8.42E-09	4.84E-09	8.56E-09	3.61E-09
Selenium	1.60E+00	3.42E-08	5.97E-12	7.39E-12	4.25E-12	7.51E-12	3.17E-12
Silver	9.27E-01	1.99E-08	3.47E-12	4.29E-12	2.47E-12	4.36E-12	1.84E-12
Sodium	4.79E+02	1.03E-05	1.79E-09	2.22E-09	1.28E-09	2.25E-09	9.50E-10
Thallium	5.24E-01	1.12E-08	1.96E-12	2.43E-12	1.40E-12	2.47E-12	1.04E-12
Vanadium	2.31E+01	4.95E-07	8.63E-11	1.07E-10	6.15E-11	1.09E-10	4.58E-11
Zinc	3.55E+02	7.62E-06	1.33E-09	1.65E-09	9.47E-10	1.67E-09	7.05E-10
Cyanide	8.95E+00	1.92E-07	3.35E-11	4.14E-11	2.38E-11	4.21E-11	1.78E-11
PESTICIDES/PCBs							
PCB-1242	5.17E-01	1.11E-08	1.93E-12	2.39E-12	1.38E-12	2.43E-12	1.03E-12
PCB-1254	1.45E+01	3.10E-07	5.41E-11	6.70E-11	3.86E-11	6.82E-11	2.87E-11
PCB-1260	1.12E+01	2.40E-07	4.18E-11	5.18E-11	2.98E-11	5.27E-11	2.22E-11
PCB-1248	1.68E+01	3.59E-07	6.26E-11	7.75E-11	4.46E-11	7.88E-11	3.32E-11
TOTAL	2.13E+05	4.57E-03	7.97E-07	9.86E-07	5.67E-07	1.00E-06	4.23E-07

indicates that the total airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area A are 3 orders of magnitude greater than those calculated for fugitive dusts released by recreational traffic in Area A.

Table 4-19 presents the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area B. The total airborne contaminant concentrations presented in the table range from $7.29\text{E-}03 \text{ mg/m}^3$ for on-site receptors to $5.40\text{E-}07 \text{ mg/m}^3$ for receptors at River Road. Comparison of Tables 4-19 and 4-14 indicates that the total airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area B are 2 to 3 orders of magnitude greater than those calculated for fugitive dusts released by recreational traffic in the same area.

The total airborne contaminant concentrations at the receptor points due to construction traffic in Area C are presented in Table 4-20. As expected, the highest total contaminant concentration presented in the table, $1.99\text{E-}02 \text{ mg/m}^3$, is calculated for on-site receptors. The total airborne contaminant concentrations calculated for off-site receptors due to fugitive dusts released by construction traffic in Area C, in descending order of

Table 4-19
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Traffic On-site
Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.41E-01	8.55E-09	1.20E-12	2.23E-12	2.38E-12	6.34E-13	1.22E-12
Carbon Disulfide	3.88E-01	7.52E-09	1.05E-12	1.96E-12	2.10E-12	5.57E-13	1.07E-12
1,1-Dichloroethane	3.88E-01	7.52E-09	1.05E-12	1.96E-12	2.10E-12	5.57E-13	1.07E-12
1,2-Dichloroethene (total)	5.95E-01	1.15E-08	1.61E-12	3.01E-12	3.21E-12	8.55E-13	1.64E-12
Ethylbenzene	3.88E-01	7.52E-09	1.05E-12	1.96E-12	2.10E-12	5.57E-13	1.07E-12
Tetrachloroethene	1.55E+00	3.01E-08	4.21E-12	7.84E-12	8.37E-12	2.23E-12	4.28E-12
Toluene	3.88E-01	7.52E-09	1.05E-12	1.96E-12	2.10E-12	5.57E-13	1.07E-12
Trichloroethene	2.74E+00	5.32E-08	7.44E-12	1.39E-11	1.48E-11	3.94E-12	7.58E-12
Xylene (total)	3.88E-01	7.52E-09	1.05E-12	1.96E-12	2.10E-12	5.57E-13	1.07E-12
SEMI-VOLATILES							
Acenaphthene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Acenaphthylene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Anthracene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Benzo(a)anthracene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Benzo(b)fluoranthene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Benzo(k)fluoranthene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Benzoic acid	8.12E+01	1.57E-06	2.20E-10	4.11E-10	4.38E-10	1.17E-10	2.24E-10
Benzo(a)pyrene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Butylbenzylphthalate	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Chrysene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Dibenzo(a,h)anthracene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
2,4-Dimethylphenol	7.76E+01	1.50E-06	2.11E-10	3.92E-10	4.19E-10	1.11E-10	2.14E-10
bis(2-Ethylhexyl)phthalate	4.49E+01	8.72E-07	1.22E-10	2.27E-10	2.43E-10	6.46E-11	1.24E-10
Fluoranthene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Fluorene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
Indeno(1,2,3-cd)pyrene	1.67E+01	3.25E-07	4.54E-11	8.47E-11	9.04E-11	2.40E-11	4.63E-11
2-Methylnaphthalene	4.15E+00	8.04E-08	1.13E-11	2.10E-11	2.24E-11	5.96E-12	1.15E-11
2-Methylphenol	5.69E+01	1.10E-06	1.54E-10	2.88E-10	3.07E-10	8.17E-11	1.57E-10
4-Methylphenol	4.27E+02	8.28E-06	1.16E-09	2.16E-09	2.31E-09	6.13E-10	1.18E-09
Naphthalene	1.69E+01	3.29E-07	4.60E-11	8.57E-11	9.15E-11	2.43E-11	4.68E-11
Di-n-octylphthalate	1.65E+01	3.19E-07	4.47E-11	8.33E-11	8.89E-11	2.37E-11	4.55E-11
Phenanthrene	2.48E+00	4.82E-08	6.74E-12	1.26E-11	1.34E-11	3.57E-12	6.87E-12
Phenol	2.50E+02	4.85E-06	6.79E-10	1.27E-09	1.35E-09	3.59E-10	6.91E-10
Pyrene	1.64E+01	3.19E-07	4.46E-11	8.32E-11	8.88E-11	2.36E-11	4.54E-11

Table 4-19 (cont'd)
 Airborne Contaminant Concentrations
 Due to Fugitive Dust Releases From
 Construction Traffic On-site
 Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	3.40E+04	6.59E-04	9.22E-08	1.72E-07	1.83E-07	4.88E-08	9.39E-08
Antimony	1.85E+02	3.60E-06	5.03E-10	9.38E-10	1.00E-09	2.66E-10	5.12E-10
Arsenic	1.39E+01	2.69E-07	3.77E-11	7.02E-11	7.50E-11	1.99E-11	3.84E-11
Barium	3.04E+03	5.89E-05	8.24E-09	1.54E-08	1.64E-08	4.36E-09	8.39E-09
Beryllium	6.30E+00	1.22E-07	1.71E-11	3.18E-11	3.40E-11	9.04E-12	1.74E-11
Cadmium	9.33E+00	1.81E-07	2.53E-11	4.72E-11	5.04E-11	1.34E-11	2.58E-11
Calcium	2.09E+05	4.05E-03	5.67E-07	1.06E-06	1.13E-06	3.00E-07	5.77E-07
Chromium	1.74E+02	3.37E-06	4.71E-10	8.78E-10	9.38E-10	2.50E-10	4.80E-10
Cobalt	1.33E+01	2.58E-07	3.61E-11	6.73E-11	7.18E-11	1.91E-11	3.68E-11
Copper	6.35E+02	1.23E-05	1.72E-09	3.21E-09	3.43E-09	9.12E-10	1.75E-09
Iron	5.14E+04	9.97E-04	1.39E-07	2.60E-07	2.78E-07	7.39E-08	1.42E-07
Lead	2.45E+03	4.75E-05	6.65E-09	1.24E-08	1.32E-08	3.52E-09	6.78E-09
Magnesium	6.55E+04	1.27E-03	1.78E-07	3.31E-07	3.54E-07	9.41E-08	1.81E-07
Manganese	2.84E+03	5.51E-05	7.71E-09	1.44E-08	1.53E-08	4.08E-09	7.85E-09
Mercury	1.72E-01	3.34E-09	4.67E-13	8.70E-13	9.29E-13	2.47E-13	4.75E-13
Nickel	4.59E+01	8.90E-07	1.25E-10	2.32E-10	2.48E-10	6.60E-11	1.27E-10
Potassium	2.55E+03	4.95E-05	6.93E-09	1.29E-08	1.38E-08	3.67E-09	7.06E-09
Selenium	2.18E+00	4.22E-08	5.91E-12	1.10E-11	1.18E-11	3.13E-12	6.02E-12
Silver	9.37E-01	1.82E-08	2.54E-12	4.74E-12	5.06E-12	1.35E-12	2.59E-12
Sodium	1.58E+03	3.06E-05	4.28E-09	7.97E-09	8.51E-09	2.27E-09	4.36E-09
Thallium	7.01E-01	1.36E-08	1.90E-12	3.55E-12	3.79E-12	1.01E-12	1.94E-12
Vanadium	2.89E+01	5.60E-07	7.83E-11	1.46E-10	1.56E-10	4.15E-11	7.97E-11
Zinc	1.36E+03	2.64E-05	3.70E-09	6.89E-09	7.36E-09	1.96E-09	3.77E-09
Cyanide	6.20E+00	1.20E-07	1.68E-11	3.13E-11	3.35E-11	8.90E-12	1.71E-11
PESTICIDES/PCBs							
PCB-1242	1.66E+01	3.21E-07	4.50E-11	8.38E-11	8.94E-11	2.38E-11	4.58E-11
PCB-1254	3.83E+01	7.43E-07	1.04E-10	1.94E-10	2.07E-10	5.51E-11	1.06E-10
PCB-1260	3.66E+01	7.10E-07	9.94E-11	1.85E-10	1.98E-10	5.26E-11	1.01E-10
PCB-1248	3.44E+01	6.68E-07	9.35E-11	1.74E-10	1.86E-10	4.95E-11	9.52E-11
TOTAL	3.76E+05	7.29E-03	1.02E-06	1.90E-06	2.03E-06	5.40E-07	1.04E-06

Table 4-20
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Traffic On-site
Area C - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.00E-03	1.41E-10	4.22E-15	3.84E-14	5.18E-14	3.76E-15	1.06E-14
Carbon Disulfide	5.00E-03	1.77E-10	5.28E-15	4.80E-14	6.48E-14	4.70E-15	1.32E-14
1,1-Dichloroethane	3.00E-03	1.06E-10	3.17E-15	2.88E-14	3.89E-14	2.82E-15	7.91E-15
1,2-Dichloroethene (total)	6.50E-02	2.30E-09	6.86E-14	6.23E-13	8.42E-13	6.11E-14	1.71E-13
Ethylbenzene	6.00E-03	2.12E-10	6.34E-15	5.75E-14	7.78E-14	5.64E-15	1.58E-14
Tetrachloroethene	7.00E-03	2.47E-10	7.39E-15	6.71E-14	9.07E-14	6.58E-15	1.85E-14
Toluene	1.40E-02	4.94E-10	1.48E-14	1.34E-13	1.81E-13	1.32E-14	3.69E-14
Trichloroethene	1.90E-02	6.71E-10	2.01E-14	1.82E-13	2.46E-13	1.79E-14	5.01E-14
Xylene (total)	3.60E-02	1.27E-09	3.80E-14	3.45E-13	4.67E-13	3.38E-14	9.50E-14
SEMI-VOLATILES							
Acenaphthene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Acenaphthylene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Anthracene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Benzo(a)anthracene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Benzo(b)fluoranthene	1.80E+00	6.36E-08	1.90E-12	1.73E-11	2.33E-11	1.69E-12	4.75E-12
Benzo(k)fluoranthene	8.10E-01	2.86E-08	8.55E-13	7.77E-12	1.05E-11	7.62E-13	2.14E-12
Benzoic acid	6.82E+00	2.41E-07	7.20E-12	6.54E-11	8.83E-11	6.41E-12	1.80E-11
Benzo(a)pyrene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Butylbenzylphthalate	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Chrysene	1.10E+00	3.89E-08	1.16E-12	1.06E-11	1.43E-11	1.03E-12	2.90E-12
Dibenzo(a,h)anthracene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
2,4-Dimethylphenol	7.50E-01	2.65E-08	7.92E-13	7.19E-12	9.72E-12	7.05E-13	1.98E-12
bis(2-Ethylhexyl)phthalate	8.20E+00	2.90E-07	8.66E-12	7.87E-11	1.06E-10	7.71E-12	2.16E-11
Fluoranthene	1.50E+00	5.30E-08	1.58E-12	1.44E-11	1.94E-11	1.41E-12	3.96E-12
Fluorene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Indeno(1,2,3-cd)pyrene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
2-Methylnaphthalene	1.10E+00	3.89E-08	1.16E-12	1.06E-11	1.43E-11	1.03E-12	2.90E-12
2-Methylphenol	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
4-Methylphenol	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Naphthalene	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Di-n-octylphthalate	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Phenanthrene	1.70E+00	6.00E-08	1.80E-12	1.63E-11	2.20E-11	1.60E-12	4.48E-12
Phenol	1.41E+00	4.97E-08	1.48E-12	1.35E-11	1.82E-11	1.32E-12	3.71E-12
Pyrene	1.90E+00	6.71E-08	2.01E-12	1.82E-11	2.46E-11	1.79E-12	5.01E-12

Table 4-20 (cont'd)

Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Traffic On-site
Area C - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.33E+04	4.70E-04	1.40E-08	1.28E-07	1.72E-07	1.25E-08	3.51E-08
Antimony	4.80E+00	1.70E-07	5.07E-12	4.60E-11	6.22E-11	4.51E-12	1.27E-11
Arsenic	2.12E+01	7.49E-07	2.24E-11	2.03E-10	2.75E-10	1.99E-11	5.59E-11
Barium	2.37E+02	8.37E-06	2.50E-10	2.27E-09	3.07E-09	2.23E-10	6.25E-10
Beryllium	9.70E-01	3.43E-08	1.02E-12	9.30E-12	1.26E-11	9.12E-13	2.56E-12
Cadmium	2.40E+00	8.48E-08	2.53E-12	2.30E-11	3.11E-11	2.26E-12	6.33E-12
Calcium	7.33E+04	2.59E-03	7.74E-08	7.03E-07	9.50E-07	6.89E-08	1.93E-07
Chromium	2.97E+01	1.05E-06	3.14E-11	2.85E-10	3.85E-10	2.79E-11	7.83E-11
Cobalt	8.10E+00	2.86E-07	8.55E-12	7.77E-11	1.05E-10	7.62E-12	2.14E-11
Copper	7.39E+01	2.61E-06	7.80E-11	7.09E-10	9.58E-10	6.95E-11	1.95E-10
Iron	2.38E+04	8.41E-04	2.51E-08	2.28E-07	3.08E-07	2.24E-08	6.28E-08
Lead	7.44E+02	2.63E-05	7.86E-10	7.14E-09	9.64E-09	6.99E-10	1.96E-09
Magnesium	2.53E+04	8.94E-04	2.67E-08	2.43E-07	3.28E-07	2.38E-08	6.67E-08
Manganese	7.45E+02	2.63E-05	7.87E-10	7.15E-09	9.66E-09	7.00E-10	1.97E-09
Mercury	2.30E-01	8.12E-09	2.43E-13	2.21E-12	2.98E-12	2.16E-13	6.07E-13
Nickel	2.24E+01	7.91E-07	2.37E-11	2.15E-10	2.90E-10	2.11E-11	5.91E-11
Potassium	1.99E+03	7.03E-05	2.10E-09	1.91E-08	2.58E-08	1.87E-09	5.25E-09
Selenium	6.70E-01	2.37E-08	7.08E-13	6.43E-12	8.68E-12	6.30E-13	1.77E-12
Silver	8.30E-01	2.93E-08	8.77E-13	7.96E-12	1.08E-11	7.80E-13	2.19E-12
Sodium	3.01E+02	1.06E-05	3.18E-10	2.89E-09	3.90E-09	2.83E-10	7.94E-10
Thallium	4.20E-01	1.48E-08	4.44E-13	4.03E-12	5.44E-12	3.95E-13	1.11E-12
Vanadium	2.17E+01	7.66E-07	2.29E-11	2.08E-10	2.81E-10	2.04E-11	5.72E-11
Zinc	3.43E+02	1.21E-05	3.62E-10	3.29E-09	4.45E-09	3.22E-10	9.05E-10
Cyanide	5.40E-01	1.91E-08	5.70E-13	5.18E-12	7.00E-12	5.08E-13	1.42E-12
PESTICIDES/PCBS *							
PCB-1242	1.45E+00	5.14E-08	1.54E-12	1.39E-11	1.88E-11	1.37E-12	3.84E-12
PCB-1254	5.57E+01	1.97E-06	5.88E-11	5.34E-10	7.22E-10	5.24E-11	1.47E-10
PCB-1260	6.23E+00	2.20E-07	6.57E-12	5.97E-11	8.07E-11	5.85E-12	1.64E-11
PCB-1248	3.32E+01	1.17E-06	3.51E-11	3.19E-10	4.31E-10	3.12E-11	8.76E-11
TOTAL	1.40E+05	4.96E-03	1.48E-07	1.35E-06	1.82E-06	1.32E-07	3.70E-07

* 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

concentration, are as follows: $7.29\text{E-}06 \text{ mg/m}^3$ at Robinson Street, $5.40\text{E-}06 \text{ mg/m}^3$ at North Marion Street, $1.48\text{E-}06 \text{ mg/m}^3$ at Sommer Street, $5.94\text{E-}07 \text{ mg/m}^3$ at the playground, and $5.29\text{E-}07 \text{ mg/m}^3$ at River Road. Comparison of Tables 4-20 and 4-15 indicate that the total airborne contaminant concentrations at the receptor points due to fugitive dusts from construction traffic in Area C are 2 to 3 orders of magnitude higher than those calculated for fugitive dusts from recreational traffic in the same area.

Table 4-21 presents the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area D. The total airborne contaminant concentrations presented in the table range from $8.93\text{E-}03 \text{ mg/m}^3$ for on-site receptors to $2.91\text{E-}07 \text{ mg/m}^3$ for receptors at River Road. Comparison of Tables 4-21 and 4-16 indicates that the total airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area D are 1 to 2 orders of magnitude greater than those calculated for fugitive dusts released by recreational traffic in the same area.

4.2.2.2 Emissions from construction on-site

Fugitive dust releases due to construction are estimated by different methods based upon the types of equipment and

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February 26, 1991

Table 4-21
Airborne Contaminant Concentrations
Due To Fugitive Dust Releases From
Construction Traffic On-site
Area D - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Carbon Disulfide	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
1,1-Dichloroethane	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
1,2-Dichloroethene (total)	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Ethylbenzene	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Tetrachloroethene	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Toluene	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Trichloroethene	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
Xylene (total)	3.00E-03	5.79E-11	2.73E-15	3.56E-14	1.35E-14	1.88E-15	7.48E-15
SEMI-VOLATILES							
Acenaphthene	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Acenaphthylene	1.40E-01	2.70E-09	1.28E-13	1.66E-12	6.30E-13	8.80E-14	3.49E-13
Anthracene	8.70E-02	1.68E-09	7.93E-14	1.03E-12	3.92E-13	5.47E-14	2.17E-13
Benzo(a)anthracene	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Benzo(b)fluoranthene	1.50E+00	2.89E-08	1.37E-12	1.78E-11	6.75E-12	9.42E-13	3.74E-12
Benzo(k)fluoranthene	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Benzoic acid	2.00E-01	3.86E-09	1.82E-13	2.38E-12	9.01E-13	1.26E-13	4.98E-13
Benzo(a)pyrene	9.90E-01	1.91E-08	9.02E-13	1.18E-11	4.46E-12	6.22E-13	2.47E-12
Butylbenzylphthalate	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Chrysene	1.20E+00	2.31E-08	1.09E-12	1.43E-11	5.40E-12	7.54E-13	2.99E-12
Dibenzo(a,h)anthracene	1.20E-01	2.31E-09	1.09E-13	1.43E-12	5.40E-13	7.54E-14	2.99E-13
2,4-Dimethylphenol	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
bis(2-Ethylhexyl)phthalate	3.30E+00	6.36E-08	3.01E-12	3.92E-11	1.49E-11	2.07E-12	8.22E-12
Fluoranthene	2.20E+00	4.24E-08	2.01E-12	2.61E-11	9.91E-12	1.38E-12	5.48E-12
Fluorene	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Indeno(1,2,3-cd)pyrene	9.00E-01	1.74E-08	8.20E-13	1.07E-11	4.05E-12	5.65E-13	2.24E-12
2-Methylnaphthalene	1.20E-01	2.31E-09	1.09E-13	1.43E-12	5.40E-13	7.54E-14	2.99E-13
2-Methylphenol	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
4-Methylphenol	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Naphthalene	6.80E-02	1.31E-09	6.20E-14	8.08E-13	3.06E-13	4.27E-14	1.69E-13
Di-n-octylphthalate	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Phenanthrene	6.20E-01	1.20E-08	5.65E-13	7.36E-12	2.79E-12	3.90E-13	1.55E-12
Phenol	4.06E-01	7.83E-09	3.70E-13	4.82E-12	1.83E-12	2.55E-13	1.01E-12
Pyrene	1.30E+00	2.51E-08	1.19E-12	1.54E-11	5.85E-12	8.17E-13	3.24E-12

Table 4-21 (cont'd)
 Airborne Contaminant Concentrations
 Due To Fugitive Dust Releases From
 Construction Traffic On-site
 Area D - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.54E+04	2.97E-04	1.40E-08	1.83E-07	6.93E-08	9.68E-09	3.84E-08
Antimony	4.20E+00	8.10E-08	3.83E-12	4.99E-11	1.89E-11	2.64E-12	1.05E-11
Arsenic	8.07E+01	1.56E-06	7.36E-11	9.58E-10	3.63E-10	5.07E-11	2.01E-10
Barium	2.81E+02	5.42E-06	2.56E-10	3.34E-09	1.27E-09	1.77E-10	7.00E-10
Beryllium	9.90E-01	1.91E-08	9.02E-13	1.18E-11	4.46E-12	6.22E-13	2.47E-12
Cadmium	2.90E+00	5.59E-08	2.64E-12	3.44E-11	1.31E-11	1.82E-12	7.23E-12
Calcium	2.58E+04	4.98E-04	2.35E-08	3.06E-07	1.16E-07	1.62E-08	6.43E-08
Chromium	3.12E+01	6.02E-07	2.84E-11	3.71E-10	1.40E-10	1.96E-11	7.78E-11
Cobalt	1.54E+01	2.97E-07	1.40E-11	1.83E-10	6.93E-11	9.68E-12	3.84E-11
Copper	8.99E+01	1.73E-06	8.19E-11	1.07E-09	4.05E-10	5.65E-11	2.24E-10
Iron	5.65E+04	1.09E-03	5.15E-08	6.71E-07	2.54E-07	3.55E-08	1.41E-07
Lead	4.69E+02	9.05E-06	4.28E-10	5.57E-09	2.11E-09	2.95E-10	1.17E-09
Magnesium	1.24E+04	2.39E-04	1.13E-08	1.47E-07	5.58E-08	7.79E-09	3.09E-08
Manganese	7.51E+02	1.45E-05	6.85E-10	8.92E-09	3.38E-09	4.72E-10	1.87E-09
Mercury	3.10E-01	5.98E-09	2.83E-13	3.68E-12	1.40E-12	1.95E-13	7.73E-13
Nickel	2.90E+01	5.59E-07	2.64E-11	3.44E-10	1.31E-10	1.82E-11	7.23E-11
Potassium	2.42E+03	4.57E-05	2.21E-09	2.87E-08	1.09E-08	1.52E-09	6.03E-09
Selenium	1.50E+00	2.89E-08	1.37E-12	1.78E-11	6.75E-12	9.42E-13	3.74E-12
Silver	9.30E-01	1.79E-08	8.48E-13	1.10E-11	4.19E-12	5.84E-13	2.32E-12
Sodium	2.86E+02	5.52E-06	2.61E-10	3.40E-09	1.29E-09	1.80E-10	7.13E-10
Thallium	6.20E-01	1.20E-08	5.65E-13	7.36E-12	2.79E-12	3.90E-13	1.55E-12
Vanadium	4.56E+01	8.79E-07	4.16E-11	5.42E-10	2.05E-10	2.86E-11	1.14E-10
Zinc	9.40E+02	1.81E-05	8.57E-10	1.12E-08	4.23E-09	5.91E-10	2.34E-09
Cyanide	7.50E-01	1.45E-08	6.84E-13	8.91E-12	3.38E-12	4.71E-13	1.87E-12
PESTICIDES/PCBS *							
PCB-1242	9.80E-02	1.89E-09	8.93E-14	1.16E-12	4.41E-13	6.16E-14	2.44E-13
PCB-1254	1.98E-01	3.82E-09	1.80E-13	2.35E-12	8.92E-13	1.24E-13	4.93E-13
PCB-1260	1.98E-01	3.82E-09	1.80E-13	2.35E-12	8.92E-13	1.24E-13	4.93E-13
PCB-1248	9.80E-02	1.89E-09	8.93E-14	1.16E-12	4.41E-13	6.16E-14	2.44E-13
TOTAL	1.16E+05	2.23E-03	1.05E-07	1.37E-06	5.20E-07	7.26E-08	2.88E-07

* 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

construction activities under evaluation (EPA, 1989a). As remedial actions have not yet been identified for the Booth Oil Site, it is assumed that soil moving during remediation will be conducted by bulldozer. The emission rate of respirable dusts during construction by bulldozer is estimated by the formula (EPA, 1989a):

$$E_h = 0.45 \times s^{1.5} \times M^{-1.4}$$

where:

- E_h = respirable particulate emission rate due to soils handling by bulldozer (kg/hr)
- s = soil silt content (weight fraction)
- M = soil moisture content (weight fraction)

The soil moisture content is calculated by:

$$M = \frac{fc \times W_w}{W_s}$$

where:

- M = soil moisture content (weight fraction)
- fc = field capacity (dimensionless)
- W_w = weight of 1 ft³ of water (lbs)
- W_s = weight of 1 ft³ of soil (lbs)

BOS2REPa/bos-t2
February 26, 1991

As discussed earlier, the following soil types are identified at the Booth Oil Site: Canandaigua silt loam (CaA), Raynham silt loam (RaA), and Rhinebeck silt loam (RbA). The field capacity (fc) for each of these soil types is 0.20 (USDA, 1972). The weight of 1 ft³ of water is 7.0 lbs. The weight of 1 ft³ of soil ranges from 80.0 lbs for CaA and RaA to 104 lbs for RbA (USDA, 1972). Assuming an equal distribution of each soil type at the site, an average moisture content of 0.016 is calculated for soil at the Booth Oil Site.

Based upon the above, and an average soil silt content of 0.75 (USDA, 1972), an emission rate of 95.5 kg/hr is calculated for construction activities at the site. Assuming, as in Section 4.2.2.2, that fugitive dust emissions from construction activities are not of concern on rainy days, snow-covered days and non-working days, a total construction emission rate of 7.35E+04 kg/yr is calculated for the Booth Oil Site. Assuming equal amounts of construction activities take place across the entire site, an emission rate of 1.84E+04 kg/yr is calculated for each area of the site.

As discussed in Sections 4.2.1 and 4.2.2.1, a simplified air dispersion model, entitled "SCREEN" (EPA, 1988b), is used to estimate mean airborne contaminant concentrations at the receptor

BOS2REPa/bos-t2
February 26, 1991

points. The inputs for SCREEN model, with the exception of emission rates, remain the same as for volatilization (see Section 4.2.1) and emission of fugitive dust by vehicles traveling on-site (see Section 4.2.2.1).

As for volatilization and fugitive dust emissions by traffic, the results of the SCREEN model for fugitive dust emissions are multiplied by the percent frequency of the wind direction toward each receptor point (obtained from NCDC, 1980) to arrive at mean airborne dust concentrations. Table 4-7 lists the wind directions and frequencies for each area of the site and each receptor point.

The calculated airborne dust levels at the receptor points are presented in Table 4-12. Review of the table indicates that construction emissions consistently result in the highest dust concentrations for each receptor point from each area of the site. Conversely, parking in Area B and recreational traffic consistently result in the lowest airborne dust concentrations at each receptor point from each area of the site.

The on-site airborne respirable dust levels presented in Table 4-12 for construction emissions are all greater than the Occupational Safety and Health Administration (OSHA) limit of 5 mg/m³. It is expected that on-site controls will be used to

BOS2REPa/bos-t2
February 26, 1991

suppress dusts beneath this limit. Therefore, the fugitive dust emission calculations presented herein for construction emissions are conservative and do not account for any on-site controls. Use of these emission estimates herein results in conservative estimates of on-site and off-site inhalation exposures during construction.

The airborne dust levels presented in Table 4-12 are multiplied by the mean soil contaminant concentrations calculated for each area of the site to estimate airborne contaminant concentrations at the receptor points due to fugitive dust releases on-site. Table 4-22 lists the upper 95% confidence arithmetic mean contaminant concentrations detected in the surficial soil of Area A and the calculated airborne contaminant concentrations at the receptor points due to fugitive dust releases from construction activities in Area A. As expected, the table indicates that the highest total airborne contaminant concentration, 9.79 mg/m^3 is calculated for on-site receptors. In descending order of concentration, the total off-site airborne contaminant concentrations at the receptor points resulting from construction emissions of fugitive dust from Area A are as follows: $2.15\text{E-}03 \text{ mg/m}^3$ at River Road, $2.11\text{E-}03 \text{ mg/m}^3$ at North Marion Street, $1.71\text{E-}03 \text{ mg/m}^3$ at the playground, $1.22\text{E-}03 \text{ mg/m}^3$ at Robinson Street, and $9.06\text{E-}04$ at Sommer Street. Review of Tables 4-22, 4-18, 4-13 and

BOS2REPa/bos-t2
February 26, 1991

Table 4-22
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Activities On-Site
Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.13E-01	1.90E-05	3.31E-09	4.10E-09	2.36E-09	4.17E-09	1.76E-09
Carbon Disulfide	1.07E-01	4.92E-06	8.58E-10	1.06E-09	6.11E-10	1.08E-09	4.55E-10
1,1-Dichloroethane	9.30E-01	4.27E-05	7.45E-09	9.23E-09	5.31E-09	9.39E-09	3.95E-09
1,2-Dichloroethene (total)	1.90E-01	8.73E-06	1.52E-09	1.89E-09	1.08E-09	1.92E-09	8.08E-10
Ethylbenzene	5.84E-01	2.68E-05	4.68E-09	5.79E-09	3.33E-09	5.89E-09	2.48E-09
Tetrachloroethene	1.66E-01	7.63E-06	1.33E-09	1.65E-09	9.47E-10	1.68E-09	7.06E-10
Toluene	4.13E-01	1.90E-05	3.31E-09	4.10E-09	2.36E-09	4.17E-09	1.76E-09
Trichloroethene	4.13E-01	1.90E-05	3.31E-09	4.10E-09	2.36E-09	4.17E-09	1.76E-09
Xylene (total)	1.19E+01	5.48E-04	9.56E-08	1.18E-07	6.81E-08	1.20E-07	5.07E-08
SEMI-VOLATILES							
Acenaphthene	1.88E+00	8.62E-05	1.50E-08	1.86E-08	1.07E-08	1.89E-08	7.98E-09
Acenaphthylene	1.70E+00	7.82E-05	1.36E-08	1.69E-08	9.72E-09	1.72E-08	7.24E-09
Anthracene	1.72E+00	7.88E-05	1.37E-08	1.70E-08	9.79E-09	1.73E-08	7.29E-09
Benzo(a)anthracene	1.58E+00	7.26E-05	1.27E-08	1.57E-08	9.02E-09	1.59E-08	6.72E-09
Benzo(b)fluoranthene	1.62E+00	7.44E-05	1.30E-08	1.61E-08	9.24E-09	1.63E-08	6.88E-09
Benzo(k)fluoranthene	1.72E+00	7.89E-05	1.38E-08	1.70E-08	9.80E-09	1.73E-08	7.30E-09
Benzoic acid	8.33E+00	3.83E-04	6.67E-08	8.26E-08	4.75E-08	8.40E-08	3.54E-08
Benzo(a)pyrene	1.60E+00	7.35E-05	1.28E-08	1.59E-08	9.13E-09	1.61E-08	6.80E-09
Butylbenzylphthalate	8.21E-01	3.77E-05	6.58E-09	8.15E-09	4.69E-09	8.29E-09	3.49E-09
Chrysene	1.38E+00	6.32E-05	1.10E-08	1.36E-08	7.85E-09	1.39E-08	5.85E-09
Dibenzo(a,h)anthracene	1.72E+00	7.89E-05	1.38E-08	1.70E-08	9.80E-09	1.73E-08	7.30E-09
2,4-Dimethylphenol	1.75E+00	8.02E-05	1.40E-08	1.73E-08	9.96E-09	1.76E-08	7.42E-09
bis(2-Ethylhexyl)phthalate	3.03E+00	1.39E-04	2.43E-08	3.00E-08	1.73E-08	3.06E-08	1.29E-08
Fluoranthene	2.73E+00	1.26E-04	2.19E-08	2.71E-08	1.56E-08	2.76E-08	1.16E-08
Fluorene	1.75E+00	8.04E-05	1.40E-08	1.74E-08	9.98E-09	1.77E-08	7.44E-09
Indeno(1,2,3-cd)pyrene	1.71E+00	7.86E-05	1.37E-08	1.70E-08	9.76E-09	1.73E-08	7.28E-09
2-Methylnaphthalene	6.77E+00	3.11E-04	5.43E-08	6.72E-08	3.86E-08	6.83E-08	2.88E-08
2-Methylphenol	1.72E+00	7.89E-05	1.38E-08	1.70E-08	9.80E-09	1.73E-08	7.30E-09
4-Methylphenol	1.71E+00	7.87E-05	1.37E-08	1.70E-08	9.78E-09	1.73E-08	7.28E-09
Naphthalene	1.56E+00	7.17E-05	1.25E-08	1.55E-08	8.90E-09	1.57E-08	6.63E-09
Di-n-octylphthalate	1.76E+00	8.10E-05	1.41E-08	1.75E-08	1.01E-08	1.78E-08	7.50E-09
Phenanthrene	3.43E+00	1.57E-04	2.75E-08	3.40E-08	1.96E-08	3.46E-08	1.46E-08
Phenol	1.72E+00	7.89E-05	1.38E-08	1.70E-08	9.80E-09	1.73E-08	7.30E-09
Pyrene	2.17E+00	9.99E-05	1.74E-08	2.16E-08	1.24E-08	2.19E-08	9.24E-09

Table 4-22 (cont'd)
 Airborne Contaminant Concentrations
 Due to Fugitive Dust Releases From
 Construction Activities On-Site
 Area A - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.12E+04	5.13E-01	8.94E-05	1.11E-04	6.37E-05	1.13E-04	4.74E-05
Antimony	6.79E+00	3.12E-04	5.44E-08	6.74E-08	3.88E-08	6.86E-08	2.89E-08
Arsenic	2.69E+01	1.24E-03	2.16E-07	2.67E-07	1.54E-07	2.72E-07	1.15E-07
Barium	2.02E+02	9.26E-03	1.62E-06	2.00E-06	1.15E-06	2.03E-06	8.57E-07
Beryllium	1.46E+00	6.70E-05	1.17E-08	1.45E-08	8.32E-09	1.47E-08	6.20E-09
Cadmium	1.66E+00	7.62E-05	1.33E-08	1.65E-08	9.46E-09	1.67E-08	7.05E-09
Calcium	1.11E+05	5.11E+00	8.91E-04	1.10E-03	6.35E-04	1.12E-03	4.73E-04
Chromium	2.35E+01	1.08E-03	1.88E-07	2.33E-07	1.34E-07	2.37E-07	9.98E-08
Cobalt	6.96E+00	3.20E-04	5.58E-08	6.90E-08	3.97E-08	7.02E-08	2.96E-08
Copper	8.44E+01	3.88E-03	6.77E-07	8.38E-07	4.82E-07	8.52E-07	3.59E-07
Iron	2.86E+04	1.31E+00	2.29E-04	2.83E-04	1.63E-04	2.88E-04	1.21E-04
Lead	8.98E+02	4.12E-02	7.19E-06	8.91E-06	5.12E-06	9.06E-06	3.82E-06
Magnesium	5.71E+04	2.62E+00	4.58E-04	5.67E-04	3.26E-04	5.76E-04	2.43E-04
Manganese	9.60E+02	4.41E-02	7.69E-06	9.52E-06	5.48E-06	9.68E-06	4.08E-06
Mercury	2.87E-01	1.32E-05	2.30E-09	2.85E-09	1.64E-09	2.90E-09	1.22E-09
Nickel	1.97E+01	9.03E-04	1.58E-07	1.95E-07	1.12E-07	1.98E-07	8.36E-08
Potassium	1.82E+03	8.36E-02	1.46E-05	1.80E-05	1.04E-05	1.84E-05	7.73E-06
Selenium	1.60E+00	7.33E-05	1.28E-08	1.58E-08	9.11E-09	1.61E-08	6.79E-09
Silver	9.27E-01	4.26E-05	7.43E-09	9.20E-09	5.29E-09	9.36E-09	3.94E-09
Sodium	4.79E+02	2.20E-02	3.84E-06	4.75E-06	2.73E-06	4.83E-06	2.04E-06
Thallium	5.24E-01	2.41E-05	4.20E-09	5.20E-09	2.99E-09	5.29E-09	2.23E-09
Vanadium	2.31E+01	1.06E-03	1.85E-07	2.29E-07	1.32E-07	2.33E-07	9.81E-08
Zinc	3.55E+02	1.63E-02	2.85E-06	3.53E-06	2.03E-06	3.59E-06	1.51E-06
Cyanide	8.95E+00	4.11E-04	7.17E-08	8.88E-08	5.11E-08	9.03E-08	3.81E-08
PESTICIDES/PCBs							
PCB-1242	5.17E-01	2.38E-05	4.14E-09	5.13E-09	2.95E-09	5.22E-09	2.20E-09
PCB-1254	1.45E+01	6.65E-04	1.16E-07	1.44E-07	8.27E-08	1.46E-07	6.16E-08
PCB-1260	1.12E+01	5.14E-04	8.97E-08	1.11E-07	6.39E-08	1.13E-07	4.76E-08
PCB-1248	1.68E+01	7.70E-04	1.34E-07	1.66E-07	9.56E-08	1.69E-07	7.12E-08
TOTAL	2.13E+05	9.79E+00	1.71E-03	2.11E-03	1.22E-03	2.15E-03	9.06E-04

4-8 indicates that these concentrations follow the same order as the total airborne contaminant concentrations calculated for volatilized contaminants, and fugitive dusts generated by traffic in Area A.

Table 4-23 presents the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction traffic in Area B. The total airborne contaminant concentrations presented in the table range from $1.56 \times 10^1 \text{ mg/m}^3$ for on-site receptors to $1.16\text{E-}03 \text{ mg/m}^3$ for receptors at River Road. The sequence of total airborne contaminant concentrations at the receptor points from construction in Area B, in descending order of concentration: $4.35\text{E-}03 \text{ mg/m}^3$ at Robinson Street, $4.08\text{E-}03 \text{ mg/m}^3$ at North Marion Street, $2.23\text{E-}03 \text{ mg/m}^3$ at Sommer Street, $2.19\text{E-}03 \text{ mg/m}^3$ at the playground, and $1.16\text{E-}03 \text{ mg/m}^3$ at River Road.

The total airborne contaminant concentrations at the receptor points due to construction in Area C are presented in Table 4-24. As expected, the highest total contaminant concentration presented in the table, $1.06\text{E+}01 \text{ mg/m}^3$, is calculated for on-site receptors. The total airborne contaminant concentrations calculated for off-site receptors due to fugitive dusts released by construction in Area C, in descending order of concentration, are as follows: $3.90\text{E-}03 \text{ mg/m}^3$ at Robinson Street, $2.89\text{E-}03 \text{ mg/m}^3$ at North Marion

Table 4-23
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Activities Traffic On-Site
Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.41E-01	1.83E-05	2.56E-09	4.78E-09	5.11E-09	1.36E-09	2.61E-09
Carbon Disulfide	3.88E-01	1.61E-05	2.26E-09	4.21E-09	4.49E-09	1.20E-09	2.30E-09
1,1-Dichloroethane	3.88E-01	1.61E-05	2.26E-09	4.21E-09	4.49E-09	1.20E-09	2.30E-09
1,2-Dichloroethene (total)	5.95E-01	2.47E-05	3.46E-09	6.45E-09	6.89E-09	1.83E-09	3.52E-09
Ethylbenzene	3.88E-01	1.61E-05	2.26E-09	4.21E-09	4.49E-09	1.20E-09	2.30E-09
Tetrachloroethene	1.55E+00	6.44E-05	9.01E-09	1.68E-08	1.79E-08	4.77E-09	9.18E-09
Toluene	3.88E-01	1.61E-05	2.26E-09	4.21E-09	4.49E-09	1.20E-09	2.30E-09
Trichloroethene	2.74E+00	1.14E-04	1.60E-08	2.97E-08	3.18E-08	8.45E-09	1.63E-08
Xylene (total)	3.88E-01	1.61E-05	2.26E-09	4.21E-09	4.49E-09	1.20E-09	2.30E-09
SEMI-VOLATILES							
Acenaphthene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Acenaphthylene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Anthracene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Benzo(a)anthracene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Benzo(b)fluoranthene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Benzo(k)fluoranthene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Benzoic acid	8.12E+01	3.37E-03	4.72E-07	8.80E-07	9.40E-07	2.50E-07	4.81E-07
Benzo(a)pyrene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Butylbenzylphthalate	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Chrysene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Dibenzo(a,h)anthracene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
2,4-Dimethylphenol	7.76E+01	3.22E-03	4.51E-07	8.41E-07	8.98E-07	2.39E-07	4.59E-07
bis(2-Ethylhexyl)phthalate	4.49E+01	1.87E-03	2.61E-07	4.87E-07	5.20E-07	1.38E-07	2.66E-07
Fluoranthene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Fluorene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
Indeno(1,2,3-cd)pyrene	1.67E+01	6.96E-04	9.73E-08	1.81E-07	1.94E-07	5.16E-08	9.92E-08
2-Methylnaphthalene	4.15E+00	1.72E-04	2.41E-08	4.50E-08	4.80E-08	1.28E-08	2.46E-08
2-Methylphenol	5.69E+01	2.36E-03	3.31E-07	6.17E-07	6.59E-07	1.75E-07	3.37E-07
4-Methylphenol	4.27E+02	1.77E-02	2.48E-06	4.63E-06	4.94E-06	1.32E-06	2.53E-06
Naphthalene	1.69E+01	7.04E-04	9.85E-08	1.84E-07	1.96E-07	5.22E-08	1.00E-07
Di-n-octylphthalate	1.65E+01	6.84E-04	9.57E-08	1.78E-07	1.91E-07	5.07E-08	9.75E-08
Phenanthrene	2.48E+00	1.03E-04	1.44E-08	2.69E-08	2.88E-08	7.65E-09	1.47E-08
Phenol	2.50E+02	1.04E-02	1.45E-06	2.71E-06	2.90E-06	7.70E-07	1.48E-06
Pyrene	1.64E+01	6.83E-04	9.56E-08	1.78E-07	1.90E-07	5.06E-08	9.74E-08

Table 4-23 (cont'd)
 Airborne Contaminant Concentrations
 Due to Fugitive Dust Releases From
 Construction Activities Traffic On-Site
 Area B - Surficial Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	3.40E+04	1.41E+00	1.98E-04	3.68E-04	3.93E-04	1.05E-04	2.01E-04
Antimony	1.85E+02	7.71E-03	1.08E-06	2.01E-06	2.15E-06	5.71E-07	1.10E-06
Arsenic	1.39E+01	5.77E-04	8.07E-08	1.51E-07	1.61E-07	4.28E-08	8.22E-08
Barium	3.04E+03	1.26E-01	1.77E-05	3.29E-05	3.51E-05	9.35E-06	1.80E-05
Beryllium	6.30E+00	2.62E-04	3.66E-08	6.83E-08	7.29E-08	1.94E-08	3.73E-08
Cadmium	9.33E+00	3.88E-04	5.43E-08	1.01E-07	1.08E-07	2.87E-08	5.53E-08
Calcium	2.09E+05	8.68E+00	1.21E-03	2.26E-03	2.42E-03	6.43E-04	1.24E-03
Chromium	1.74E+02	7.22E-03	1.01E-06	1.88E-06	2.01E-06	5.35E-07	1.03E-06
Cobalt	1.33E+01	5.53E-04	7.73E-08	1.44E-07	1.54E-07	4.10E-08	7.88E-08
Copper	6.35E+02	2.64E-02	3.69E-06	6.88E-06	7.35E-06	1.96E-06	3.76E-06
Iron	5.14E+04	2.14E+00	2.99E-04	5.57E-04	5.95E-04	1.58E-04	3.04E-04
Lead	2.45E+03	1.02E-01	1.43E-05	2.66E-05	2.84E-05	7.55E-06	1.45E-05
Magnesium	6.55E+04	2.72E+00	3.81E-04	7.10E-04	7.58E-04	2.02E-04	3.88E-04
Manganese	2.84E+03	1.18E-01	1.65E-05	3.08E-05	3.29E-05	8.75E-06	1.68E-05
Mercury	1.72E-01	7.15E-06	1.00E-09	1.86E-09	1.99E-09	5.30E-10	1.02E-09
Nickel	4.59E+01	1.91E-03	2.67E-07	4.98E-07	5.32E-07	1.41E-07	2.72E-07
Potassium	2.55E+03	1.06E-01	1.49E-05	2.77E-05	2.96E-05	7.87E-06	1.51E-05
Selenium	2.18E+00	9.05E-05	1.27E-08	2.36E-08	2.52E-08	6.71E-09	1.29E-08
Silver	9.37E-01	3.90E-05	5.45E-09	1.02E-08	1.08E-08	2.89E-09	5.55E-09
Sodium	1.58E+03	6.55E-02	9.17E-06	1.71E-05	1.83E-05	4.86E-06	9.34E-06
Thallium	7.01E-01	2.91E-05	4.08E-09	7.60E-09	8.12E-09	2.16E-09	4.15E-09
Vanadium	2.89E+01	1.20E-03	1.68E-07	3.13E-07	3.34E-07	8.89E-08	1.71E-07
Zinc	1.36E+03	5.66E-02	7.92E-06	1.48E-05	1.58E-05	4.20E-06	8.07E-06
Cyanide	6.20E+00	2.58E-04	3.60E-08	6.72E-08	7.17E-08	1.91E-08	3.67E-08
PESTICIDES/PCBs							
PCB-1242	1.66E+01	6.89E-04	9.63E-08	1.80E-07	1.92E-07	5.10E-08	9.81E-08
PCB-1254	3.83E+01	1.59E-03	2.23E-07	4.15E-07	4.44E-07	1.18E-07	2.27E-07
PCB-1260	3.66E+01	1.52E-03	2.13E-07	3.97E-07	4.24E-07	1.13E-07	2.17E-07
PCB-1248	3.44E+01	1.43E-03	2.00E-07	3.73E-07	3.99E-07	1.06E-07	2.04E-07
TOTAL	3.76E+05	1.56E+01	2.19E-03	4.08E-03	4.35E-03	1.16E-03	2.23E-03

Table 4-24
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Activities On-site
Area C - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	4.00E-03	3.03E-07	9.06E-12	8.22E-11	1.11E-10	8.06E-12	2.26E-11
Carbon Disulfide	5.00E-03	3.79E-07	1.13E-11	1.03E-10	1.39E-10	1.01E-11	2.83E-11
1,1-Dichloroethane	3.00E-03	2.27E-07	6.79E-12	6.17E-11	8.33E-11	6.05E-12	1.70E-11
1,2-Dichloroethene (total)	6.50E-02	4.92E-06	1.47E-10	1.34E-09	1.81E-09	1.31E-10	3.68E-10
Ethylbenzene	6.00E-03	4.54E-07	1.36E-11	1.23E-10	1.67E-10	1.21E-11	3.39E-11
Tetrachloroethene	7.00E-03	5.30E-07	1.58E-11	1.44E-10	1.94E-10	1.41E-11	3.96E-11
Toluene	1.40E-02	1.06E-06	3.17E-11	2.88E-10	3.89E-10	2.82E-11	7.92E-11
Trichloroethene	1.90E-02	1.44E-06	4.30E-11	3.91E-10	5.28E-10	3.83E-11	1.07E-10
Xylene (total)	3.60E-02	2.73E-06	8.15E-11	7.40E-10	1.00E-09	7.25E-11	2.04E-10
SEMI-VOLATILES							
Acenaphthene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Acenaphthylene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Anthracene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Benzo(a)anthracene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Benzo(b)fluoranthene	1.80E+00	1.36E-04	4.08E-09	3.70E-08	5.00E-08	3.63E-09	1.02E-08
Benzo(k)fluoranthene	8.10E-01	6.13E-05	1.83E-09	1.67E-08	2.25E-08	1.63E-09	4.58E-09
Benzoic acid	6.82E+00	5.16E-04	1.54E-08	1.40E-07	1.89E-07	1.37E-08	3.85E-08
Benzo(a)pyrene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Butylbenzylphthalate	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Chrysene	1.10E+00	8.33E-05	2.49E-09	2.26E-08	3.06E-08	2.22E-09	6.22E-09
Dibenzo(a,h)anthracene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
2,4-Dimethylphenol	7.50E-01	5.68E-05	1.70E-09	1.54E-08	2.08E-08	1.51E-09	4.24E-09
bis(2-Ethylhexyl)phthalate	8.20E+00	6.21E-04	1.86E-08	1.69E-07	2.28E-07	1.65E-08	4.64E-08
Fluoranthene	1.50E+00	1.14E-04	3.40E-09	3.08E-08	4.17E-08	3.02E-09	8.48E-09
Fluorene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Indeno(1,2,3-cd)pyrene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
2-Methylnaphthalene	1.10E+00	8.33E-05	2.49E-09	2.26E-08	3.06E-08	2.22E-09	6.22E-09
2-Methylphenol	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
4-Methylphenol	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Naphthalene	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Di-n-octylphthalate	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Phenanthrene	1.70E+00	1.29E-04	3.85E-09	3.50E-08	4.72E-08	3.43E-09	9.61E-09
Phenol	1.41E+00	1.06E-04	3.18E-09	2.89E-08	3.91E-08	2.83E-09	7.95E-09
Pyrene	1.90E+00	1.44E-04	4.30E-09	3.91E-08	5.28E-08	3.83E-09	1.07E-08

Table 4-24 (cont'd)
Airborne Contaminant Concentrations
Due to Fugitive Dust Releases From
Construction Activities On-site
Area C - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.33E+04	1.01E+00	3.01E-05	2.73E-04	3.69E-04	2.68E-05	7.52E-05
Antimony	4.80E+00	3.63E-04	1.09E-08	9.87E-08	1.33E-07	9.67E-09	2.71E-08
Arsenic	2.12E+01	1.60E-03	4.80E-08	4.36E-07	5.89E-07	4.27E-08	1.20E-07
Barium	2.37E+02	1.79E-02	5.37E-07	4.87E-06	6.58E-06	4.78E-07	1.34E-06
Beryllium	9.70E-01	7.34E-05	2.20E-09	1.99E-08	2.69E-08	1.95E-09	5.49E-09
Cadmium	2.40E+00	1.82E-04	5.43E-09	4.93E-08	6.67E-08	4.84E-09	1.36E-08
Calcium	7.33E+04	5.55E+00	1.66E-04	1.51E-03	2.04E-03	1.48E-04	4.14E-04
Chromium	2.97E+01	2.25E-03	6.72E-08	6.11E-07	8.25E-07	5.99E-08	1.68E-07
Cobalt	8.10E+00	6.13E-04	1.83E-08	1.67E-07	2.25E-07	1.63E-08	4.58E-08
Copper	7.39E+01	5.59E-03	1.67E-07	1.52E-06	2.05E-06	1.49E-07	4.18E-07
Iron	2.38E+04	1.80E+00	5.39E-05	4.89E-04	6.61E-04	4.80E-05	1.35E-04
Lead	7.44E+02	5.63E-02	1.68E-06	1.53E-05	2.07E-05	1.50E-06	4.21E-06
Magnesium	2.53E+04	1.92E+00	5.73E-05	5.20E-04	7.03E-04	5.10E-05	1.43E-04
Manganese	7.45E+02	5.64E-02	1.69E-06	1.53E-05	2.07E-05	1.50E-06	4.21E-06
Mercury	2.30E-01	1.74E-05	5.21E-10	4.73E-09	6.39E-09	4.64E-10	1.30E-09
Nickel	2.24E+01	1.70E-03	5.07E-08	4.61E-07	6.22E-07	4.51E-08	1.27E-07
Potassium	1.99E+03	1.51E-01	4.51E-06	4.09E-05	5.53E-05	4.01E-06	1.13E-05
Selenium	6.70E-01	5.07E-05	1.52E-09	1.38E-08	1.86E-08	1.35E-09	3.79E-09
Silver	8.30E-01	6.28E-05	1.88E-09	1.71E-08	2.31E-08	1.67E-09	4.69E-09
Sodium	3.01E+02	2.28E-02	6.81E-07	6.19E-06	8.36E-06	6.07E-07	1.70E-06
Thallium	4.20E-01	3.18E-05	9.51E-10	8.64E-09	1.17E-08	8.46E-10	2.38E-09
Vanadium	2.17E+01	1.64E-03	4.91E-08	4.46E-07	6.03E-07	4.37E-08	1.23E-07
Zinc	3.43E+02	2.60E-02	7.77E-07	7.05E-06	9.53E-06	6.91E-07	1.94E-06
Cyanide	5.40E-01	4.09E-05	1.22E-09	1.11E-08	1.50E-08	1.09E-09	3.05E-09
PESTICIDES/PCBS *							
PCB-1242	1.45E+00	1.10E-04	3.29E-09	2.99E-08	4.04E-08	2.93E-09	8.22E-09
PCB-1254	5.57E+01	4.22E-03	1.26E-07	1.15E-06	1.55E-06	1.12E-07	3.15E-07
PCB-1260	6.23E+00	4.71E-04	1.41E-08	1.28E-07	1.73E-07	1.25E-08	3.52E-08
PCB-1248	3.32E+01	2.51E-03	7.52E-08	6.83E-07	9.23E-07	6.69E-08	1.88E-07
TOTAL	1.40E+05	1.06E+01	3.18E-04	2.89E-03	3.90E-03	2.83E-04	7.94E-04

* 95% Confidence Arithmetic Mean used for Pesticides/PCB's

Street, $7.94\text{E-}04 \text{ mg/m}^3$ at Sommer Street, $3.18\text{E-}04 \text{ mg/m}^3$ at the playground, and $2.83\text{E-}04 \text{ mg/m}^3$ at River Road. Comparison of Tables 4-24 and 4-20 indicates that the total airborne contaminant concentrations at the receptor points due to fugitive dusts from construction in Area C follow the same sequence as those calculated from fugitive dust emissions by traffic in Area C.

Table 4-25 presents the airborne contaminant concentrations at the receptor points due to fugitive dust released from construction in Area D. The total airborne contaminant concentrations presented in the table range from 4.78 mg/m^3 for on-site receptors to $1.56\text{E-}04 \text{ mg/m}^3$ for receptors at River Road. The sequence of total airborne contaminant concentrations calculated for fugitive dust emissions by construction in Area D are, in descending order of concentration: $2.94\text{E-}03 \text{ mg/m}^3$ at North Marion Street, $1.12\text{E-}03 \text{ mg/m}^3$ at Robinson Street, $6.17\text{E-}04 \text{ mg/m}^3$ at Sommer Street, $2.26\text{E-}04 \text{ mg/m}^3$ at the playground, and $1.56\text{E-}04 \text{ mg/m}^3$ at River Road. Comparison of Tables 4-25, 4-21 and 4-16 indicates that these off-site concentrations follow the same sequence as calculated for fugitive dust emissions by traffic on-site.

The airborne contaminant concentrations calculated above are used in Section 4.4 to estimate inhalation exposure doses at the receptor points.

BOS2REPa/bos-t2
February 26, 1991

Table 4-25

Airborne Contaminant Concentrations
Due To Fugitive Dust Releases From
Construction Activities On-site
Area D - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
VOLATILES							
Benzene	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Carbon Disulfide	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
1,1-Dichloroethane	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
1,2-Dichloroethene (total)	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Ethylbenzene	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Tetrachloroethene	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Toluene	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Trichloroethene	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
Xylene (total)	3.00E-03	1.24E-07	5.86E-12	7.63E-11	2.90E-11	4.04E-12	1.60E-11
SEMI-VOLATILES							
Acenaphthene	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Acenaphthylene	1.40E-01	5.79E-06	2.74E-10	3.56E-09	1.35E-09	1.89E-10	7.48E-10
Anthracene	8.70E-02	3.60E-06	1.70E-10	2.21E-09	8.40E-10	1.17E-10	4.65E-10
Benzo(a)anthracene	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Benzo(b)fluoranthene	1.50E+00	6.20E-05	2.93E-09	3.82E-08	1.45E-08	2.02E-09	8.01E-09
Benzo(k)fluoranthene	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Benzoic acid	2.00E-01	8.27E-06	3.91E-10	5.09E-09	1.93E-09	2.69E-10	1.07E-09
Benzo(a)pyrene	9.90E-01	4.09E-05	1.93E-09	2.52E-08	9.56E-09	1.33E-09	5.29E-09
Butylbenzylphthalate	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Chrysene	1.20E+00	4.96E-05	2.34E-09	3.05E-08	1.16E-08	1.62E-09	6.41E-09
Dibenzo(a,h)anthracene	1.20E-01	4.96E-06	2.34E-10	3.05E-09	1.16E-09	1.62E-10	6.41E-10
2,4-Dimethylphenol	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
bis(2-Ethylhexyl)phthalate	3.30E+00	1.36E-04	6.45E-09	8.40E-08	3.19E-08	4.44E-09	1.76E-08
Fluoranthene	2.20E+00	9.10E-05	4.30E-09	5.60E-08	2.12E-08	2.96E-09	1.18E-08
Fluorene	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Indeno(1,2,3-cd)pyrene	9.00E-01	3.72E-05	1.76E-09	2.29E-08	8.69E-09	1.21E-09	4.81E-09
2-Methylnaphthalene	1.20E-01	4.96E-06	2.34E-10	3.05E-09	1.16E-09	1.62E-10	6.41E-10
2-Methylphenol	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
4-Methylphenol	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Naphthalene	6.80E-02	2.81E-06	1.33E-10	1.73E-09	6.56E-10	9.16E-11	3.63E-10
Di-n-octylphthalate	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Phenanthrene	6.20E-01	2.56E-05	1.21E-09	1.58E-08	5.98E-09	8.35E-10	3.31E-09
Phenol	4.06E-01	1.68E-05	7.93E-10	1.03E-08	3.92E-09	5.47E-10	2.17E-09
Pyrene	1.30E+00	5.38E-05	2.54E-09	3.31E-08	1.25E-08	1.75E-09	6.94E-09

Table 4-25 (cont'd)

Airborne Contaminant Concentrations
Due To Fugitive Dust Releases From
Construction Activities On-site
Area D - Surficial Soil

	Soil Concentration (mg/kg)	On-site Airborne Concentration (mg/m ³)	Playground Airborne Concentration (mg/m ³)	N. Marion St. Airborne Concentration (mg/m ³)	Robinson St. Airborne Concentration (mg/m ³)	River Road Airborne Concentration (mg/m ³)	Sommer Street Airborne Concentration (mg/m ³)
INORGANICS							
Aluminum	1.54E+04	6.37E-01	3.01E-05	3.92E-04	1.49E-04	2.07E-05	8.23E-05
Antimony	4.20E+00	1.74E-04	8.21E-09	1.07E-07	4.05E-08	5.66E-09	2.24E-08
Arsenic	8.07E+01	3.34E-03	1.58E-07	2.05E-06	7.79E-07	1.09E-07	4.31E-07
Barium	2.81E+02	1.16E-02	5.49E-07	7.15E-06	2.71E-06	3.78E-07	1.50E-06
Beryllium	9.90E-01	4.09E-05	1.93E-09	2.52E-08	9.56E-09	1.33E-09	5.29E-09
Cadmium	2.90E+00	1.20E-04	5.67E-09	7.38E-08	2.80E-08	3.91E-09	1.55E-08
Calcium	2.58E+04	1.07E+00	5.04E-05	6.57E-04	2.49E-04	3.47E-05	1.38E-04
Chromium	3.12E+01	1.29E-03	6.10E-08	7.94E-07	3.01E-07	4.20E-08	1.67E-07
Cobalt	1.54E+01	6.37E-04	3.01E-08	3.92E-07	1.49E-07	2.07E-08	8.23E-08
Copper	8.99E+01	3.72E-03	1.76E-07	2.29E-06	8.68E-07	1.21E-07	4.80E-07
Iron	5.65E+04	2.34E+00	1.10E-04	1.44E-03	5.45E-04	7.61E-05	3.02E-04
Lead	4.69E+02	1.94E-02	9.16E-07	1.19E-05	4.53E-06	6.32E-07	2.51E-06
Magnesium	1.24E+04	5.13E-01	2.42E-05	3.16E-04	1.20E-04	1.67E-05	6.62E-05
Manganese	7.51E+02	3.11E-02	1.47E-06	1.91E-05	7.25E-06	1.01E-06	4.01E-06
Mercury	3.10E-01	1.28E-05	6.06E-10	7.89E-09	2.99E-09	4.17E-10	1.66E-09
Nickel	2.90E+01	1.20E-03	5.67E-08	7.38E-07	2.80E-07	3.91E-08	1.55E-07
Potassium	2.42E+03	1.00E-01	4.73E-06	6.16E-05	2.34E-05	3.26E-06	1.29E-05
Selenium	1.50E+00	6.20E-05	2.93E-09	3.82E-08	1.45E-08	2.02E-09	8.01E-09
Silver	9.30E-01	3.85E-05	1.82E-09	2.37E-08	8.98E-09	1.25E-09	4.97E-09
Sodium	2.86E+02	1.18E-02	5.59E-07	7.28E-06	2.76E-06	3.85E-07	1.53E-06
Thallium	6.20E-01	2.56E-05	1.21E-09	1.58E-08	5.98E-09	8.35E-10	3.31E-09
Vanadium	4.56E+01	1.89E-03	8.91E-08	1.16E-06	4.40E-07	6.14E-08	2.44E-07
Zinc	9.40E+02	3.89E-02	1.84E-06	2.39E-05	9.07E-06	1.27E-06	5.02E-06
Cyanide	7.50E-01	3.10E-05	1.47E-09	1.91E-08	7.24E-09	1.01E-09	4.01E-09
PESTICIDES/PCBS *							
PCB-1242	9.80E-02	4.05E-06	1.91E-10	2.49E-09	9.46E-10	1.32E-10	5.24E-10
PCB-1254	1.98E-01	8.19E-06	3.87E-10	5.04E-09	1.91E-09	2.67E-10	1.06E-09
PCB-1260	1.98E-01	8.19E-06	3.87E-10	5.04E-09	1.91E-09	2.67E-10	1.06E-09
PCB-1248	9.80E-02	4.05E-06	1.91E-10	2.49E-09	9.46E-10	1.32E-10	5.24E-10
TOTAL	1.16E+05	4.78E+00	2.26E-04	2.94E-03	1.12E-03	1.56E-04	6.17E-04

* 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

4.3 Ingestion Exposure

Surficial soil at the Booth Oil Site may be ingested both inadvertently and intentionally (pica behavior) by children playing on-site. Similarly, children may ingest off-site soils in the same manner. Based upon the mean contaminant concentrations calculated for the Phase I RI surficial soil sampling data, contaminant doses due to soil ingestion are estimated herein for children exposed to each area of the Booth Oil Site and to the playground. Separate chemical intakes due to surficial soil ingestion are calculated for children at play and pica children by the formula (EPA, 1989c):

$$EEX = \frac{C_i \times a \times ER \times f \times ED}{BW \times T}$$

where:

- EEX = ingestion exposure dose (mg/kg-day)
- C_i = upper 95% confidence arithmetic mean concentration of contaminant i (mg/kg)
- a = conversion factor (1 kg/10⁶ mg)
- ER = soil ingestion rate (mg/day)
- f = frequency of exposure (days/year)
- ED = exposure duration (years)
- BW = average body weight (kg)
- T = averaging time (days)

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February 26, 1991

The following assumptions are used in the calculations:

- The soil ingestion rate (ER) for non-pica children ages 10 years to 18 years old is 10 mg/day (EPA, 1989b). This ingestion rate is for the entire site. It is assumed that children will consume equal amounts of soil from each area of the site to comprise this total. That is, it is assumed that non-pica children will ingest 2.5 mg/day of soil from each area of the site.
- The soil ingestion rate (ER) for pica children ages 10 years to 18 years old is 100 mg/day (EPA, 1989b). As with the non-pica ingestion rate, this value is a total ingestion rate for the entire site. It is assumed that pica children will ingest 25 mg/day of soil from each area of the site.
- The frequency of exposure (f) of children to the site, as discussed in Section 4.1, is 74 days/year.
- The duration of exposure (ED) for children is 8 years (i.e., from 10 through 18 years).
- The average body weight (BW) for children ages 10 through 18 years old is 51.3 kg (EPA, 1989b).

BOS2REPa/bos-t2
February 26, 1991

- The averaging time (T) for noncarcinogenic effects is equal to the exposure duration (ED) multiplied by 365 days/year (i.e., 2,920 days) (EPA, 1989c).
- The averaging time (T) for carcinogenic effects is equal to the 70-year standard lifetime (EPA, 1989b; EPA, 1989c) multiplied by 365 days/year (i.e., 25,550 days) (EPA, 1989c).

Separate doses are calculated for carcinogenic and noncarcinogenic effects. This is necessary for accurate comparison to carcinogenic and noncarcinogenic toxicity factors in the quantitative risk assessment. The noncarcinogenic dose is the actual average daily chemical intake during the exposure period. This dose is later compared to EPA Reference Doses in evaluating noncarcinogenic risk. The carcinogenic dose is the average chemical intake over a 70-year standard lifetime. The carcinogenic dose is later multiplied by EPA Carcinogenic Slope Factors to calculate incremental increases in lifetime cancer risk.

The total ingestion dose is calculated as the sum of the contaminant-specific ingestion doses. Tables 4-26 through 4-29 present the ingestion doses calculated for pica and non-pica children due to surficial soil in Areas A through D, respectively. Comparison of the tables indicates that the sequence of doses due

Table 4-26
Calculated Ingestion Exposure Doses
Area A Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
VOLATILES					
Benzene	0.413	4.08E-09	4.67E-10	4.08E-08	4.67E-09
Carbon Disulfide	0.107	1.06E-09	1.21E-10	1.06E-08	1.21E-09
1,1-Dichloroethane	0.930	9.19E-09	1.05E-09	9.19E-08	1.05E-08
1,2-Dichloroethene (total)	0.190	1.88E-09	2.15E-10	1.88E-08	2.15E-09
Ethylbenzene	0.584	5.77E-09	6.60E-10	5.77E-08	6.60E-09
Tetrachloroethene	0.166	1.64E-09	1.88E-10	1.64E-08	1.88E-09
Toluene	0.413	4.08E-09	4.67E-10	4.08E-08	4.67E-09
Trichloroethene	0.413	4.08E-09	4.67E-10	4.08E-08	4.67E-09
Xylene (total)	11.929	1.18E-07	1.35E-08	1.18E-06	1.35E-07
SEMI-VOLATILES					
Acenaphthene	1.876	1.85E-08	2.12E-09	1.85E-07	2.12E-08
Acenaphthylene	1.703	1.68E-08	1.92E-09	1.68E-07	1.92E-08
Anthracene	1.715	1.69E-08	1.94E-09	1.69E-07	1.94E-08
Benzo(a)anthracene	1.580	1.56E-08	1.79E-09	1.56E-07	1.79E-08
Benzo(b)fluoranthene	1.619	1.60E-08	1.83E-09	1.60E-07	1.83E-08
Benzo(k)fluoranthene	1.718	1.70E-08	1.94E-09	1.70E-07	1.94E-08
Benzoic acid	8.327	8.23E-08	9.41E-09	8.23E-07	9.41E-08
Benzo(a)pyrene	1.599	1.58E-08	1.81E-09	1.58E-07	1.81E-08
Butylbenzylphthalate	0.821	8.11E-09	9.28E-10	8.11E-08	9.28E-09
Chrysene	1.375	1.36E-08	1.55E-09	1.36E-07	1.55E-08
Dibenzo(a,h)anthracene	1.718	1.70E-08	1.94E-09	1.70E-07	1.94E-08
2,4-Dimethylphenol	1.746	1.73E-08	1.97E-09	1.73E-07	1.97E-08
bis(2-Ethylhexyl)phthalate	3.028	2.99E-08	3.42E-09	2.99E-07	3.42E-08
Fluoranthene	2.732	2.70E-08	3.09E-09	2.70E-07	3.09E-08
Fluorene	1.749	1.73E-08	1.98E-09	1.73E-07	1.98E-08
Indeno(1,2,3-cd)pyrene	1.711	1.69E-08	1.93E-09	1.69E-07	1.93E-08
2-Methylnaphthalene	6.772	6.69E-08	7.65E-09	6.69E-07	7.65E-08
2-Methylphenol	1.718	1.70E-08	1.94E-09	1.70E-07	1.94E-08
4-Methylphenol	1.713	1.69E-08	1.94E-09	1.69E-07	1.94E-08
Naphthalene	1.560	1.54E-08	1.76E-09	1.54E-07	1.76E-08
Di-n-octylphthalate	1.763	1.74E-08	1.99E-09	1.74E-07	1.99E-08
Phenanthrene	3.428	3.39E-08	3.87E-09	3.39E-07	3.87E-08
Phenol	1.718	1.70E-08	1.94E-09	1.70E-07	1.94E-08
Pyrene	2.174	2.15E-08	2.46E-09	2.15E-07	2.46E-08

Table 4-26 (cont'd)
Calculated Ingestion Exposure Doses
Area A Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
INORGANICS					
Aluminum	11157.889	1.10E-04	1.26E-05	1.10E-03	1.26E-04
Antimony	6.793	6.71E-08	7.68E-09	6.71E-07	7.68E-08
Arsenic	26.933	2.66E-07	3.04E-08	2.66E-06	3.04E-07
Barium	201.508	1.99E-06	2.28E-07	1.99E-05	2.28E-06
Beryllium	1.458	1.44E-08	1.65E-09	1.44E-07	1.65E-08
Cadmium	1.658	1.64E-08	1.87E-09	1.64E-07	1.87E-08
Calcium	111206.629	1.10E-03	1.26E-04	1.10E-02	1.26E-03
Chromium	23.463	2.32E-07	2.65E-08	2.32E-06	2.65E-07
Cobalt	6.958	6.87E-08	7.86E-09	6.87E-07	7.86E-08
Copper	84.428	8.34E-07	9.54E-08	8.34E-06	9.54E-07
Iron	28550.854	2.82E-04	3.23E-05	2.82E-03	3.23E-04
Lead	897.675	8.87E-06	1.01E-06	8.87E-05	1.01E-05
Magnesium	57110.045	5.64E-04	6.45E-05	5.64E-03	6.45E-04
Manganese	959.508	9.48E-06	1.08E-06	9.48E-05	1.08E-05
Mercury	0.287	2.84E-09	3.24E-10	2.84E-08	3.24E-09
Nickel	19.663	1.94E-07	2.22E-08	1.94E-06	2.22E-07
Potassium	1818.764	1.80E-05	2.06E-06	1.80E-04	2.06E-05
Selenium	1.596	1.58E-08	1.80E-09	1.58E-07	1.80E-08
Silver	0.927	9.16E-09	1.05E-09	9.16E-08	1.05E-08
Sodium	478.789	4.73E-06	5.41E-07	4.73E-05	5.41E-06
Thallium	0.524	5.18E-09	5.92E-10	5.18E-08	5.92E-09
Vanadium	23.079	2.28E-07	2.61E-08	2.28E-06	2.61E-07
Zinc	355.489	3.51E-06	4.02E-07	3.51E-05	4.02E-06
Cyanide	8.951	8.84E-08	1.01E-08	8.84E-07	1.01E-07
PESTICIDES/PCBs					
PCB-1242	0.517	5.11E-09	5.84E-10	5.11E-08	5.84E-09
PCB-1254	14.483	1.43E-07	1.64E-08	1.43E-06	1.64E-07
PCB-1260	11.193	1.11E-07	1.26E-08	1.11E-06	1.26E-07
PCB-1248	16.752	1.66E-07	1.89E-08	1.66E-06	1.89E-07
TOTAL	2.13E+05	2.11E-03	2.41E-04	2.11E-02	2.41E-03

Table 4-27
Calculated Ingestion Exposure Doses
Area B Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
VOLATILES					
Benzene	0.441	4.36E-09	4.98E-10	4.36E-08	4.98E-09
Carbon Disulfide	0.388	3.83E-09	4.38E-10	3.83E-08	4.38E-09
1,1-Dichloroethane	0.388	3.83E-09	4.38E-10	3.83E-08	4.38E-09
1,2-Dichloroethene (total)	0.595	5.88E-09	6.72E-10	5.88E-08	6.72E-09
Ethylbenzene	0.388	3.83E-09	4.38E-10	3.83E-08	4.38E-09
Tetrachloroethene	1.550	1.53E-08	1.75E-09	1.53E-07	1.75E-08
Toluene	0.388	3.83E-09	4.38E-10	3.83E-08	4.38E-09
Trichloroethene	2.743	2.71E-08	3.10E-09	2.71E-07	3.10E-08
Xylene (total)	0.388	3.83E-09	4.38E-10	3.83E-08	4.38E-09
SEMI-VOLATILES					
Acenaphthene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Acenaphthylene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Anthracene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Benzo(a)anthracene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Benzo(b)fluoranthene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Benzo(k)fluoranthene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Benzoic acid	81.155	8.02E-07	9.17E-08	8.02E-06	9.17E-07
Benzo(a)pyrene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Butylbenzylphthalate	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Chrysene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Dibenzo(a,h)anthracene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
2,4-Dimethylphenol	77.559	7.66E-07	8.76E-08	7.66E-06	8.76E-07
bis(2-Ethylhexyl)phthalate	44.943	4.44E-07	5.08E-08	4.44E-06	5.08E-07
Fluoranthene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Fluorene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
Indeno(1,2,3-cd)pyrene	16.738	1.65E-07	1.89E-08	1.65E-06	1.89E-07
2-Methylnaphthalene	4.147	4.10E-08	4.69E-09	4.10E-07	4.69E-08
2-Methylphenol	56.883	5.62E-07	6.43E-08	5.62E-06	6.43E-07
4-Methylphenol	426.959	4.22E-06	4.82E-07	4.22E-05	4.82E-06
Naphthalene	16.941	1.67E-07	1.91E-08	1.67E-06	1.91E-07
Di-n-octylphthalate	16.461	1.63E-07	1.86E-08	1.63E-06	1.86E-07
Phenanthrene	2.484	2.45E-08	2.81E-09	2.45E-07	2.81E-08
Phenol	250.144	2.47E-06	2.83E-07	2.47E-05	2.83E-06
Pyrene	16.441	1.62E-07	1.86E-08	1.62E-06	1.86E-07

Table 4-27 (cont'd)
Calculated Ingestion Exposure Doses
Area B Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
INORGANICS					
Aluminum	33973.465	3.36E-04	3.84E-05	3.36E-03	3.84E-04
Antimony	185.389	1.83E-06	2.09E-07	1.83E-05	2.09E-06
Arsenic	13.882	1.37E-07	1.57E-08	1.37E-06	1.57E-07
Barium	3035.135	3.00E-05	3.43E-06	3.00E-04	3.43E-05
Beryllium	6.295	6.22E-08	7.11E-09	6.22E-07	7.11E-08
Cadmium	9.331	9.22E-08	1.05E-08	9.22E-07	1.05E-07
Calcium	208882.191	2.06E-03	2.36E-04	2.06E-02	2.36E-03
Chromium	173.651	1.72E-06	1.96E-07	1.72E-05	1.96E-06
Cobalt	13.298	1.31E-07	1.50E-08	1.31E-06	1.50E-07
Copper	634.839	6.27E-06	7.17E-07	6.27E-05	7.17E-06
Iron	51397.683	5.08E-04	5.81E-05	5.08E-03	5.81E-04
Lead	2451.739	2.42E-05	2.77E-06	2.42E-04	2.77E-05
Magnesium	65474.666	6.47E-04	7.40E-05	6.47E-03	7.40E-04
Manganese	2841.377	2.81E-05	3.21E-06	2.81E-04	3.21E-05
Mercury	0.172	1.70E-09	1.94E-10	1.70E-08	1.94E-09
Nickel	45.908	4.54E-07	5.19E-08	4.54E-06	5.19E-07
Potassium	2554.020	2.52E-05	2.89E-06	2.52E-04	2.89E-05
Selenium	2.178	2.15E-08	2.46E-09	2.15E-07	2.46E-08
Silver	0.937	9.26E-09	1.06E-09	9.26E-08	1.06E-08
Sodium	1576.426	1.56E-05	1.78E-06	1.56E-04	1.78E-05
Thallium	0.701	6.93E-09	7.92E-10	6.93E-08	7.92E-09
Vanadium	28.851	2.85E-07	3.26E-08	2.85E-06	3.26E-07
Zinc	1362.476	1.35E-05	1.54E-06	1.35E-04	1.54E-05
Cyanide	6.195	6.12E-08	7.00E-09	6.12E-07	7.00E-08
PESTICIDES/PCBs					
PCB-1242	16.563	1.64E-07	1.87E-08	1.64E-06	1.87E-07
PCB-1254	38.314	3.79E-07	4.33E-08	3.79E-06	4.33E-07
PCB-1260	36.631	3.62E-07	4.14E-08	3.62E-06	4.14E-07
PCB-1248	34.446	3.40E-07	3.89E-08	3.40E-06	3.89E-07
TOTAL	3.76E+05	3.72E-03	4.25E-04	3.72E-02	4.25E-03

Table 4-28
Calculated Ingestion Exposure Doses
Area C Surficial Soil

	Soil Concentration (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
VOLATILES					
Benzene	0.004	3.95E-11	4.52E-12	3.95E-10	4.52E-11
Carbon Disulfide	0.005	4.94E-11	5.65E-12	4.94E-10	5.65E-11
1,1-Dichloroethane	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
1,2-Dichloroethene (total)	0.065	6.42E-10	7.35E-11	6.42E-09	7.35E-10
Ethylbenzene	0.006	5.93E-11	6.78E-12	5.93E-10	6.78E-11
Tetrachloroethene	0.007	6.92E-11	7.91E-12	6.92E-10	7.91E-11
Toluene	0.014	1.38E-10	1.58E-11	1.38E-09	1.58E-10
Trichloroethene	0.019	1.88E-10	2.15E-11	1.88E-09	2.15E-10
Xylene (total)	0.036	3.56E-10	4.07E-11	3.56E-09	4.07E-10
SEMI-VOLATILES					
Acenaphthene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Acenaphthylene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Anthracene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Benzo(a)anthracene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Benzo(b)fluoranthene	1.800	1.78E-08	2.03E-09	1.78E-07	2.03E-08
Benzo(k)fluoranthene	0.810	8.00E-09	9.15E-10	8.00E-08	9.15E-09
Benzoic acid	6.816	6.73E-08	7.70E-09	6.73E-07	7.70E-08
Benzo(a)pyrene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Butylbenzylphthalate	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Chrysene	1.100	1.09E-08	1.24E-09	1.09E-07	1.24E-08
Dibenzo(a,h)anthracene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
2,4-Dimethylphenol	0.750	7.41E-09	8.48E-10	7.41E-08	8.48E-09
bis(2-Ethylhexyl)phthalate	8.200	8.10E-08	9.27E-09	8.10E-07	9.27E-08
Fluoranthene	1.500	1.48E-08	1.70E-09	1.48E-07	1.70E-08
Fluorene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Indeno(1,2,3-cd)pyrene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
2-Methylnaphthalene	1.100	1.09E-08	1.24E-09	1.09E-07	1.24E-08
2-Methylphenol	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
4-Methylphenol	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Naphthalene	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Di-n-octylphthalate	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Phenanthrene	1.700	1.68E-08	1.92E-09	1.68E-07	1.92E-08
Phenol	1.406	1.39E-08	1.59E-09	1.39E-07	1.59E-08
Pyrene	1.900	1.88E-08	2.15E-09	1.68E-07	2.15E-08

Table 4-28 (cont'd)
Calculated Ingestion Exposure Doses
Area C Surficial Soil

	Soil Concentration (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
INORGANICS					
Aluminum	13300.000	1.31E-04	1.50E-05	1.31E-03	1.50E-04
Antimony	4.800	4.74E-08	5.42E-09	4.74E-07	5.42E-08
Arsenic	21.200	2.09E-07	2.40E-08	2.09E-06	2.40E-07
Barium	237.000	2.34E-06	2.68E-07	2.34E-05	2.68E-06
Beryllium	0.970	9.58E-09	1.10E-09	9.58E-08	1.10E-08
Cadmium	2.400	2.37E-08	2.71E-09	2.37E-07	2.71E-08
Calcium	73300.000	7.24E-04	8.28E-05	7.24E-03	8.28E-04
Chromium	29.700	2.93E-07	3.36E-08	2.93E-06	3.36E-07
Cobalt	8.100	8.00E-08	9.15E-09	8.00E-07	9.15E-08
Copper	73.900	7.30E-07	8.35E-08	7.30E-06	8.35E-07
Iron	23800.000	2.35E-04	2.69E-05	2.35E-03	2.69E-04
Lead	744.000	7.35E-06	8.41E-07	7.35E-05	8.41E-06
Magnesium	25300.000	2.50E-04	2.86E-05	2.50E-03	2.86E-04
Manganese	745.000	7.36E-06	8.42E-07	7.36E-05	8.42E-06
Mercury	0.230	2.27E-09	2.60E-10	2.27E-08	2.60E-09
Nickel	22.400	2.21E-07	2.53E-08	2.21E-06	2.53E-07
Potassium	1990.000	1.97E-05	2.25E-06	1.97E-04	2.25E-05
Selenium	0.670	6.62E-09	7.57E-10	6.62E-08	7.57E-09
Silver	0.830	8.20E-09	9.38E-10	8.20E-08	9.38E-09
Sodium	301.000	2.97E-06	3.40E-07	2.97E-05	3.40E-06
Thallium	0.420	4.15E-09	4.75E-10	4.15E-08	4.75E-09
Vanadium	21.700	2.14E-07	2.45E-08	2.14E-06	2.45E-07
Zinc	343.000	3.39E-06	3.88E-07	3.39E-05	3.88E-06
Cyanide	0.540	5.34E-09	6.10E-10	5.34E-08	6.10E-09
PESTICIDES/PCBS *					
PCB-1242	1.454	1.44E-08	1.64E-09	1.44E-07	1.64E-08
PCB-1254	55.693	5.50E-07	6.29E-08	5.50E-06	6.29E-07
PCB-1260	6.225	6.15E-08	7.03E-09	6.15E-07	7.03E-08
PCB-1248	33.218	3.28E-07	3.75E-08	3.28E-06	3.75E-07
TOTAL	1.40E+05	1.39E-03	1.59E-04	1.39E-02	1.59E-03

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

Table 4-29
Calculated Ingestion Exposure Doses
Area D Surficial Soil

	Soil Concentration (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
VOLATILES					
Benzene	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Carbon Disulfide	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
1,1-Dichloroethane	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
1,2-Dichloroethene (total)	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Ethylbenzene	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Tetrachloroethene	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Toluene	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Trichloroethene	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
Xylene (total)	0.003	2.96E-11	3.39E-12	2.96E-10	3.39E-11
SEMI-VOLATILES					
Acenaphthene	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Acenaphthylene	0.140	1.38E-09	1.58E-10	1.38E-08	1.58E-09
Anthracene	0.087	8.60E-10	9.83E-11	8.60E-09	9.83E-10
Benzo(a)anthracene	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Benzo(b)fluoranthene	1.500	1.48E-08	1.70E-09	1.48E-07	1.70E-08
Benzo(k)fluoranthene	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Benzoic acid	0.200	1.98E-09	2.26E-10	1.98E-08	2.26E-09
Benzo(a)pyrene	0.990	9.78E-09	1.12E-09	9.78E-08	1.12E-08
Butylbenzylphthalate	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Chrysene	1.200	1.19E-08	1.36E-09	1.19E-07	1.36E-08
Dibenzo(a,h)anthracene	0.120	1.19E-09	1.36E-10	1.19E-08	1.36E-09
2,4-Dimethylphenol	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
bis(2-Ethylhexyl)phthalate	3.300	3.26E-08	3.73E-09	3.26E-07	3.73E-08
Fluoranthene	2.200	2.17E-08	2.49E-09	2.17E-07	2.49E-08
Fluorene	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Indeno(1,2,3-cd)pyrene	0.900	8.89E-09	1.02E-09	8.89E-08	1.02E-08
2-Methylnaphthalene	0.120	1.19E-09	1.36E-10	1.19E-08	1.36E-09
2-Methylphenol	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
4-Methylphenol	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Naphthalene	0.068	6.72E-10	7.68E-11	6.72E-09	7.68E-10
Di-n-octylphthalate	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Phenanthrene	0.620	6.13E-09	7.01E-10	6.13E-08	7.01E-09
Phenol	0.406	4.01E-09	4.59E-10	4.01E-08	4.59E-09
Pyrene	1.300	1.28E-08	1.47E-09	1.28E-07	1.47E-08

Table 4-29 (cont'd)
Calculated Ingestion Exposure Doses
Area D Surficial Soil

	Soil Concentration (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
INORGANICS					
Aluminum	15400.000	1.52E-04	1.74E-05	1.52E-03	1.74E-04
Antimony	4.200	4.15E-08	4.75E-09	4.15E-07	4.75E-08
Arsenic	80.700	7.97E-07	9.12E-08	7.97E-06	9.12E-07
Barium	281.000	2.78E-06	3.18E-07	2.78E-05	3.18E-06
Beryllium	0.990	9.78E-09	1.12E-09	9.78E-08	1.12E-08
Cadmium	2.900	2.87E-08	3.28E-09	2.87E-07	3.28E-08
Calcium	25800.000	2.55E-04	2.92E-05	2.55E-03	2.92E-04
Chromium	31.200	3.08E-07	3.53E-08	3.08E-06	3.53E-07
Cobalt	15.400	1.52E-07	1.74E-08	1.52E-06	1.74E-07
Copper	89.900	8.88E-07	1.02E-07	8.88E-06	1.02E-06
Iron	56500.000	5.58E-04	6.38E-05	5.58E-03	6.38E-04
Lead	469.000	4.63E-06	5.30E-07	4.63E-05	5.30E-06
Magnesium	12400.000	1.23E-04	1.40E-05	1.23E-03	1.40E-04
Manganese	751.000	7.42E-06	8.49E-07	7.42E-05	8.49E-06
Mercury	0.310	3.06E-09	3.50E-10	3.06E-08	3.50E-09
Nickel	29.000	2.87E-07	3.28E-08	2.87E-06	3.28E-07
Potassium	2420.000	2.39E-05	2.73E-06	2.39E-04	2.73E-05
Selenium	1.500	1.48E-08	1.70E-09	1.48E-07	1.70E-08
Silver	0.930	9.19E-09	1.05E-09	9.19E-08	1.05E-08
Sodium	286.000	2.83E-06	3.23E-07	2.83E-05	3.23E-06
Thallium	0.620	6.13E-09	7.01E-10	6.13E-08	7.01E-09
Vanadium	45.600	4.51E-07	5.15E-08	4.51E-06	5.15E-07
Zinc	940.000	9.29E-06	1.06E-06	9.29E-05	1.06E-05
Cyanide	0.750	7.41E-09	8.48E-10	7.41E-08	8.48E-09
PESTICIDES/PCBS *					
PCB-1242	0.098	9.68E-10	1.11E-10	9.68E-09	1.11E-09
PCB-1254	0.198	1.96E-09	2.24E-10	1.96E-08	2.24E-09
PCB-1260	0.198	1.96E-09	2.24E-10	1.96E-08	2.24E-09
PCB-1248	0.098	9.68E-10	1.11E-10	9.68E-09	1.11E-09
TOTAL	1.16E+05	1.14E-03	1.31E-04	1.14E-02	1.31E-03

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

to ingestion of surficial soil at the Booth Oil Site, in descending order, is as follows: Area B, Area A, Area C and Area D. This dose sequence follows the sequence of total mean soil contaminant concentrations: Area B ($3.76\text{E}+05$ mg/kg), Area A ($2.13\text{E}+05$ mg/kg), Area C ($1.40\text{E}+05$ mg/kg) and Area D ($1.16\text{E}+05$ mg/kg). This is as expected. Since the same ingestion rate is used for each area of the site, the total mean contaminant concentration for each area is the determining factor in calculating area-specific chemical intakes.

As discussed earlier, the standard ingestion rates of 10 mg/day for non-pica children and 100 mg/day for pica children are divided equally among the areas of the site. Accordingly, the total ingestion exposure dose for children exposed to the Booth Oil Site is calculated as the sum of the area-specific doses. Table 4-30 presents the total carcinogenic and noncarcinogenic ingestion exposure doses calculated for pica and non-pica children exposed to the Booth Oil Site.

Table 4-31 presents the ingestion exposure doses calculated for pica and non-pica children exposed to the playground, based upon the surficial soil samples collected during the Phase I RI. It must be noted that this dose is calculated using the total ingestion rates discussed above (i.e., 10 mg/day for non-pica

Table 4-30
Total Ingestion Exposure Doses
Booth Oil Site - Surficial Soil

		Non-Pica Children		Pica Children	
Area	Mean Soil Concentrations (mg/kg)	Non-carcinogenic ingestion dose (mg/kg-day)	Carcinogenic Ingestion dose (mg/kg-day)	Non-carcinogenic ingestion dose (mg/kg-day)	Carcinogenic ingestion dose (mg/kg-day)
Area A	2.13E+05	2.11E-03	2.41E-04	2.11E-02	2.41E-03
Area B	3.76E+05	3.72E-03	4.25E-04	3.72E-02	4.25E-03
Area C	1.40E+05	1.39E-03	1.59E-04	1.39E-02	1.59E-03
Area D	1.16E+05	1.14E-03	1.31E-04	1.14E-02	1.31E-03
Total	-	8.36E-03	9.56E-04	8.36E-02	9.56E-03

Table 4-31
Calculated Ingestion Exposure Doses
Playground Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
VOLATILES					
Benzene	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Carbon Disulfide	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
1,1-Dichloroethane	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
1,2-Dichloroethene (total)	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Ethylbenzene	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Tetrachloroethene	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Toluene	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Trichloroethene	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
Xylene (total)	0.005	1.85E-10	2.12E-11	1.85E-09	2.12E-10
SEMI-VOLATILES					
Acenaphthene	0.476	1.88E-08	2.15E-09	1.88E-07	2.15E-08
Acenaphthylene	0.467	1.84E-08	2.11E-09	1.84E-07	2.11E-08
Anthracene	0.469	1.85E-08	2.12E-09	1.85E-07	2.12E-08
Benzo(a)anthracene	0.709	2.80E-08	3.20E-09	2.80E-07	3.20E-08
Benzo(b)fluoranthene	0.825	3.26E-08	3.73E-09	3.26E-07	3.73E-08
Benzo(k)fluoranthene	0.822	3.25E-08	3.72E-09	3.25E-07	3.72E-08
Benzoic acid	0.131	5.17E-09	5.92E-10	5.17E-08	5.92E-09
Benzo(a)pyrene	0.735	2.90E-08	3.32E-09	2.90E-07	3.32E-08
Butylbenzylphthalate	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
Chrysene	1.082	4.27E-08	4.89E-09	4.27E-07	4.89E-08
Dibenzo(a,h)anthracene	0.461	1.82E-08	2.08E-09	1.82E-07	2.08E-08
2,4-Dimethylphenol	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
bis(2-Ethylhexyl)phthalate	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
Fluoranthene	2.280	9.01E-08	1.03E-08	9.01E-07	1.03E-07
Fluorene	0.452	1.79E-08	2.04E-09	1.79E-07	2.04E-08
Indeno(1,2,3-cd)pyrene	0.695	2.75E-08	3.14E-09	2.75E-07	3.14E-08
2-Methylnaphthalene	0.209	8.26E-09	9.45E-10	8.26E-08	9.45E-09
2-Methylphenol	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
4-Methylphenol	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
Naphthalene	0.109	4.31E-09	4.93E-10	4.31E-08	4.93E-09
Di-n-octylphthalate	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
Phenanthrene	2.315	9.14E-08	1.05E-08	9.14E-07	1.05E-07
Phenol	0.412	1.63E-08	1.86E-09	1.63E-07	1.86E-08
Pyrene	1.605	6.34E-08	7.25E-09	6.34E-07	7.25E-08

Table 4-31 (cont'd)
Calculated Ingestion Exposure Doses
Playground Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Non-Pica Non-Carc. Ingest. Dose (mg/kg-day)	Non-Pica Carc. Ingest. Dose (mg/kg-day)	Pica Non-Carc. Ingest. Dose (mg/kg-day)	Pica Carc. Ingest. Dose (mg/kg-day)
INORGANICS					
Aluminum	17105.226	6.76E-04	7.73E-05	6.76E-03	7.73E-04
Antimony	4.339	1.71E-07	1.96E-08	1.71E-06	1.96E-07
Arsenic	18.105	7.15E-07	8.18E-08	7.15E-06	8.18E-07
Barium	136.702	5.40E-06	6.18E-07	5.40E-05	6.18E-06
Beryllium	1.146	4.53E-08	5.18E-09	4.53E-07	5.18E-08
Cadmium	0.980	3.87E-08	4.43E-09	3.87E-07	4.43E-08
Calcium	14566.633	5.75E-04	6.58E-05	5.75E-03	6.58E-04
Chromium	26.717	1.06E-06	1.21E-07	1.06E-05	1.21E-06
Cobalt	10.158	4.01E-07	4.59E-08	4.01E-06	4.59E-07
Copper	74.550	2.94E-06	3.37E-07	2.94E-05	3.37E-06
Iron	35545.527	1.40E-03	1.61E-04	1.40E-02	1.61E-03
Lead	138.789	5.48E-06	6.27E-07	5.48E-05	6.27E-06
Magnesium	8505.065	3.36E-04	3.84E-05	3.36E-03	3.84E-04
Manganese	768.560	3.04E-05	3.47E-06	3.04E-04	3.47E-05
Mercury	0.120	4.74E-09	5.42E-10	4.74E-08	5.42E-09
Nickel	28.509	1.13E-06	1.29E-07	1.13E-05	1.29E-06
Potassium	2544.382	1.01E-04	1.15E-05	1.01E-03	1.15E-04
Selenium	1.577	6.23E-08	7.13E-09	6.23E-07	7.13E-08
Silver	0.970	3.83E-08	4.38E-09	3.83E-07	4.38E-08
Sodium	280.806	1.11E-05	1.27E-06	1.11E-04	1.27E-05
Thallium	0.550	2.17E-08	2.49E-09	2.17E-07	2.49E-08
Vanadium	39.056	1.54E-06	1.77E-07	1.54E-05	1.77E-06
Zinc	291.350	1.15E-05	1.32E-06	1.15E-04	1.32E-05
Cyanide	0.650	2.57E-08	2.94E-09	2.57E-07	2.94E-08
PESTICIDES/PCBs					
PCB-1242	0.154	6.08E-09	6.96E-10	6.08E-08	6.96E-09
PCB-1254	0.317	1.25E-08	1.43E-09	1.25E-07	1.43E-08
PCB-1260	0.317	1.25E-08	1.43E-09	1.25E-07	1.43E-08
PCB-1248	0.154	6.08E-09	6.96E-10	6.08E-08	6.96E-09
TOTAL	8.01E+04	3.16E-03	3.62E-04	3.16E-02	3.62E-03

children and 100 mg/day for pica children). As such, the ingestion doses calculated for exposures to the playground are intended for comparison to the total ingestion exposure doses calculated for the entire Booth Oil Site. Comparison of the total ingestion doses presented in Tables 4-30 and 4-31 indicates that the ingestion doses calculated for exposures to the playground are slightly lower, but within the same order of magnitude, as those calculated for exposure to the entire Booth Oil Site.

4.4 Inhalation Exposure

Inhalation exposure doses are calculated individually for exposures of children, residents and unprotected construction workers to volatilized contaminants and fugitive dusts from the Booth Oil Site. Inhalation doses due to fugitive dusts are calculated individually for fugitive dusts due to traffic and construction activities on-site. Total inhalation doses for each population from the Booth Oil Site are then calculated as the sum of the source-specific inhalation doses.

Inhalation exposure doses for each emission source are calculated by the formula (EPA, 1989c):

$$IEX_{ix} = \frac{C_{aix} \times IR \times t_e \times f \times ED}{BW \times T}$$

where:

IEX_{ix}	=	inhalation exposure dose for contaminant i at receptor x (mg/kg-day)
C_{aix}	=	airborne concentration of contaminant i at receptor x (mg/m ³)
IR	=	inhalation rate (m ³ /hr)
t_e	=	exposure time (hr/day)
f	=	frequency of exposure (days/yr)
ED	=	exposure duration (years)
BW	=	average body weight (kg)
T	=	averaging time (days)

The following assumptions are used in the calculations:

- Airborne contaminant concentrations at the receptor points (C_{aix}) are calculated according to the methods described in Section 4.2 of this report.
- The inhalation rate (IR) for children is 3.2 m³/hr. This value corresponds to a moderate activity level (EPA, 1989b).

- The inhalation rate (IR) for residents, commercial populations and unprotected construction workers is $1.0 \text{ m}^3/\text{hr}$ (EPA, 1989b).
- The exposure time (t_e) for children is 3 hours/day during the school year and 4 hours/day during the summer.
- The exposure time (t_e) for residents and construction during construction activities on-site is 8.0 hours/day.
- The exposure time (t_e) for residents for non-construction emissions is 15.37 hours/day. This value corresponds to an average of 107.59 hours/week spent at home (EPA, 1989b).
- The exposure time (t_e) for commercial populations for non-construction emissions is 8.0 hours/day.
- The frequency of exposure (f) for children is 74 days/year.
- The frequency of exposure (f) for residents, commercial populations and unprotected construction workers during construction on-site is 250 days/year.

BOS2REPa/bos-t2
February 26, 1991

- The frequency of exposure (f) for residents for non-construction emissions is 365 days/year.
- The frequency of exposure (f) for commercial populations for non-construction emissions is 250 days/year.
- The exposure duration (ED) for children is 10 years (i.e., 10 through 18 years old).
- The exposure duration (ED) for residents, commercial populations and unprotected construction workers during construction on-site is 1.0 year.
- The exposure duration (ED) for residents for non-construction emissions is 30 years. This corresponds to the upper 95% confidence interval on the mean residence time (EPA, 1989b).
- The exposure duration (ED) for commercial populations for non-construction emissions is 40 years. This value is based upon the OSHA standard for occupational exposures.
- The average body weight (BW) for children ages 10 through 18 is 51.2 kg (EPA, 1989b).

BOS2REPa/bos-t2
February 26, 1991

- The average body weight (BW) for adults (i.e., residents, commercial populations and unprotected construction workers) is 70 kg (EPA, 1989b).

As discussed in Section 4.3, separate doses are calculated for carcinogenic and noncarcinogenic effects, through the use of different averaging times (T). The noncarcinogenic averaging time is equal to the exposure duration (ED) multiplied by 365 days/year. The carcinogenic averaging time is equal to the 70-year standard lifetime multiplied by 365 days/year. The averaging times for children are 2920 days for noncarcinogenic effects and 25,550 days for carcinogenic effects. The averaging times for residents, commercial populations and unprotected construction workers for inhalation exposures to construction emissions are 365 days for noncarcinogenic effects and 25,550 days for carcinogenic effects. The averaging times for residents for non-construction emissions are 10,950 days for noncarcinogenic effects and 25,550 days for carcinogenic effects. The averaging times for commercial populations for non-construction emissions are 14,600 days for noncarcinogenic effects and 25,550 days for carcinogenic effects.

Tables 4-32 through 4-35 present the inhalation exposure doses for children, residents, commercial populations and unprotected construction workers due to volatilization of contaminants from

Table 4-32
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area A

Upper 95% Confidence Arith. Mean Soil Conc.	Constr. Worker		Constr. Worker		Children		Children		Children		Residential		Residential
	On-Site	Non-Carc. Inhalation Dose (mg/kg-day)	On-Site	Carcinogenic Inhalation Dose (mg/kg-day)	On-Site	Non-Carc. Inhalation Dose (mg/kg-day)	On-Site	Carcinogenic Inhalation Dose (mg/kg-day)	Playground	Non-Carc. Inhalation Dose (mg/kg-day)	Playground	Carcinogenic Inhalation Dose (mg/kg-day)	
VOLATILES													
Benzene	4.13E-01	3.18E-12	4.55E-14	1.70E-12	1.94E-13	2.97E-16	3.39E-17	1.93E-15	1.00E-15				
Carbon Disulfide	1.07E-01	3.13E-12	4.48E-14	1.68E-12	1.92E-13	2.93E-16	3.34E-17	1.90E-15	8.14E-16				
1,1-Dichloroethane	9.30E-01	1.81E-11	2.59E-13	9.71E-12	1.11E-12	1.69E-15	1.94E-16	1.10E-14	4.71E-15				
1,2-Dichloroethane (total)	1.90E-01	6.73E-12	9.62E-14	3.60E-12	4.11E-13	6.28E-16	7.18E-17	4.08E-15	1.75E-15				
Ethylbenzene	5.84E-01	3.44E-13	4.92E-15	1.84E-13	2.11E-14	3.21E-17	3.67E-18	2.09E-16	8.94E-17				
Tetrachloroethane	1.66E-01	4.55E-13	6.51E-15	2.43E-13	2.78E-14	4.24E-17	4.85E-18	2.76E-16	1.18E-16				
Toluene	4.13E-01	1.05E-12	1.50E-14	5.61E-13	6.42E-14	9.79E-17	1.12E-17	6.37E-16	2.72E-16				
Trichloroethane	4.13E-01	3.19E-12	4.56E-14	1.71E-12	1.95E-13	2.98E-16	3.40E-17	1.94E-15	8.28E-16				
Xylene (total)	1.19E+01	1.14E-11	1.62E-13	6.08E-12	6.95E-13	1.06E-15	1.21E-16	6.89E-15	2.95E-15				
TOTAL	1.51E+01	4.76E-11	6.80E-13	2.55E-11	2.91E-12	4.44E-15	5.08E-16	2.89E-14	1.25E-14				

Table 4-32 (cont'd)
Inhalation Exposure Doses
Due to Volatilization from
Sufficient Soil - Area A

VOLATILES	Commercial Robinson St. Non-Carc. Inhalation Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhalation Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhalation Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhalation Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)
Benzene	3.95E-16	2.25E-16	6.98E-16	3.98E-16	8.26E-16	3.53E-16	2.94E-16	1.68E-16
Carbon Disulfide	3.89E-16	2.22E-16	6.88E-16	3.93E-16	8.15E-16	3.49E-16	2.90E-16	1.68E-16
1,1-Dichloroethane	2.25E-15	1.29E-15	3.98E-15	2.27E-15	4.72E-15	2.02E-15	1.68E-15	9.58E-16
1,2-Dichloroethene (total)	8.35E-16	4.77E-16	1.48E-15	8.43E-16	1.75E-15	7.48E-16	6.22E-16	3.55E-16
Ethylbenzene	4.28E-17	2.44E-17	7.56E-17	4.32E-17	8.95E-17	3.83E-17	3.19E-17	1.82E-17
Tetrachloroethene	5.65E-17	3.22E-17	9.99E-17	5.70E-17	1.18E-16	5.06E-17	4.21E-17	2.40E-17
Toluene	1.30E-16	7.44E-17	2.30E-16	1.32E-16	2.73E-16	1.17E-16	9.71E-17	5.54E-17
Trichloroethene	3.96E-16	2.26E-16	7.01E-16	4.00E-16	8.30E-16	3.55E-16	2.95E-16	1.69E-16
Xylene (total)	1.41E-15	8.05E-16	2.49E-15	1.42E-15	2.95E-15	1.26E-15	1.05E-15	6.00E-16
TOTAL	5.91E-15	3.37E-15	1.04E-14	5.96E-15	1.24E-14	5.29E-15	4.40E-15	2.51E-15

Table 4-33
Inhalation Exposure Doses
Due to Volatilization from
Superficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Worker On-Site		Children On-Site		Children Playground		Children Playground		Residential N. Marion St.	
		Non-Carc. Inhalation Dose (mg/kg-day)	Carcinogenic Inhalation Dose (mg/kg-day)	Non-Carc. Inhalation Dose (mg/kg-day)	Carcinogenic Inhalation Dose (mg/kg-day)	Non-Carc. Inhalation Dose (mg/kg-day)	Carcinogenic Inhalation Dose (mg/kg-day)	Non-Carc. Inhalation Dose (mg/kg-day)	Carcinogenic Inhalation Dose (mg/kg-day)	Non-Carc. Inhalation Dose (mg/kg-day)	Carcinogenic Inhalation Dose (mg/kg-day)
benzene	4.41E-01	1.88E-12	2.69E-14	1.01E-12	1.15E-13	1.41E-16	1.61E-17	1.38E-15	3.90E-15		
carbon disulfide	3.88E-01	6.31E-12	9.03E-14	3.38E-12	3.88E-13	4.72E-16	5.40E-17	4.62E-15	1.98E-15		
1,1-Dichloroethane	3.88E-01	4.20E-12	6.01E-14	2.25E-12	2.57E-13	3.14E-16	3.59E-17	3.08E-15	1.32E-15		
2,2-Dichloroethane (total)	5.95E-01	1.17E-11	1.67E-13	6.25E-12	7.14E-13	8.74E-16	9.99E-17	8.55E-15	3.66E-15		
ethylbenzene	3.88E-01	1.27E-13	1.81E-15	6.78E-14	7.75E-15	9.49E-18	1.08E-18	9.29E-17	3.97E-17		
nitrochloroethane	1.55E+00	2.33E-12	3.34E-14	1.25E-12	1.43E-13	1.75E-16	2.00E-17	1.71E-15	7.32E-16		
toluene	3.88E-01	5.42E-13	7.75E-15	2.90E-13	3.31E-14	4.05E-17	4.64E-18	3.97E-16	1.70E-16		
trichloroethane	2.74E+00	1.17E-11	1.67E-13	6.25E-12	7.14E-13	8.74E-16	9.99E-17	8.55E-15	3.66E-15		
ethylene (total)	3.88E-01	2.03E-13	2.91E-15	1.09E-13	1.24E-14	1.52E-17	1.74E-18	1.49E-16	6.37E-17		
TOTAL	7.27E+00	3.89E-11	5.57E-13	2.08E-11	2.38E-12	2.92E-15	3.33E-16	2.85E-14	1.55E-14		

Table 4-33 (cont'd)
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area B

VOLATILES	Commercial Robinson St. Non-Carc. Inhalation Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhalation Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhalation Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhalation Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)
Benzene	5.24E-16	2.99E-16	1.39E-16	7.96E-17	7.53E-16	3.22E-16	2.68E-16	1.53E-16
Carbon Disulfide	1.76E-15	1.00E-15	4.67E-16	2.67E-16	2.53E-15	1.08E-15	8.99E-16	5.13E-16
1,1-Dichloroethane	1.17E-15	6.67E-16	3.11E-16	1.78E-16	1.68E-15	7.19E-16	5.98E-16	3.42E-16
1,2-Dichloroethane (total)	3.25E-15	1.85E-15	8.64E-16	4.93E-16	4.67E-15	2.00E-15	1.66E-15	9.49E-16
Ethylbenzene	3.53E-17	2.01E-17	9.39E-18	5.36E-18	5.07E-17	2.17E-17	1.81E-17	1.03E-17
Tetrachloroethene	6.50E-16	3.71E-16	1.73E-16	9.87E-17	9.34E-16	4.00E-16	3.33E-16	1.90E-16
Toluene	1.51E-16	8.61E-17	4.01E-17	2.29E-17	2.17E-16	9.28E-17	7.72E-17	4.41E-17
Trichloroethene	3.25E-15	1.85E-15	8.64E-16	4.93E-16	4.67E-15	2.00E-15	1.66E-15	9.49E-16
Xylenes (total)	5.66E-17	3.23E-17	1.51E-17	8.60E-18	8.14E-17	3.48E-17	2.90E-17	1.65E-17
TOTAL	1.08E-14	6.19E-15	2.88E-15	1.65E-15	1.56E-14	6.67E-15	5.55E-15	3.17E-15

surficial soil. Table 4-32 presents the inhalation exposure doses due to volatilization from surficial soil in Area A. The inhalation exposure doses for this scenario range from $4.76\text{E-}11$ mg/kg-day for unprotected construction workers on-site to $4.40\text{E-}15$ mg/kg-day for commercial populations at Sommer Street. The inhalation exposure doses for populations due to volatilization from surficial soil in Area B are presented in Table 4-33. The doses presented in Table 4-33 range from $3.89\text{E-}11$ mg/kg-day for unprotected construction workers on-site to $2.88\text{E-}15$ mg/kg-day for commercial populations at River Road.

Table 4-34 presents the inhalation exposure doses calculated for populations exposed to volatilized contaminants from surficial soil in Area C. The doses presented in Table 4-34 range from $1.64\text{E-}11$ mg/kg-day for unprotected construction workers on-site to $2.62\text{E-}16$ mg/kg-day for children at the playground. The inhalation doses calculated for populations exposed to volatilized contaminants from surficial soil in Area D are presented in Table 4-35. The doses calculated for this exposure scenario range from $1.18\text{E-}13$ mg/kg-day for unprotected construction workers on-site to $2.99\text{E-}18$ mg/kg-day for children at the playground.

The total inhalation doses for exposure of each population to volatilized contaminants from the Booth Oil Site are calculated as

Table 4-34
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area C

Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Workers		Constr. Workers		Children		Children		Children		Children		Residential		Residential	
	On-Site Non-Carc. Inhalation Dose (mg/kg-day)	On-Site Carcinogenic Inhalation Dose (mg/kg-day)	On-Site Non-Carc. Inhalation Dose (mg/kg-day)	On-Site Carcinogenic Inhalation Dose (mg/kg-day)	On-Site Non-Carc. Inhalation Dose (mg/kg-day)	On-Site Carcinogenic Inhalation Dose (mg/kg-day)	Playground Non-Carc. Inhalation Dose (mg/kg-day)	Playground Carcinogenic Inhalation Dose (mg/kg-day)	Playground Non-Carc. Inhalation Dose (mg/kg-day)	Playground Carcinogenic Inhalation Dose (mg/kg-day)	N. Marlon St. Non-Carc. Inhalation Dose (mg/kg-day)	N. Marlon St. Carcinogenic Inhalation Dose (mg/kg-day)				
VOLATILES																
Benzene	4.00E-03	1.83E-13	2.62E-15	9.79E-14	1.12E-14	2.93E-18	3.35E-19	1.40E-16	6.01E-15							
Carbon Disulfide	5.00E-03	8.69E-13	1.24E-14	4.65E-13	5.31E-14	1.39E-17	1.59E-18	6.63E-16	2.83E-16							
1,1-Dichloroethane	3.00E-03	3.47E-13	4.96E-15	1.86E-13	2.12E-14	5.55E-18	6.34E-19	2.65E-16	1.13E-16							
1,2-Dichloroethene (total)	6.50E-02	1.36E-11	1.95E-13	7.29E-12	8.34E-13	2.18E-16	2.49E-17	1.04E-14	4.45E-15							
Ethylbenzene	6.00E-03	2.09E-14	3.00E-16	1.12E-14	1.28E-15	3.35E-19	3.83E-20	1.60E-17	6.84E-18							
Tetrachloroethene	7.00E-03	1.08E-13	1.54E-15	5.77E-14	6.60E-15	1.72E-18	1.97E-19	8.22E-17	3.52E-17							
Toluene	1.40E-02	2.03E-13	2.91E-15	1.09E-13	1.24E-14	3.25E-18	3.72E-19	1.55E-16	6.64E-17							
Trichloroethene	1.90E-02	8.38E-13	1.20E-14	4.48E-13	5.13E-14	1.34E-17	1.53E-18	6.39E-16	2.73E-16							
Xylene (total)	3.60E-02	1.96E-13	2.81E-15	1.05E-13	1.20E-14	3.14E-18	3.59E-19	1.50E-16	6.40E-17							
TOTAL	1.59E-01	1.64E-11	2.34E-13	8.77E-12	1.00E-12	2.62E-16	3.00E-17	1.25E-14	1.13E-14							

Table 4-34 (cont'd)
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area C

VOLATILES	Commercial Robinson St. Non-Carc. Inhalation Dose (mg/kg-day)		Commercial Robinson St. Carcinogenic Inhalation Dose (mg/kg-day)		Commercial River Road Non-Carc. Inhalation Dose (mg/kg-day)		Commercial River Road Carcinogenic Inhalation Dose (mg/kg-day)		Residential Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)		Residential Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)		Commercial Sommer St. Non-Carc. Inhalation Dose (mg/kg-day)		Commercial Sommer St. Carcinogenic Inhalation Dose (mg/kg-day)	
Benzene	6.72E-17	3.83E-17	4.87E-18	2.78E-18	3.84E-17	1.84E-17	1.37E-17	7.80E-18								
Carbon Disulfide	3.19E-16	1.82E-16	2.31E-17	1.32E-17	1.82E-16	7.79E-17	6.49E-17	3.70E-17								
1,1-Dichloroethane	1.27E-16	7.26E-17	9.23E-18	5.27E-18	7.28E-17	3.11E-17	2.59E-17	1.48E-17								
1,2-Dichloroethene (total)	5.00E-15	2.85E-15	3.63E-16	2.07E-16	2.86E-15	1.22E-15	1.02E-15	5.81E-16								
Ethylbenzene	7.69E-18	4.39E-18	5.58E-19	3.18E-19	4.40E-18	1.88E-18	1.56E-18	8.93E-19								
Tetrachloroethene	3.96E-17	2.26E-17	2.87E-18	1.64E-18	2.26E-17	9.67E-18	8.05E-18	4.60E-18								
Toluene	7.46E-17	4.26E-17	5.41E-18	3.09E-18	4.27E-17	1.83E-17	1.52E-17	8.67E-18								
Trichloroethene	3.07E-16	1.76E-16	2.23E-17	1.27E-17	1.76E-16	7.52E-17	6.26E-17	3.57E-17								
Xylene (total)	7.20E-17	4.11E-17	5.22E-18	2.98E-18	4.12E-17	1.76E-17	1.47E-17	8.37E-18								
TOTAL	6.01E-15	3.43E-15	4.36E-16	2.49E-16	3.44E-15	1.47E-15	1.22E-15	6.99E-16								

Table 4-35
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area D

Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Worker		Children		Children		Children		Children		Residential	
	On-Site Non-Carc. Inhalation Dose (mg/kg-day)	On-Site Carcinogenic Inhalation Dose (mg/kg-day)	On-Site Non-Carc. Inhalation Dose (mg/kg-day)	On-Site Carcinogenic Inhalation Dose (mg/kg-day)	Playground Non-Carc. Inhalation Dose (mg/kg-day)	Playground Carcinogenic Inhalation Dose (mg/kg-day)	Playground Non-Carc. Inhalation Dose (mg/kg-day)	Playground Carcinogenic Inhalation Dose (mg/kg-day)	N. Marion St. Non-Carc. Inhalation Dose (mg/kg-day)	N. Marion St. Carcinogenic Inhalation Dose (mg/kg-day)		
VOLATILES												
Benzene	3.00E-03	8.61E-15	1.23E-16	4.61E-15	5.27E-16	2.18E-19	2.49E-20	1.49E-17	1.10E-17			
Carbon Disulfide	3.00E-03	3.27E-14	4.67E-16	1.75E-14	2.00E-15	8.26E-19	9.44E-20	5.65E-17	2.42E-17			
1,1-Dichloroethane	3.00E-03	2.18E-14	3.11E-16	1.16E-14	1.33E-15	5.50E-19	6.29E-20	3.77E-17	1.61E-17			
1,2-Dichloroethane (total)	3.00E-03	3.93E-14	5.82E-16	2.10E-14	2.40E-15	9.94E-19	1.14E-19	6.80E-17	2.91E-17			
Ethylbenzene	3.00E-03	6.55E-16	9.37E-18	3.51E-16	4.01E-17	1.66E-20	1.89E-21	1.13E-18	4.85E-19			
Tetrachloroethane	3.00E-03	3.03E-15	4.33E-17	1.62E-15	1.85E-16	7.65E-20	8.75E-21	5.23E-18	2.24E-18			
Toluene	3.00E-03	2.80E-15	4.01E-17	1.50E-15	1.72E-16	7.09E-20	8.11E-21	4.85E-18	2.08E-18			
Trichloroethane	3.00E-03	8.55E-15	1.22E-16	4.57E-15	5.23E-16	2.16E-19	2.47E-20	1.48E-17	6.33E-18			
Xylene (total)	3.00E-03	1.05E-15	1.50E-17	5.62E-16	6.42E-17	2.65E-20	3.03E-21	1.82E-18	7.76E-19			
TOTAL	2.70E-02	1.18E-13	1.69E-15	6.34E-14	7.24E-15	2.99E-18	3.42E-19	2.05E-16	9.23E-17			

Table 4-35 (cont'd)
Inhalation Exposure Doses
Due to Volatilization from
Surficial Soil - Area D

	Commercial Robinson St. Non-Carc.		Commercial Robinson St. Carcinogenic		Commercial River Road Non-Carc.		Commercial River Road Carcinogenic		Residential Sommer St. Non-Carc.		Residential Sommer St. Carcinogenic		Commercial Sommer St. Non-Carc.		Commercial Sommer St. Carcinogenic	
	Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)		Inhalation Dose (mg/kg-day)	
VOLATILES																
Benzene	2.01E-18		1.15E-18		2.80E-19		1.60E-19		3.13E-18		1.34E-18		1.11E-18		6.35E-19	
Carbon Disulfide	7.62E-18		4.35E-18		1.06E-18		6.07E-19		1.19E-17		5.07E-18		4.22E-18		2.41E-18	
1,1-Dichloroethane	5.08E-18		2.90E-18		7.09E-19		4.05E-19		7.90E-18		3.38E-18		2.81E-18		1.61E-18	
1,2-Dichloroethene (total)	9.18E-18		5.24E-18		1.28E-18		7.31E-19		1.43E-17		6.10E-18		5.08E-18		2.90E-18	
Ethylbenzene	1.53E-19		8.73E-20		2.13E-20		1.22E-20		2.38E-19		1.02E-19		8.47E-20		4.83E-20	
Tetrachloroethene	7.07E-19		4.03E-19		9.86E-20		5.63E-20		1.10E-18		4.70E-19		3.91E-19		2.23E-19	
Toluene	6.55E-19		3.74E-19		9.13E-20		5.21E-20		1.02E-18		4.35E-19		3.62E-19		2.07E-19	
Trichloroethene	2.00E-18		1.14E-18		2.79E-19		1.59E-19		3.10E-18		1.33E-18		1.11E-18		6.31E-19	
Xylene (total)	2.45E-19		1.40E-19		3.42E-20		1.95E-20		3.81E-19		1.63E-19		1.36E-19		7.74E-20	
TOTAL	2.76E-17		1.58E-17		3.86E-18		2.20E-18		4.30E-17		1.84E-17		1.53E-17		8.74E-18	

Table 4-36
Total Inhalation Exposure Doses Due to
Volatilization from Surficial Soil

Receptor	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	6.80E-13	5.57E-13	2.34E-13	1.69E-15	1.47E-12
Non-Carcinogenic Dose	4.76E-11	3.89E-11	1.64E-11	1.18E-13	1.03E-10
Children On-Site					
Carcinogenic Dose	2.91E-12	2.38E-12	1.00E-12	7.24E-15	6.30E-12
Non-Carcinogenic Dose	2.55E-11	2.08E-11	8.77E-12	6.34E-14	5.51E-11
Children at the Playground					
Carcinogenic Dose	5.08E-16	3.33E-16	3.00E-17	3.42E-19	8.71E-16
Non-Carcinogenic Dose	4.44E-15	2.92E-15	2.62E-16	2.99E-18	7.62E-15
Residents at No. Marion Street					
Carcinogenic Dose	1.25E-14	1.55E-15	1.13E-14	9.23E-17	2.54E-14
Non-Carcinogenic Dose	2.89E-14	2.85E-14	1.25E-14	2.05E-16	7.01E-14
Commercial Pop. at Robinson St.					
Carcinogenic Dose	3.37E-15	6.19E-15	3.43E-15	1.58E-17	1.30E-14
Non-Carcinogenic Dose	5.91E-15	1.08E-14	6.01E-15	2.76E-17	2.27E-14
Commercial Pop. at River Road					
Carcinogenic Dose	5.96E-15	1.65E-15	2.49E-16	2.20E-18	7.86E-15
Non-Carcinogenic Dose	1.04E-14	2.88E-15	4.36E-16	3.86E-18	1.37E-14
Residents at Sommer Street					
Carcinogenic Dose	5.29E-15	6.67E-15	1.47E-15	1.84E-17	1.34E-14
Non-Carcinogenic Dose	1.24E-14	1.56E-14	3.44E-15	4.30E-17	3.15E-14
Commercial Pop. at Sommer St.					
Carcinogenic Dose	2.51E-15	3.17E-15	6.99E-16	8.74E-18	6.39E-15
Non-Carcinogenic Dose	4.40E-15	5.55E-15	1.22E-15	1.53E-17	1.12E-14

Table 4-37
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area A

	Upper 95% Confidence Arth. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.13E-01	2.84E-12	3.24E-13	4.95E-16	5.66E-17	3.22E-15	1.38E-15
Carbon Disulfide	1.07E-01	7.35E-13	8.40E-14	1.28E-16	1.47E-17	8.33E-16	3.56E-16
1,1-Dichloroethane	9.30E-01	6.39E-12	7.30E-13	1.11E-15	1.27E-16	7.24E-15	3.10E-15
1,2-Dichloroethene (total)	1.90E-01	1.31E-12	1.49E-13	2.28E-16	2.60E-17	1.48E-15	6.33E-16
Ethylbenzene	5.84E-01	4.01E-12	4.59E-13	7.00E-16	8.00E-17	4.55E-15	1.95E-15
Tetrachloroethene	1.66E-01	1.14E-12	1.30E-13	1.99E-16	2.27E-17	1.29E-15	5.53E-16
Toluene	4.13E-01	2.84E-12	3.24E-13	4.95E-16	5.66E-17	3.22E-15	1.38E-15
Trichloroethene	4.13E-01	2.84E-12	3.24E-13	4.95E-16	5.66E-17	3.22E-15	1.38E-15
Xylene (total)	1.19E+01	8.19E-11	9.37E-12	1.43E-14	1.63E-15	9.29E-14	3.97E-14
SEMI-VOLATILES							
Acenaphthene	1.88E+00	1.29E-11	1.47E-12	2.25E-15	2.57E-16	1.46E-14	6.25E-15
Acenaphthylene	1.70E+00	1.17E-11	1.34E-12	2.04E-15	2.33E-16	1.33E-14	5.67E-15
Anthracene	1.72E+00	1.18E-11	1.35E-12	2.05E-15	2.35E-16	1.34E-14	5.71E-15
Benzo(a)anthracene	1.58E+00	1.09E-11	1.24E-12	1.89E-15	2.16E-16	1.23E-14	5.26E-15
Benzo(b)fluoranthene	1.62E+00	1.11E-11	1.27E-12	1.94E-15	2.22E-16	1.26E-14	5.39E-15
Benzo(k)fluoranthene	1.72E+00	1.18E-11	1.35E-12	2.06E-15	2.35E-16	1.34E-14	5.72E-15
Benzoic acid	8.33E+00	5.72E-11	6.54E-12	9.98E-15	1.14E-15	6.49E-14	2.77E-14
Benzo(a)pyrene	1.60E+00	1.10E-11	1.26E-12	1.92E-15	2.19E-16	1.25E-14	5.33E-15
Butylbenzylphthalate	8.21E-01	5.64E-12	6.45E-13	9.84E-16	1.12E-16	6.39E-15	2.74E-15
Chrysene	1.38E+00	9.45E-12	1.08E-12	1.65E-15	1.88E-16	1.07E-14	4.58E-15
Dibenzo(a,h)anthracene	1.72E+00	1.18E-11	1.35E-12	2.06E-15	2.35E-16	1.34E-14	5.72E-15
2,4-Dimethylphenol	1.75E+00	1.20E-11	1.37E-12	2.09E-15	2.39E-16	1.36E-14	5.82E-15
bis(2-Ethylhexyl)phthalate	3.03E+00	2.08E-11	2.38E-12	3.63E-15	4.15E-16	2.36E-14	1.01E-14
Fluoranthene	2.73E+00	1.88E-11	2.15E-12	3.27E-15	3.74E-16	2.13E-14	9.10E-15
Fluorene	1.75E+00	1.20E-11	1.37E-12	2.10E-15	2.40E-16	1.36E-14	5.83E-15
Indeno(1,2,3-cd)pyrene	1.71E+00	1.18E-11	1.34E-12	2.05E-15	2.34E-16	1.33E-14	5.70E-15
2-Methylnaphthalene	6.77E+00	4.65E-11	5.32E-12	8.11E-15	9.28E-16	5.27E-14	2.26E-14
2-Methylphenol	1.72E+00	1.18E-11	1.35E-12	2.06E-15	2.35E-16	1.34E-14	5.72E-15
4-Methylphenol	1.71E+00	1.18E-11	1.35E-12	2.05E-15	2.35E-16	1.33E-14	5.71E-15
Naphthalene	1.56E+00	1.07E-11	1.23E-12	1.87E-15	2.14E-16	1.22E-14	5.20E-15
Di-n-octylphthalate	1.76E+00	1.21E-11	1.38E-12	2.11E-15	2.41E-16	1.37E-14	5.87E-15
Phenanthrene	3.43E+00	2.35E-11	2.69E-12	4.11E-15	4.70E-16	2.67E-14	1.14E-14
Phenol	1.72E+00	1.18E-11	1.35E-12	2.06E-15	2.35E-16	1.34E-14	5.72E-15
Pyrene	2.17E+00	1.49E-11	1.71E-12	2.60E-15	2.98E-16	1.69E-14	7.24E-15

Table 4-37 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area A

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.12E+04	7.67E-08	8.76E-09	1.34E-11	1.53E-12	8.69E-11	3.72E-11
Antimony	6.79E+00	4.67E-11	5.33E-12	8.14E-15	9.30E-16	5.29E-14	2.26E-14
Arsenic	2.69E+01	1.85E-10	2.12E-11	3.23E-14	3.69E-15	2.10E-13	8.97E-14
Barium	2.02E+02	1.38E-09	1.58E-10	2.41E-13	2.76E-14	1.57E-12	6.71E-13
Beryllium	1.46E+00	1.00E-11	1.15E-12	1.75E-15	2.00E-16	1.14E-14	4.86E-15
Cadmium	1.66E+00	1.14E-11	1.30E-12	1.99E-15	2.27E-16	1.29E-14	5.52E-15
Calcium	1.11E+05	7.64E-07	8.73E-08	1.33E-10	1.52E-11	8.66E-10	3.70E-10
Chromium	2.35E+01	1.61E-10	1.84E-11	2.81E-14	3.21E-15	1.83E-13	7.82E-14
Cobalt	6.96E+00	4.78E-11	5.46E-12	8.34E-15	9.53E-16	5.42E-14	2.32E-14
Copper	8.44E+01	5.80E-10	6.63E-11	1.01E-13	1.16E-14	6.58E-13	2.81E-13
Iron	2.86E+04	1.96E-07	2.24E-08	3.42E-11	3.91E-12	2.22E-10	9.51E-11
Lead	8.98E+02	6.17E-09	7.05E-10	1.08E-12	1.23E-13	6.99E-12	2.99E-12
Magnesium	5.71E+04	3.92E-07	4.49E-08	6.84E-11	7.82E-12	4.45E-10	1.90E-10
Manganese	9.60E+02	6.59E-09	7.54E-10	1.15E-12	1.31E-13	7.47E-12	3.20E-12
Mercury	2.87E-01	1.97E-12	2.25E-13	3.44E-16	3.93E-17	2.24E-15	9.56E-16
Nickel	1.97E+01	1.35E-10	1.54E-11	2.36E-14	2.69E-15	1.53E-13	6.55E-14
Potassium	1.82E+03	1.25E-08	1.43E-09	2.18E-12	2.49E-13	1.42E-11	6.06E-12
Selenium	1.60E+00	1.10E-11	1.25E-12	1.91E-15	2.19E-16	1.24E-14	5.32E-15
Silver	9.27E-01	6.37E-12	7.28E-13	1.11E-15	1.27E-16	7.22E-15	3.09E-15
Sodium	4.79E+02	3.29E-09	3.76E-10	5.74E-13	6.56E-14	3.73E-12	1.60E-12
Thallium	5.24E-01	3.60E-12	4.12E-13	6.28E-16	7.18E-17	4.06E-15	1.75E-15
Vanadium	2.31E+01	1.59E-10	1.81E-11	2.77E-14	3.16E-15	1.80E-13	7.69E-14
Zinc	3.55E+02	2.44E-09	2.79E-10	4.26E-13	4.87E-14	2.77E-12	1.18E-12
Cyanide	8.95E+00	6.15E-11	7.03E-12	1.07E-14	1.23E-15	6.97E-14	2.98E-14
PESTICIDES/PCBs							
PCB-1242	5.17E-01	3.55E-12	4.06E-13	6.19E-16	7.08E-17	4.03E-15	1.72E-15
PCB-1254	1.45E+01	9.95E-11	1.14E-11	1.74E-14	1.98E-15	1.13E-13	4.82E-14
PCB-1260	1.12E+01	7.69E-11	8.79E-12	1.34E-14	1.53E-15	8.72E-14	3.73E-14
PCB-1248	1.68E+01	1.15E-10	1.32E-11	2.01E-14	2.29E-15	1.30E-13	5.58E-14
TOTAL	2.13E+05	1.46E-06	1.67E-07	2.55E-10	2.92E-11	1.66E-09	7.10E-10

Table 4-37 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	6.59E-16	3.76E-16	1.16E-15	6.65E-16	1.38E-15	5.90E-16	4.91E-16	2.80E-16
Carbon Disulfide	1.71E-16	9.74E-17	3.02E-16	1.72E-16	3.57E-16	1.53E-16	1.27E-16	7.26E-17
1,1-Dichloroethane	1.48E-15	8.47E-16	2.62E-15	1.50E-15	3.10E-15	1.33E-15	1.10E-15	6.31E-16
1,2-Dichloroethane (total)	3.03E-16	1.73E-16	5.36E-16	3.06E-16	6.34E-16	2.71E-16	2.26E-16	1.29E-16
Ethylbenzene	9.31E-16	5.32E-16	1.65E-15	9.40E-16	1.95E-15	8.34E-16	6.94E-16	3.96E-16
Tetrachloroethene	2.65E-16	1.51E-16	4.68E-16	2.67E-16	5.54E-16	2.37E-16	1.97E-16	1.13E-16
Toluene	6.59E-16	3.76E-16	1.16E-15	6.65E-16	1.38E-15	5.90E-16	4.91E-16	2.80E-16
Trichloroethene	6.59E-16	3.76E-16	1.16E-15	6.65E-16	1.38E-15	5.90E-16	4.91E-16	2.80E-16
Xylene (total)	1.90E-14	1.09E-14	3.36E-14	1.92E-14	3.98E-14	1.70E-14	1.42E-14	8.09E-15
SEMI-VOLATILES								
Acenaphthene	2.99E-15	1.71E-15	5.29E-15	3.02E-15	6.26E-15	2.68E-15	2.23E-15	1.27E-15
Acenaphthylene	2.72E-15	1.55E-15	4.80E-15	2.74E-15	5.68E-15	2.43E-15	2.02E-15	1.15E-15
Anthracene	2.73E-15	1.56E-15	4.83E-15	2.76E-15	5.72E-15	2.45E-15	2.04E-15	1.16E-15
Benzo(a)anthracene	2.52E-15	1.44E-15	4.45E-15	2.54E-15	5.27E-15	2.26E-15	1.88E-15	1.07E-15
Benzo(b)fluoranthene	2.58E-15	1.47E-15	4.56E-15	2.61E-15	5.40E-15	2.31E-15	1.92E-15	1.10E-15
Benzo(k)fluoranthene	2.74E-15	1.56E-15	4.84E-15	2.76E-15	5.73E-15	2.45E-15	2.04E-15	1.17E-15
Benzoic acid	1.33E-14	7.58E-15	2.35E-14	1.34E-14	2.78E-14	1.19E-14	9.89E-15	5.65E-15
Benzo(a)pyrene	2.55E-15	1.46E-15	4.51E-15	2.57E-15	5.34E-15	2.28E-15	1.90E-15	1.08E-15
Butylbenzylphthalate	1.31E-15	7.47E-16	2.31E-15	1.32E-15	2.74E-15	1.17E-15	9.75E-16	5.57E-16
Chrysene	2.19E-15	1.25E-15	3.88E-15	2.21E-15	4.59E-15	1.96E-15	1.63E-15	9.32E-16
Dibenzo(a,h)anthracene	2.74E-15	1.56E-15	4.84E-15	2.76E-15	5.73E-15	2.45E-15	2.04E-15	1.17E-15
2,4-Dimethylphenol	2.78E-15	1.59E-15	4.92E-15	2.81E-15	5.83E-15	2.49E-15	2.07E-15	1.18E-15
bis(2-Ethylhexyl)phthalate	4.83E-15	2.76E-15	8.54E-15	4.87E-15	1.01E-14	4.32E-15	3.60E-15	2.05E-15
Fluoranthene	4.36E-15	2.49E-15	7.70E-15	4.40E-15	9.12E-15	3.90E-15	3.25E-15	1.85E-15
Fluorene	2.79E-15	1.59E-15	4.93E-15	2.81E-15	5.84E-15	2.50E-15	2.08E-15	1.19E-15
Indeno(1,2,3-cd)pyrene	2.73E-15	1.56E-15	4.82E-15	2.75E-15	5.71E-15	2.44E-15	2.03E-15	1.16E-15
2-Methylnaphthalene	1.08E-14	6.16E-15	1.91E-14	1.09E-14	2.26E-14	9.67E-15	8.04E-15	4.59E-15
2-Methylphenol	2.74E-15	1.56E-15	4.84E-15	2.76E-15	5.73E-15	2.45E-15	2.04E-15	1.17E-15
4-Methylphenol	2.73E-15	1.56E-15	4.83E-15	2.76E-15	5.72E-15	2.45E-15	2.03E-15	1.16E-15
Naphthalene	2.49E-15	1.42E-15	4.40E-15	2.51E-15	5.21E-15	2.23E-15	1.85E-15	1.06E-15
Di-n-octylphthalate	2.81E-15	1.60E-15	4.97E-15	2.84E-15	5.88E-15	2.52E-15	2.09E-15	1.20E-15
Phenanthrene	5.47E-15	3.12E-15	9.66E-15	5.52E-15	1.14E-14	4.89E-15	4.07E-15	2.32E-15
Phenol	2.74E-15	1.56E-15	4.84E-15	2.76E-15	5.73E-15	2.45E-15	2.04E-15	1.17E-15
Pyrene	3.47E-15	1.98E-15	6.13E-15	3.50E-15	7.26E-15	3.10E-15	2.58E-15	1.47E-15

Table 4-37 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.78E-11	1.02E-11	3.15E-11	1.80E-11	3.72E-11	1.59E-11	1.33E-11	7.57E-12
Antimony	1.08E-14	6.18E-15	1.91E-14	1.09E-14	2.27E-14	9.70E-15	8.07E-15	4.61E-15
Arsenic	4.29E-14	2.45E-14	7.59E-14	4.33E-14	8.99E-14	3.84E-14	3.20E-14	1.83E-14
Barium	3.21E-13	1.83E-13	5.68E-13	3.24E-13	6.73E-13	2.88E-13	2.39E-13	1.37E-13
Beryllium	2.32E-15	1.33E-15	4.11E-15	2.35E-15	4.87E-15	2.08E-15	1.73E-15	9.89E-16
Cadmium	2.64E-15	1.51E-15	4.67E-15	2.67E-15	5.53E-15	2.37E-15	1.97E-15	1.12E-15
Calcium	1.77E-10	1.01E-10	3.13E-10	1.79E-10	3.71E-10	1.59E-10	1.32E-10	7.54E-11
Chromium	3.74E-14	2.14E-14	6.61E-14	3.78E-14	7.83E-14	3.35E-14	2.79E-14	1.59E-14
Cobalt	1.11E-14	6.33E-15	1.96E-14	1.12E-14	2.32E-14	9.93E-15	8.27E-15	4.72E-15
Copper	1.35E-13	7.69E-14	2.38E-13	1.36E-13	2.82E-13	1.21E-13	1.00E-13	5.73E-14
Iron	4.55E-11	2.60E-11	8.05E-11	4.59E-11	9.53E-11	4.08E-11	3.39E-11	1.94E-11
Lead	1.43E-12	8.17E-13	2.53E-12	1.44E-12	3.00E-12	1.28E-12	1.07E-12	6.09E-13
Magnesium	9.11E-11	5.20E-11	1.61E-10	9.19E-11	1.91E-10	8.15E-11	6.78E-11	3.87E-11
Manganese	1.53E-12	8.73E-13	2.70E-12	1.54E-12	3.20E-12	1.37E-12	1.14E-12	6.51E-13
Mercury	4.58E-16	2.61E-16	8.09E-16	4.62E-16	9.58E-16	4.10E-16	3.41E-16	1.95E-16
Nickel	3.14E-14	1.79E-14	5.54E-14	3.16E-14	6.56E-14	2.81E-14	2.34E-14	1.33E-14
Potassium	2.90E-12	1.66E-12	5.13E-12	2.93E-12	6.07E-12	2.60E-12	2.16E-12	1.23E-12
Selenium	2.54E-15	1.45E-15	4.50E-15	2.57E-15	5.33E-15	2.28E-15	1.90E-15	1.08E-15
Silver	1.48E-15	8.44E-16	2.61E-15	1.49E-15	3.09E-15	1.32E-15	1.10E-15	6.29E-16
Sodium	7.63E-13	4.36E-13	1.35E-12	7.70E-13	1.60E-12	6.83E-13	5.69E-13	3.25E-13
Thallium	8.36E-16	4.77E-16	1.48E-15	8.43E-16	1.75E-15	7.48E-16	6.22E-16	3.55E-16
Vanadium	3.68E-14	2.10E-14	6.51E-14	3.71E-14	7.70E-14	3.29E-14	2.74E-14	1.57E-14
Zinc	5.67E-13	3.24E-13	1.00E-12	5.72E-13	1.19E-12	5.07E-13	4.22E-13	2.41E-13
Cyanide	1.43E-14	8.15E-15	2.52E-14	1.44E-14	2.99E-14	1.28E-14	1.06E-14	6.07E-15
PESTICIDES/PCBs								
PCB-1242	8.24E-16	4.71E-16	1.46E-15	8.32E-16	1.73E-15	7.38E-16	6.14E-16	3.51E-16
PCB-1254	2.31E-14	1.32E-14	4.08E-14	2.33E-14	4.83E-14	2.07E-14	1.72E-14	9.82E-15
PCB-1260	1.78E-14	1.02E-14	3.16E-14	1.80E-14	3.74E-14	1.60E-14	1.33E-14	7.59E-15
PCB-1248	2.67E-14	1.52E-14	4.72E-14	2.70E-14	5.59E-14	2.39E-14	1.99E-14	1.14E-14
TOTAL	3.40E-10	1.94E-10	6.01E-10	3.43E-10	7.11E-10	3.04E-10	2.53E-10	1.44E-10

Table 4-38
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area B

	Upper 95% Confidence Arth. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.13E-01	2.74E-12	3.13E-13	3.83E-16	4.38E-17	3.75E-15	1.61E-15
Carbon Disulfide	1.07E-01	2.41E-12	2.76E-13	3.37E-16	3.86E-17	3.30E-15	1.41E-15
1,1-Dichloroethane	9.30E-01	2.41E-12	2.76E-13	3.37E-16	3.86E-17	3.30E-15	1.41E-15
1,2-Dichloroethane (total)	1.80E-01	3.70E-12	4.23E-13	5.17E-16	5.91E-17	5.06E-15	2.17E-15
Ethylbenzene	5.84E-01	2.41E-12	2.76E-13	3.37E-16	3.86E-17	3.30E-15	1.41E-15
Tetrachloroethene	1.66E-01	9.64E-12	1.10E-12	1.35E-15	1.54E-16	1.32E-14	5.64E-15
Toluene	4.13E-01	2.41E-12	2.76E-13	3.37E-16	3.86E-17	3.30E-15	1.41E-15
Trichloroethene	4.13E-01	1.71E-11	1.95E-12	2.38E-15	2.73E-16	2.33E-14	9.98E-15
Xylene (total)	1.19E+01	2.41E-12	2.76E-13	3.37E-16	3.86E-17	3.30E-15	1.41E-15
SEMI-VOLATILES							
Acenaphthene	1.88E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Acenaphthylene	1.70E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Anthracene	1.72E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Benzo(a)anthracene	1.58E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Benzo(b)fluoranthene	1.62E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Benzo(k)fluoranthene	1.72E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Benzoic acid	8.33E+00	5.05E-10	5.77E-11	7.05E-14	8.06E-15	6.91E-13	2.95E-13
Benzo(a)pyrene	1.60E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Butylbenzylphthalate	8.21E-01	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Chrysene	1.38E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Dibenzo(a,h)anthracene	1.72E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
2,4-Dimethylphenol	1.75E+00	4.82E-10	5.51E-11	6.74E-14	7.71E-15	6.60E-13	2.82E-13
bis(2-Ethylhexyl)phthalate	3.03E+00	2.79E-10	3.19E-11	3.91E-14	4.47E-15	3.82E-13	1.64E-13
Fluoranthene	2.73E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Fluorene	1.75E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
Indeno(1,2,3-cd)pyrene	1.71E+00	1.04E-10	1.19E-11	1.45E-14	1.66E-15	1.42E-13	6.09E-14
2-Methylnaphthalene	6.77E+00	2.58E-11	2.95E-12	3.60E-15	4.12E-16	3.53E-14	1.51E-14
2-Methylphenol	1.72E+00	3.54E-10	4.04E-11	4.94E-14	5.65E-15	4.84E-13	2.07E-13
4-Methylphenol	1.71E+00	2.65E-09	3.03E-10	3.71E-13	4.24E-14	3.63E-12	1.55E-12
Naphthalene	1.56E+00	1.05E-10	1.20E-11	1.47E-14	1.68E-15	1.44E-13	6.17E-14
Di-n-octylphthalate	1.76E+00	1.02E-10	1.17E-11	1.43E-14	1.64E-15	1.40E-13	5.99E-14
Phenanthrene	3.43E+00	1.54E-11	1.77E-12	2.16E-15	2.47E-16	2.11E-14	9.04E-15
Phenol	1.72E+00	1.56E-09	1.78E-10	2.17E-13	2.49E-14	2.13E-12	9.11E-13
Pyrene	2.17E+00	1.02E-10	1.17E-11	1.43E-14	1.63E-15	1.40E-13	5.98E-14

Table 4-38 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.12E+04	2.11E-07	2.41E-08	2.95E-11	3.38E-12	2.89E-10	1.24E-10
Antimony	6.79E+00	1.15E-09	1.32E-10	1.61E-13	1.84E-14	1.58E-12	6.75E-13
Arsenic	2.69E+01	8.63E-11	9.87E-12	1.21E-14	1.38E-15	1.18E-13	5.05E-14
Barium	2.02E+02	1.89E-08	2.16E-09	2.64E-12	3.02E-13	2.58E-11	1.10E-11
Beryllium	1.46E+00	3.91E-11	4.47E-12	5.47E-15	6.26E-16	5.36E-14	2.29E-14
Cadmium	1.66E+00	5.80E-11	6.63E-12	8.11E-15	9.27E-16	7.94E-14	3.40E-14
Calcium	1.11E+05	1.30E-06	1.48E-07	1.82E-10	2.08E-11	1.78E-09	7.60E-10
Chromium	2.35E+01	1.08E-09	1.23E-10	1.51E-13	1.73E-14	1.48E-12	6.32E-13
Cobalt	6.96E+00	8.27E-11	9.45E-12	1.16E-14	1.32E-15	1.13E-13	4.84E-14
Copper	8.44E+01	3.95E-09	4.51E-10	5.52E-13	6.31E-14	5.40E-12	2.31E-12
Iron	2.86E+04	3.20E-07	3.65E-08	4.47E-11	5.11E-12	4.37E-10	1.87E-10
Lead	8.98E+02	1.52E-08	1.74E-09	2.13E-12	2.44E-13	2.09E-11	8.92E-12
Magnesium	5.71E+04	4.07E-07	4.65E-08	5.69E-11	6.51E-12	5.57E-10	2.38E-10
Manganese	9.60E+02	1.77E-08	2.02E-09	2.47E-12	2.82E-13	2.42E-11	1.03E-11
Mercury	2.87E-01	1.07E-12	1.22E-13	1.50E-16	1.71E-17	1.46E-15	6.26E-16
Nickel	1.97E+01	2.85E-10	3.26E-11	3.99E-14	4.56E-15	3.91E-13	1.67E-13
Potassium	1.82E+03	1.59E-08	1.82E-09	2.22E-12	2.54E-13	2.17E-11	9.30E-12
Selenium	1.60E+00	1.35E-11	1.55E-12	1.89E-15	2.16E-16	1.85E-14	7.93E-15
Silver	9.27E-01	5.83E-12	6.66E-13	8.15E-16	9.31E-17	7.97E-15	3.41E-15
Sodium	4.79E+02	9.80E-09	1.12E-09	1.37E-12	1.57E-13	1.34E-11	5.74E-12
Thallium	5.24E-01	4.36E-12	4.98E-13	6.09E-16	6.97E-17	5.97E-15	2.55E-15
Vanadium	2.31E+01	1.79E-10	2.05E-11	2.51E-14	2.87E-15	2.46E-13	1.05E-13
Zinc	3.55E+02	8.47E-09	9.68E-10	1.18E-12	1.35E-13	1.16E-11	4.96E-12
Cyanide	8.95E+00	3.85E-11	4.40E-12	5.39E-15	6.16E-16	5.27E-14	2.26E-14
PESTICIDES/PCBs							
PCB-1242	5.17E-01	1.03E-10	1.18E-11	1.44E-14	1.65E-15	1.41E-13	6.03E-14
PCB-1254	1.45E+01	2.38E-10	2.72E-11	3.33E-14	3.81E-15	3.26E-13	1.39E-13
PCB-1260	1.12E+01	2.28E-10	2.60E-11	3.18E-14	3.64E-15	3.12E-13	1.33E-13
PCB-1248	1.68E+01	2.14E-10	2.45E-11	2.99E-14	3.42E-15	2.93E-13	1.25E-13
TOTAL	2.13E+05	2.34E-06	2.67E-07	3.27E-10	3.74E-11	3.20E-09	1.37E-09

Table 4-38 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	1.43E-15	8.14E-16	3.79E-16	2.17E-16	2.05E-15	8.77E-16	7.30E-16	4.17E-16
Carbon Disulfide	1.25E-15	7.16E-16	3.34E-16	1.91E-16	1.80E-15	7.72E-16	6.42E-16	3.67E-16
1,1-Dichloroethane	1.25E-15	7.16E-16	3.34E-16	1.91E-16	1.80E-15	7.72E-16	6.42E-16	3.67E-16
1,2-Dichloroethane (total)	1.92E-15	1.10E-15	5.12E-16	2.92E-16	2.77E-15	1.18E-15	9.85E-16	5.62E-16
Ethylbenzene	1.25E-15	7.16E-16	3.34E-16	1.91E-16	1.80E-15	7.72E-16	6.42E-16	3.67E-16
Tetrachloroethene	5.01E-15	2.86E-15	1.33E-15	7.61E-16	7.21E-15	3.08E-15	2.57E-15	1.46E-15
Toluene	1.25E-15	7.16E-16	3.34E-16	1.91E-16	1.80E-15	7.72E-16	6.42E-16	3.67E-16
Trichloroethene	8.87E-15	5.06E-15	2.36E-15	1.35E-15	1.28E-14	5.46E-15	4.54E-15	2.59E-15
Xylene (total)	1.25E-15	7.16E-16	3.34E-16	1.91E-16	1.80E-15	7.72E-16	6.42E-16	3.67E-16
SEMI-VOLATILES								
Acenaphthene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Acenaphthylene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Anthracene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Benzo(a)anthracene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Benzo(b)fluoranthene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Benzo(k)fluoranthene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Benzoic acid	2.62E-13	1.50E-13	6.98E-14	3.99E-14	3.77E-13	1.61E-13	1.34E-13	7.67E-14
Benzo(a)pyrene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Butylbenzylphthalate	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Chrysene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Dibenzo(a,h)anthracene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
2,4-Dimethylphenol	2.51E-13	1.43E-13	6.67E-14	3.81E-14	3.61E-13	1.54E-13	1.28E-13	7.33E-14
bis(2-Ethylhexyl)phthalate	1.45E-13	8.30E-14	3.87E-14	2.21E-14	2.09E-13	8.94E-14	7.44E-14	4.25E-14
Fluoranthene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Fluorene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
Indeno(1,2,3-cd)pyrene	5.41E-14	3.09E-14	1.44E-14	8.22E-15	7.78E-14	3.33E-14	2.77E-14	1.58E-14
2-Methylnaphthalene	1.34E-14	7.66E-15	3.57E-15	2.04E-15	1.93E-14	8.25E-15	6.86E-15	3.92E-15
2-Methylphenol	1.84E-13	1.05E-13	4.89E-14	2.79E-14	2.64E-13	1.13E-13	9.41E-14	5.37E-14
4-Methylphenol	1.38E-12	7.88E-13	3.67E-13	2.10E-13	1.99E-12	8.49E-13	7.07E-13	4.03E-13
Naphthalene	5.48E-14	3.13E-14	1.46E-14	8.32E-15	7.88E-14	3.37E-14	2.80E-14	1.60E-14
Di-n-octylphthalate	5.32E-14	3.04E-14	1.42E-14	8.08E-15	7.65E-14	3.27E-14	2.72E-14	1.56E-14
Phenanthrene	8.03E-15	4.59E-15	2.14E-15	1.22E-15	1.15E-14	4.94E-15	4.11E-15	2.35E-15
Phenol	8.09E-13	4.62E-13	2.15E-13	1.23E-13	1.16E-12	4.97E-13	4.14E-13	2.36E-13
Pyrene	5.32E-14	3.04E-14	1.41E-14	8.07E-15	7.64E-14	3.27E-14	2.72E-14	1.55E-14

Table 4-38 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.10E-10	6.27E-11	2.92E-11	1.67E-11	1.58E-10	6.76E-11	5.62E-11	3.21E-11
Antimony	5.99E-13	3.42E-13	1.59E-13	9.10E-14	8.62E-13	3.69E-13	3.07E-13	1.75E-13
Arsenic	4.49E-14	2.56E-14	1.19E-14	6.82E-15	6.45E-14	2.76E-14	2.30E-14	1.31E-14
Barium	9.81E-12	5.60E-12	2.61E-12	1.49E-12	1.41E-11	6.04E-12	5.02E-12	2.87E-12
Beryllium	2.04E-14	1.16E-14	5.42E-15	3.09E-15	2.93E-14	1.25E-14	1.04E-14	5.95E-15
Cadmium	3.02E-14	1.72E-14	8.03E-15	4.58E-15	4.34E-14	1.86E-14	1.54E-14	8.82E-15
Calcium	6.75E-10	3.86E-10	1.80E-10	1.03E-10	9.71E-10	4.15E-10	3.46E-10	1.97E-10
Chromium	5.62E-13	3.21E-13	1.49E-13	8.53E-14	8.07E-13	3.45E-13	2.87E-13	1.64E-13
Cobalt	4.30E-14	2.45E-14	1.14E-14	6.53E-15	6.18E-14	2.64E-14	2.20E-14	1.26E-14
Copper	2.05E-12	1.17E-12	5.46E-13	3.12E-13	2.95E-12	1.26E-12	1.05E-12	6.00E-13
Iron	1.66E-10	9.49E-11	4.42E-11	2.52E-11	2.39E-10	1.02E-10	8.51E-11	4.86E-11
Lead	7.93E-12	4.53E-12	2.11E-12	1.20E-12	1.14E-11	4.88E-12	4.06E-12	2.32E-12
Magnesium	2.12E-10	1.21E-10	5.63E-11	3.22E-11	3.04E-10	1.30E-10	1.08E-10	6.19E-11
Manganese	9.19E-12	5.25E-12	2.44E-12	1.40E-12	1.32E-11	5.65E-12	4.70E-12	2.68E-12
Mercury	5.56E-16	3.18E-16	1.48E-16	8.45E-17	8.00E-16	3.42E-16	2.85E-16	1.62E-16
Nickel	1.48E-13	8.47E-14	3.95E-14	2.25E-14	2.13E-13	9.13E-14	7.60E-14	4.34E-14
Potassium	8.26E-12	4.71E-12	2.20E-12	1.25E-12	1.19E-11	5.08E-12	4.23E-12	2.41E-12
Selenium	7.04E-15	4.02E-15	1.87E-15	1.07E-15	1.01E-14	4.33E-15	3.60E-15	2.06E-15
Silver	3.03E-15	1.73E-15	8.06E-16	4.60E-16	4.36E-15	1.86E-15	1.55E-15	8.85E-16
Sodium	5.10E-12	2.91E-12	1.36E-12	7.74E-13	7.33E-12	3.14E-12	2.61E-12	1.49E-12
Thallium	2.27E-15	1.29E-15	6.03E-16	3.44E-16	3.26E-15	1.39E-15	1.16E-15	6.62E-16
Vanadium	9.33E-14	5.33E-14	2.48E-14	1.42E-14	1.34E-13	5.74E-14	4.77E-14	2.73E-14
Zinc	4.41E-12	2.52E-12	1.17E-12	6.69E-13	6.34E-12	2.71E-12	2.25E-12	1.29E-12
Cyanide	2.00E-14	1.14E-14	5.33E-15	3.04E-15	2.88E-14	1.23E-14	1.03E-14	5.85E-15
PESTICIDES/PCBs								
PCB-1242	5.36E-14	3.06E-14	1.42E-14	8.13E-15	7.70E-14	3.29E-14	2.74E-14	1.56E-14
PCB-1254	1.24E-13	7.07E-14	3.30E-14	1.88E-14	1.78E-13	7.62E-14	6.34E-14	3.62E-14
PCB-1260	1.18E-13	6.76E-14	3.15E-14	1.80E-14	1.70E-13	7.29E-14	6.06E-14	3.46E-14
PCB-1248	1.11E-13	6.36E-14	2.96E-14	1.69E-14	1.60E-13	6.85E-14	5.70E-14	3.25E-14
TOTAL	1.22E-09	6.94E-10	3.23E-10	1.85E-10	1.75E-09	7.48E-10	6.22E-10	3.55E-10

4-38. The doses presented in Table 4-38 range from $2.34\text{E-}06$ mg/kg-day for children on-site to $3.23\text{E-}10$ mg/kg-day for commercial populations at River Road.

Table 4-39 presents the inhalation exposure doses calculated for populations exposed to fugitive dust from recreational traffic in Area C. The doses presented in Table 4-39 range from $1.59\text{E-}06$ mg/kg-day for children on-site to $4.75\text{E-}11$ mg/kg-day for children at the playground. The inhalation doses calculated for populations exposed to fugitive dusts from recreational traffic in Area D are presented in Table 4-40. The doses calculated for this exposure scenario range from $7.14\text{E-}06$ mg/kg-day for unprotected construction workers on-site to $3.38\text{E-}11$ mg/kg-day for children at the playground.

Table 4-41 presents the inhalation exposure doses calculated for children, residents and commercial populations exposed to fugitive dusts due to vehicles parking in Area B. It is assumed that cars will not park in this area during construction activities on-site. Therefore, construction workers are not included in this exposure scenario. The inhalation doses presented in Table 4-41 range from $1.37\text{E-}05$ mg/kg-day for children on-site to $1.90\text{E-}09$ mg/kg-day for commercial populations at River Road.

BOS2REPa/bos-t2
February 26, 1991

Table 4-39
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area C

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.00E-03	4.53E-14	5.17E-15	1.35E-18	1.55E-19	6.45E-17	2.76E-17
Carbon Disulfide	5.00E-03	5.66E-14	6.47E-15	1.69E-18	1.93E-19	8.07E-17	3.45E-17
1,1-Dichloroethane	3.00E-03	3.40E-14	3.88E-15	1.02E-18	1.16E-19	4.84E-17	2.07E-17
1,2-Dichloroethene (total)	6.50E-02	7.36E-13	8.41E-14	2.20E-17	2.51E-18	1.05E-15	4.49E-16
Ethylbenzene	6.00E-03	6.79E-14	7.76E-15	2.03E-18	2.32E-19	9.68E-17	4.14E-17
Tetrachloroethene	7.00E-03	7.92E-14	9.06E-15	2.37E-18	2.71E-19	1.13E-16	4.83E-17
Toluene	1.40E-02	1.58E-13	1.81E-14	4.74E-18	5.42E-19	2.26E-16	9.66E-17
Trichloroethene	1.90E-02	2.15E-13	2.46E-14	6.43E-18	7.35E-19	3.07E-16	1.31E-16
Xylene (total)	3.60E-02	4.07E-13	4.66E-14	1.22E-17	1.39E-18	5.81E-16	2.48E-16
SEMI-VOLATILES							
Acenaphthene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Acenaphthylene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Anthracene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Benzo(a)anthracene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Benzo(b)fluoranthene	1.80E+00	2.04E-11	2.33E-12	6.09E-16	6.96E-17	2.90E-14	1.24E-14
Benzo(k)fluoranthene	8.10E-01	9.17E-12	1.05E-12	2.74E-16	3.13E-17	1.31E-14	5.59E-15
Benzoic acid	6.82E+00	7.71E-11	8.82E-12	2.31E-15	2.64E-16	1.10E-13	4.70E-14
Benzo(a)pyrene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Butylbenzylphthalate	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Chrysene	1.10E+00	1.24E-11	1.42E-12	3.72E-16	4.26E-17	1.78E-14	7.59E-15
Dibenzo(a,h)anthracene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
2,4-Dimethylphenol	7.50E-01	8.49E-12	9.70E-13	2.54E-16	2.90E-17	1.21E-14	5.18E-15
bis(2-Ethylhexyl)phthalate	8.20E+00	9.28E-11	1.06E-11	2.77E-15	3.17E-16	1.32E-13	5.66E-14
Fluoranthene	1.50E+00	1.70E-11	1.94E-12	5.08E-16	5.80E-17	2.42E-14	1.04E-14
Fluorene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Indeno(1,2,3-cd)pyrene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
2-Methylnaphthalene	1.10E+00	1.24E-11	1.42E-12	3.72E-16	4.26E-17	1.78E-14	7.59E-15
2-Methylphenol	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
4-Methylphenol	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Naphthalene	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Di-n-octylphthalate	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Phenanthrene	1.70E+00	1.92E-11	2.20E-12	5.75E-16	6.58E-17	2.74E-14	1.17E-14
Phenol	1.41E+00	1.59E-11	1.82E-12	4.76E-16	5.44E-17	2.27E-14	9.70E-15
Pyrene	1.90E+00	2.15E-11	2.46E-12	6.43E-16	7.35E-17	3.07E-14	1.31E-14

Table 4-38 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area C

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.33E+04	1.51E-07	1.72E-08	4.50E-12	5.14E-13	2.15E-10	9.18E-11
Antimony	4.80E+00	5.43E-11	6.21E-12	1.62E-15	1.86E-16	7.75E-14	3.31E-14
Arsenic	2.12E+01	2.40E-10	2.74E-11	7.17E-15	8.20E-16	3.42E-13	1.46E-13
Barium	2.37E+02	2.68E-09	3.07E-10	8.02E-14	9.17E-15	3.82E-12	1.64E-12
Beryllium	9.70E-01	1.10E-11	1.25E-12	3.28E-16	3.75E-17	1.57E-14	6.69E-15
Cadmium	2.40E+00	2.72E-11	3.10E-12	8.12E-16	9.28E-17	3.87E-14	1.66E-14
Calcium	7.33E+04	8.30E-07	9.48E-08	2.48E-11	2.84E-12	1.18E-09	5.06E-10
Chromium	2.97E+01	3.36E-10	3.84E-11	1.00E-14	1.15E-15	4.79E-13	2.05E-13
Cobalt	8.10E+00	9.17E-11	1.05E-11	2.74E-15	3.13E-16	1.31E-13	5.59E-14
Copper	7.39E+01	8.36E-10	9.56E-11	2.50E-14	2.86E-15	1.19E-12	5.10E-13
Iron	2.38E+04	2.69E-07	3.08E-08	8.05E-12	9.21E-13	3.84E-10	1.64E-10
Lead	7.44E+02	8.42E-09	9.63E-10	2.52E-13	2.88E-14	1.20E-11	5.14E-12
Magnesium	2.53E+04	2.86E-07	3.27E-08	8.56E-12	9.79E-13	4.08E-10	1.75E-10
Manganese	7.45E+02	8.43E-09	9.64E-10	2.52E-13	2.88E-14	1.20E-11	5.14E-12
Mercury	2.30E-01	2.60E-12	2.98E-13	7.78E-17	8.90E-18	3.71E-15	1.59E-15
Nickel	2.24E+01	2.53E-10	2.90E-11	7.58E-15	8.66E-16	3.61E-13	1.55E-13
Potassium	1.99E+03	2.25E-08	2.57E-09	6.73E-13	7.70E-14	3.21E-11	1.37E-11
Selenium	6.70E-01	7.58E-12	8.67E-13	2.27E-16	2.59E-17	1.08E-14	4.62E-15
Silver	8.30E-01	9.39E-12	1.07E-12	2.81E-16	3.21E-17	1.34E-14	5.73E-15
Sodium	3.01E+02	3.41E-09	3.89E-10	1.02E-13	1.16E-14	4.86E-12	2.08E-12
Thallium	4.20E-01	4.75E-12	5.43E-13	1.42E-16	1.62E-17	6.78E-15	2.90E-15
Vanadium	2.17E+01	2.46E-10	2.81E-11	7.34E-15	8.39E-16	3.50E-13	1.50E-13
Zinc	3.43E+02	3.88E-09	4.44E-10	1.16E-13	1.33E-14	5.53E-12	2.37E-12
Cyanide	5.40E-01	6.11E-12	6.99E-13	1.83E-16	2.09E-17	8.71E-15	3.73E-15
PESTICIDES/PCBS *							
PCB-1242	1.45E+00	1.65E-11	1.88E-12	4.92E-16	5.62E-17	2.35E-14	1.00E-14
PCB-1254	5.57E+01	6.30E-10	7.21E-11	1.88E-14	2.15E-15	8.99E-13	3.84E-13
PCB-1260	6.23E+00	7.04E-11	8.05E-12	2.11E-15	2.41E-16	1.00E-13	4.30E-14
PCB-1248	3.32E+01	3.76E-10	4.30E-11	1.12E-14	1.28E-15	5.36E-13	2.29E-13
TOTAL	1.40E+05	1.59E-06	1.82E-07	4.75E-11	5.43E-12	2.27E-09	9.69E-10

Table 4-39 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	3.10E-17	1.77E-17	2.25E-18	1.29E-18	1.78E-17	7.59E-18	6.32E-18	3.61E-18
Carbon Disulfide	3.88E-17	2.21E-17	2.81E-18	1.61E-18	2.22E-17	9.49E-18	7.90E-18	4.51E-18
1,1-Dichloroethane	2.33E-17	1.33E-17	1.69E-18	9.64E-19	1.33E-17	5.70E-18	4.74E-18	2.71E-18
1,2-Dichloroethene (total)	5.04E-16	2.89E-16	3.66E-17	2.09E-17	2.88E-16	1.23E-16	1.03E-16	5.86E-17
Ethylbenzene	4.66E-17	2.66E-17	3.38E-18	1.93E-18	2.66E-17	1.14E-17	9.48E-18	5.41E-18
Tetrachloroethene	5.43E-17	3.10E-17	3.94E-18	2.25E-18	3.11E-17	1.33E-17	1.11E-17	6.31E-18
Toluene	1.09E-16	6.20E-17	7.88E-18	4.50E-18	6.21E-17	2.66E-17	2.21E-17	1.26E-17
Trichloroethene	1.47E-16	8.42E-17	1.07E-17	6.11E-18	8.43E-17	3.61E-17	3.00E-17	1.71E-17
Xylene (total)	2.79E-16	1.59E-16	2.03E-17	1.16E-17	1.60E-16	6.83E-17	5.69E-17	3.25E-17
SEMI-VOLATILES								
Acenaphthene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Acenaphthylene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Anthracene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Benzo(a)anthracene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Benzo(b)fluoranthene	1.40E-14	7.97E-15	1.01E-15	5.78E-16	7.99E-15	3.42E-15	2.84E-15	1.62E-15
Benzo(k)fluoranthene	6.29E-15	3.59E-15	4.56E-16	2.60E-16	3.59E-15	1.54E-15	1.28E-15	7.30E-16
Benzoic acid	5.29E-14	3.02E-14	3.84E-15	2.19E-15	3.03E-14	1.29E-14	1.08E-14	6.15E-15
Benzo(a)pyrene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Butylbenzylphthalate	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Chrysene	8.54E-15	4.87E-15	6.19E-16	3.53E-16	4.88E-15	2.09E-15	1.74E-15	9.92E-16
Dibenzo(a,h)anthracene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
2,4-Dimethylphenol	5.82E-15	3.32E-15	4.22E-16	2.41E-16	3.33E-15	1.42E-15	1.18E-15	6.76E-16
bis(2-Ethylhexyl)phthalate	6.36E-14	3.63E-14	4.62E-15	2.64E-15	3.64E-14	1.56E-14	1.30E-14	7.39E-15
Fluoranthene	1.16E-14	6.64E-15	8.44E-16	4.82E-16	6.66E-15	2.85E-15	2.37E-15	1.35E-15
Fluorene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Indeno(1,2,3-cd)pyrene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
2-Methylnaphthalene	8.54E-15	4.87E-15	6.19E-16	3.53E-16	4.88E-15	2.09E-15	1.74E-15	9.92E-16
2-Methylphenol	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
4-Methylphenol	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Naphthalene	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Di-n-octylphthalate	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Phenanthrene	1.32E-14	7.53E-15	9.57E-16	5.46E-16	7.54E-15	3.23E-15	2.69E-15	1.53E-15
Phenol	1.09E-14	6.23E-15	7.91E-16	4.52E-16	6.24E-15	2.67E-15	2.22E-15	1.27E-15
Pyrene	1.47E-14	8.42E-15	1.07E-15	6.11E-16	8.43E-15	3.61E-15	3.00E-15	1.71E-15

Table 4-39 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.03E-10	5.89E-11	7.49E-12	4.27E-12	5.90E-11	2.52E-11	2.10E-11	1.20E-11
Antimony	3.72E-14	2.13E-14	2.70E-15	1.54E-15	2.13E-14	9.11E-15	7.58E-15	4.33E-15
Arsenic	1.65E-13	9.39E-14	1.19E-14	6.81E-15	9.41E-14	4.02E-14	3.35E-14	1.91E-14
Barium	1.84E-12	1.05E-12	1.33E-13	7.82E-14	1.05E-12	4.50E-13	3.74E-13	2.14E-13
Beryllium	7.53E-15	4.30E-15	5.46E-16	3.12E-16	4.31E-15	1.84E-15	1.53E-15	8.75E-16
Cadmium	1.86E-14	1.06E-14	1.35E-15	7.71E-16	1.07E-14	4.56E-15	3.79E-15	2.16E-15
Calcium	5.69E-10	3.25E-10	4.13E-11	2.36E-11	3.25E-10	1.39E-10	1.16E-10	6.61E-11
Chromium	2.30E-13	1.32E-13	1.67E-14	9.54E-15	1.32E-13	5.64E-14	4.69E-14	2.68E-14
Cobalt	6.29E-14	3.59E-14	4.56E-15	2.60E-15	3.59E-14	1.54E-14	1.28E-14	7.30E-15
Copper	5.73E-13	3.27E-13	4.16E-14	2.37E-14	3.28E-13	1.40E-13	1.17E-13	6.66E-14
Iron	1.85E-10	1.05E-10	1.34E-11	7.65E-12	1.06E-10	4.52E-11	3.76E-11	2.15E-11
Lead	5.77E-12	3.30E-12	4.19E-13	2.39E-13	3.30E-12	1.41E-12	1.18E-12	6.71E-13
Magnesium	1.96E-10	1.12E-10	1.42E-11	8.13E-12	1.12E-10	4.80E-11	4.00E-11	2.28E-11
Manganese	5.78E-12	3.30E-12	4.19E-13	2.39E-13	3.31E-12	1.41E-12	1.18E-12	6.72E-13
Mercury	1.78E-15	1.02E-15	1.29E-16	7.39E-17	1.02E-15	4.37E-16	3.63E-16	2.07E-16
Nickel	1.74E-13	9.92E-14	1.26E-14	7.20E-15	9.94E-14	4.25E-14	3.54E-14	2.02E-14
Potassium	1.54E-11	8.82E-12	1.12E-12	6.39E-13	8.83E-12	3.78E-12	3.14E-12	1.79E-12
Selenium	5.20E-15	2.97E-15	3.77E-16	2.15E-16	2.97E-15	1.27E-15	1.06E-15	6.04E-16
Silver	6.44E-15	3.68E-15	4.67E-16	2.67E-16	3.68E-15	1.58E-15	1.31E-15	7.48E-16
Sodium	2.34E-12	1.33E-12	1.69E-13	9.67E-14	1.34E-12	5.71E-13	4.75E-13	2.71E-13
Thallium	3.26E-15	1.86E-15	2.36E-16	1.35E-16	1.86E-15	7.97E-16	6.63E-16	3.79E-16
Vanadium	1.68E-13	9.61E-14	1.22E-14	6.97E-15	9.63E-14	4.12E-14	3.43E-14	1.96E-14
Zinc	2.66E-12	1.52E-12	1.93E-13	1.10E-13	1.52E-12	6.51E-13	5.42E-13	3.09E-13
Cyanide	4.19E-15	2.39E-15	3.04E-16	1.74E-16	2.40E-15	1.03E-15	8.53E-16	4.87E-16
PESTICIDES/PCBS *								
PCB-1242	1.13E-14	6.44E-15	8.18E-16	4.67E-16	6.45E-15	2.76E-15	2.30E-15	1.31E-15
PCB-1254	4.32E-13	2.47E-13	3.13E-14	1.79E-14	2.47E-13	1.06E-13	8.80E-14	5.02E-14
PCB-1260	4.83E-14	2.76E-14	3.50E-15	2.00E-15	2.76E-14	1.18E-14	9.83E-15	5.61E-15
PCB-1248	2.58E-13	1.47E-13	1.87E-14	1.07E-14	1.47E-13	6.31E-14	5.25E-14	3.00E-14
TOTAL	1.09E-09	6.22E-10	7.90E-11	4.51E-11	6.23E-10	2.67E-10	2.22E-10	1.27E-10

Table 4-40
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Recreational Traffic On-Site
Surficial Soil - Area D

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Carbon Disulfide	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
1,1-Dichloroethane	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
1,2-Dichloroethene (total)	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Ethylbenzene	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Tetrachloroethene	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Toluene	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Trichloroethene	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
Xylene (total)	3.00E-03	1.85E-13	2.12E-14	8.76E-19	1.00E-19	5.99E-17	2.56E-17
SEMI-VOLATILES							
Acenaphthene	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Acenaphthylene	1.40E-01	8.65E-12	9.89E-13	4.09E-17	4.68E-18	2.80E-15	1.20E-15
Anthracene	8.70E-02	5.38E-12	6.15E-13	2.54E-17	2.91E-18	1.74E-15	7.43E-16
Benzo(a)anthracene	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Benzo(b)fluoranthene	1.50E+00	9.27E-11	1.06E-11	4.38E-16	5.01E-17	3.00E-14	1.28E-14
Benzo(k)fluoranthene	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Benzoic acid	2.00E-01	1.24E-11	1.41E-12	5.84E-17	6.68E-18	4.00E-15	1.71E-15
Benzo(a)pyrene	9.90E-01	6.12E-11	6.99E-12	2.89E-16	3.31E-17	1.98E-14	8.46E-15
Butylbenzylphthalate	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Chrysene	1.20E+00	7.42E-11	8.48E-12	3.51E-16	4.01E-17	2.40E-14	1.03E-14
Dibenzo(a,h)anthracene	1.20E-01	7.42E-12	8.48E-13	3.51E-17	4.01E-18	2.40E-15	1.03E-15
2,4-Dimethylphenol	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
bis(2-Ethylhexyl)phthalate	3.30E+00	2.04E-10	2.33E-11	9.64E-16	1.10E-16	6.59E-14	2.82E-14
Fluoranthene	2.20E+00	1.36E-10	1.55E-11	6.43E-16	7.35E-17	4.40E-14	1.88E-14
Fluorene	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Indeno(1,2,3-cd)pyrene	9.00E-01	5.56E-11	6.36E-12	2.63E-16	3.01E-17	1.80E-14	7.69E-15
2-Methylnaphthalene	1.20E-01	7.42E-12	8.48E-13	3.51E-17	4.01E-18	2.40E-15	1.03E-15
2-Methylphenol	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
4-Methylphenol	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Naphthalene	6.80E-02	4.20E-12	4.80E-13	1.99E-17	2.27E-18	1.36E-15	5.81E-16
Di-n-octylphthalate	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Phenanthrene	6.20E-01	3.83E-11	4.38E-12	1.81E-16	2.07E-17	1.24E-14	5.30E-15
Phenol	4.06E-01	2.51E-11	2.87E-12	1.19E-16	1.36E-17	8.11E-15	3.47E-15
Pyrene	1.30E+00	8.03E-11	9.18E-12	3.80E-16	4.34E-17	2.60E-14	1.11E-14

Table 4-40 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area D

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.54E+04	9.52E-07	1.09E-07	4.50E-12	5.14E-13	3.08E-10	1.32E-10
Antimony	4.20E+00	2.60E-10	2.97E-11	1.23E-15	1.40E-16	8.39E-14	3.59E-14
Arsenic	8.07E+01	4.99E-09	5.70E-10	2.36E-14	2.70E-15	1.61E-12	6.90E-13
Barium	2.81E+02	1.74E-08	1.99E-09	8.21E-14	9.38E-15	5.61E-12	2.40E-12
Beryllium	9.90E-01	6.12E-11	6.99E-12	2.89E-16	3.31E-17	1.98E-14	8.46E-15
Cadmium	2.90E+00	1.79E-10	2.05E-11	8.47E-16	9.69E-17	5.79E-14	2.48E-14
Calcium	2.58E+04	1.59E-06	1.82E-07	7.54E-12	8.62E-13	5.15E-10	2.20E-10
Chromium	3.12E+01	1.93E-09	2.20E-10	9.11E-15	1.04E-15	6.23E-13	2.67E-13
Cobalt	1.54E+01	9.52E-10	1.09E-10	4.50E-15	5.14E-16	3.08E-13	1.32E-13
Copper	8.99E+01	5.56E-09	6.35E-10	2.63E-14	3.00E-15	1.80E-12	7.68E-13
Iron	5.65E+04	3.49E-06	3.99E-07	1.65E-11	1.89E-12	1.13E-09	4.83E-10
Lead	4.69E+02	2.90E-08	3.31E-09	1.37E-13	1.57E-14	9.37E-12	4.01E-12
Magnesium	1.24E+04	7.66E-07	8.76E-08	3.62E-12	4.14E-13	2.48E-10	1.06E-10
Manganese	7.51E+02	4.64E-08	5.31E-09	2.19E-13	2.51E-14	1.50E-11	6.42E-12
Mercury	3.10E-01	1.92E-11	2.19E-12	9.06E-17	1.04E-17	6.19E-15	2.65E-15
Nickel	2.90E+01	1.79E-09	2.05E-10	8.47E-15	9.69E-16	5.79E-13	2.48E-13
Potassium	2.42E+03	1.50E-07	1.71E-08	7.07E-13	8.08E-14	4.83E-11	2.07E-11
Selenium	1.50E+00	9.27E-11	1.06E-11	4.38E-16	5.01E-17	3.00E-14	1.28E-14
Silver	9.30E-01	5.75E-11	6.57E-12	2.72E-16	3.11E-17	1.86E-14	7.95E-15
Sodium	2.86E+02	1.77E-08	2.02E-09	8.36E-14	9.55E-15	5.71E-12	2.44E-12
Thallium	6.20E-01	3.83E-11	4.38E-12	1.81E-16	2.07E-17	1.24E-14	5.30E-15
Vanadium	4.56E+01	2.82E-09	3.22E-10	1.33E-14	1.52E-15	9.11E-13	3.90E-13
Zinc	9.40E+02	5.81E-08	6.64E-09	2.75E-13	3.14E-14	1.88E-11	8.03E-12
Cyanide	7.50E-01	4.63E-11	5.30E-12	2.19E-16	2.50E-17	1.50E-14	6.41E-15
PESTICIDES/PCBS *							
PCB-1242	9.80E-02	6.06E-12	6.92E-13	2.86E-17	3.27E-18	1.96E-15	8.37E-16
PCB-1254	1.98E-01	1.22E-11	1.40E-12	5.78E-17	6.61E-18	3.96E-15	1.69E-15
PCB-1260	1.98E-01	1.22E-11	1.40E-12	5.78E-17	6.61E-18	3.96E-15	1.69E-15
PCB-1248	9.80E-02	6.06E-12	6.92E-13	2.86E-17	3.27E-18	1.96E-15	8.37E-16
TOTAL	1.16E+05	7.14E-06	8.16E-07	3.38E-11	3.86E-12	2.31E-09	9.88E-10

* Upper 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

Table 4-40 (cont'd)
 Inhalation Exposure Doses
 Due to fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Carbon Disulfide	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
1,1-Dichloroethane	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
1,2-Dichloroethene (total)	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Ethylbenzene	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Tetrachloroethene	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Toluene	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Trichloroethene	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
Xylene (total)	8.09E-18	4.62E-18	1.13E-18	6.44E-19	1.26E-17	5.38E-18	4.48E-18	2.56E-18
SEMI-VOLATILES								
Acenaphthene	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Acenaphthylene	3.78E-16	2.16E-16	5.27E-17	3.01E-17	5.87E-16	2.51E-16	2.09E-16	1.19E-16
Anthracene	2.35E-16	1.34E-16	3.27E-17	1.87E-17	3.65E-16	1.56E-16	1.30E-16	7.41E-17
Benzo(a)anthracene	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Benzo(b)fluoranthene	4.05E-15	2.31E-15	5.64E-16	3.22E-16	6.29E-15	2.69E-15	2.24E-15	1.28E-15
Benzo(k)fluoranthene	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Benzoic acid	5.39E-16	3.08E-16	7.53E-17	4.30E-17	8.39E-16	3.59E-16	2.99E-16	1.70E-16
Benzo(a)pyrene	2.67E-15	1.52E-15	3.73E-16	2.13E-16	4.15E-15	1.78E-15	1.48E-15	8.44E-16
Butylbenzylphthalate	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Chrysene	3.24E-15	1.85E-15	4.52E-16	2.58E-16	5.03E-15	2.15E-15	1.79E-15	1.02E-15
Dibenzo(a,h)anthracene	3.24E-16	1.85E-16	4.52E-17	2.58E-17	5.03E-16	2.15E-16	1.79E-16	1.02E-16
2,4-Dimethylphenol	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
bis(2-Ethylhexyl)phthalate	8.90E-15	5.08E-15	1.24E-15	7.09E-16	1.38E-14	5.92E-15	4.93E-15	2.81E-15
Fluoranthene	5.93E-15	3.39E-15	8.28E-16	4.73E-16	9.23E-15	3.95E-15	3.28E-15	1.87E-15
Fluorene	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Indeno(1,2,3-cd)pyrene	2.43E-15	1.39E-15	3.39E-16	1.93E-16	3.77E-15	1.61E-15	1.34E-15	7.67E-16
2-Methylnaphthalene	3.24E-16	1.85E-16	4.52E-17	2.58E-17	5.03E-16	2.15E-16	1.79E-16	1.02E-16
2-Methylphenol	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
4-Methylphenol	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Naphthalene	1.83E-16	1.05E-16	2.56E-17	1.46E-17	2.85E-16	1.22E-16	1.02E-16	5.79E-17
Di-n-octylphthalate	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Phenanthrene	1.67E-15	9.55E-16	2.33E-16	1.33E-16	2.60E-15	1.11E-15	9.25E-16	5.28E-16
Phenol	1.09E-15	6.25E-16	1.53E-16	8.72E-17	1.70E-15	7.28E-16	6.06E-16	3.46E-16
Pyrene	3.51E-15	2.00E-15	4.89E-16	2.79E-16	5.45E-15	2.33E-15	1.94E-15	1.11E-15

Table 4-80 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Recreational Traffic On-Site
 Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	4.15E-11	2.37E-11	5.79E-12	3.31E-12	6.46E-11	2.76E-11	2.30E-11	1.31E-11
Antimony	1.13E-14	6.47E-15	1.58E-15	9.02E-16	1.76E-14	7.53E-15	6.27E-15	3.58E-15
Arsenic	2.18E-13	1.24E-13	3.04E-14	1.73E-14	3.38E-13	1.45E-13	1.20E-13	6.88E-14
Barium	7.58E-13	4.33E-13	1.06E-13	6.04E-14	1.18E-12	5.04E-13	4.19E-13	2.39E-13
Beryllium	2.67E-15	1.52E-15	3.73E-16	2.13E-16	4.15E-15	1.78E-15	1.48E-15	8.44E-16
Cadmium	7.82E-15	4.47E-15	1.09E-15	6.23E-16	1.22E-14	5.20E-15	4.33E-15	2.47E-15
Calcium	6.96E-11	3.97E-11	9.71E-12	5.54E-12	1.08E-10	4.63E-11	3.85E-11	2.20E-11
Chromium	8.41E-14	4.80E-14	1.17E-14	6.70E-15	1.31E-13	5.60E-14	4.66E-14	2.66E-14
Cobalt	4.15E-14	2.37E-14	5.79E-15	3.31E-15	6.46E-14	2.76E-14	2.30E-14	1.31E-14
Copper	2.42E-13	1.38E-13	3.38E-14	1.93E-14	3.77E-13	1.61E-13	1.34E-13	7.66E-14
Iron	1.52E-10	8.70E-11	2.13E-11	1.21E-11	2.37E-10	1.01E-10	8.43E-11	4.81E-11
Lead	1.26E-12	7.22E-13	1.76E-13	1.01E-13	1.97E-12	8.41E-13	7.00E-13	4.00E-13
Magnesium	3.34E-11	1.91E-11	4.67E-12	2.66E-12	5.20E-11	2.22E-11	1.85E-11	1.06E-11
Manganese	2.03E-12	1.16E-12	2.83E-13	1.61E-13	3.15E-12	1.35E-12	1.12E-12	6.40E-13
Mercury	8.36E-16	4.77E-16	1.17E-16	6.66E-17	1.30E-15	5.56E-16	4.63E-16	2.64E-16
Nickel	7.82E-14	4.47E-14	1.09E-14	6.23E-15	1.22E-13	5.20E-14	4.33E-14	2.47E-14
Potassium	6.53E-12	3.73E-12	9.11E-13	5.20E-13	1.01E-11	4.34E-12	3.61E-12	2.06E-12
Selenium	4.05E-15	2.31E-15	5.64E-16	3.22E-16	6.29E-15	2.69E-15	2.24E-15	1.28E-15
Silver	2.51E-15	1.43E-15	3.50E-16	2.00E-16	3.90E-15	1.67E-15	1.39E-15	7.93E-16
Sodium	7.71E-13	4.40E-13	1.08E-13	6.14E-14	1.20E-12	5.13E-13	4.27E-13	2.44E-13
Thallium	1.67E-15	9.55E-16	2.33E-16	1.33E-16	2.60E-15	1.11E-15	9.25E-16	5.28E-16
Vanadium	1.23E-13	7.02E-14	1.72E-14	9.80E-15	1.91E-13	8.18E-14	6.81E-14	3.89E-14
Zinc	2.54E-12	1.45E-12	3.54E-13	2.02E-13	3.94E-12	1.69E-12	1.40E-12	8.01E-13
Cyanide	2.02E-15	1.15E-15	2.82E-16	1.61E-16	3.15E-15	1.35E-15	1.12E-15	6.39E-16
PESTICIDES/PCBS *								
PCB-1242	2.64E-16	1.51E-16	3.69E-17	2.11E-17	4.11E-16	1.76E-16	1.46E-16	8.35E-17
PCB-1254	5.34E-16	3.05E-16	7.45E-17	4.25E-17	8.30E-16	3.55E-16	2.96E-16	1.69E-16
PCB-1260	5.34E-16	3.05E-16	7.45E-17	4.25E-17	8.30E-16	3.55E-16	2.96E-16	1.69E-16
PCB-1248	2.64E-16	1.51E-16	3.69E-17	2.11E-17	4.11E-16	1.76E-16	1.46E-16	8.35E-17
TOTAL	3.12E-10	1.78E-10	4.35E-11	2.48E-11	4.85E-10	2.07E-10	1.73E-10	9.85E-11

Table 4-41
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Parking Traffic On-Site
Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.41E-01	1.61E-11	1.84E-12	2.25E-15	2.57E-16	2.20E-14	9.41E-15
Carbon Disulfide	3.88E-01	1.41E-11	1.62E-12	1.98E-15	2.26E-16	1.94E-14	8.28E-15
1,1-Dichloroethane	3.88E-01	1.41E-11	1.62E-12	1.98E-15	2.26E-16	1.94E-14	8.28E-15
1,2-Dichloroethene (total)	5.95E-01	2.17E-11	2.48E-12	3.03E-15	3.47E-16	2.97E-14	1.27E-14
Ethylbenzene	3.88E-01	1.41E-11	1.62E-12	1.98E-15	2.26E-16	1.94E-14	8.28E-15
Tetrachloroethene	1.55E+00	5.65E-11	6.46E-12	7.90E-15	9.03E-16	7.74E-14	3.31E-14
Toluene	3.88E-01	1.41E-11	1.62E-12	1.98E-15	2.26E-16	1.94E-14	8.28E-15
Trichloroethene	2.74E+00	1.00E-10	1.14E-11	1.40E-14	1.60E-15	1.37E-13	5.86E-14
Xylene (total)	3.88E-01	1.41E-11	1.62E-12	1.98E-15	2.26E-16	1.94E-14	8.28E-15
SEMI-VOLATILES							
Acenaphthene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Acenaphthylene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Anthracene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Benzo(a)anthracene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Benzo(b)fluoranthene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Benzo(k)fluoranthene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Benzoic acid	8.12E+01	2.96E-09	3.38E-10	4.14E-13	4.73E-14	4.05E-12	1.73E-12
Benzo(a)pyrene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Butylbenzylphthalate	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Chrysene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Dibenzo(a,h)anthracene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
2,4-Dimethylphenol	7.76E+01	2.83E-09	3.23E-10	3.95E-13	4.52E-14	3.87E-12	1.66E-12
bis(2-Ethylhexyl)phthalate	4.49E+01	1.64E-09	1.87E-10	2.29E-13	2.62E-14	2.24E-12	9.59E-13
Fluoranthene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Fluorene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
Indeno(1,2,3-cd)pyrene	1.67E+01	6.10E-10	6.98E-11	8.53E-14	9.76E-15	8.35E-13	3.57E-13
2-Methylnaphthalene	4.15E+00	1.51E-10	1.73E-11	2.11E-14	2.42E-15	2.07E-13	8.85E-14
2-Methylphenol	5.69E+01	2.07E-09	2.37E-10	2.90E-13	3.32E-14	2.84E-12	1.21E-12
4-Methylphenol	4.27E+02	1.56E-08	1.78E-09	2.18E-12	2.49E-13	2.13E-11	9.11E-12
Naphthalene	1.69E+01	6.18E-10	7.06E-11	8.64E-14	9.87E-15	8.46E-13	3.62E-13
Di-n-octylphthalate	1.65E+01	6.00E-10	6.86E-11	8.39E-14	9.59E-15	8.22E-13	3.51E-13
Phenanthrene	2.48E+00	9.06E-11	1.04E-11	1.27E-14	1.45E-15	1.24E-13	5.30E-14
Phenol	2.50E+02	9.12E-09	1.04E-09	1.28E-12	1.46E-13	1.25E-11	5.34E-12
Pyrene	1.64E+01	5.99E-10	6.85E-11	8.38E-14	9.58E-15	8.21E-13	3.51E-13

Table 4-41 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Parking Traffic On-Site
 Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Children On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Children On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	3.40E+04	1.24E-06	1.42E-07	1.73E-10	1.98E-11	1.70E-09	7.25E-10
Antimony	1.85E+02	6.76E-09	7.73E-10	9.45E-13	1.08E-13	9.25E-12	3.96E-12
Arsenic	1.39E+01	5.06E-10	5.79E-11	7.08E-14	8.09E-15	6.93E-13	2.96E-13
Barium	3.04E+03	1.11E-07	1.26E-08	1.55E-11	1.77E-12	1.51E-10	6.48E-11
Beryllium	6.30E+00	2.29E-10	2.62E-11	3.21E-14	3.67E-15	3.14E-13	1.34E-13
Cadmium	9.33E+00	3.40E-10	3.89E-11	4.76E-14	5.44E-15	4.66E-13	1.99E-13
Calcium	2.09E+05	7.61E-06	8.71E-07	1.07E-09	1.22E-10	1.04E-08	4.46E-09
Chromium	1.74E+02	6.33E-09	7.24E-10	8.85E-13	1.01E-13	8.67E-12	3.71E-12
Cobalt	1.33E+01	4.85E-10	5.54E-11	6.78E-14	7.75E-15	6.64E-13	2.84E-13
Copper	6.35E+02	2.31E-08	2.65E-09	3.24E-12	3.70E-13	3.17E-11	1.36E-11
Iron	5.14E+04	1.87E-06	2.14E-07	2.62E-10	3.00E-11	2.57E-09	1.10E-09
Lead	2.45E+03	8.94E-08	1.02E-08	1.25E-11	1.43E-12	1.22E-10	5.23E-11
Magnesium	6.55E+04	2.39E-06	2.73E-07	3.34E-10	3.82E-11	3.27E-09	1.40E-09
Manganese	2.84E+03	1.04E-07	1.18E-08	1.45E-11	1.66E-12	1.42E-10	6.07E-11
Mercury	1.72E-01	6.27E-12	7.17E-13	8.77E-16	1.00E-16	8.58E-15	3.67E-15
Nickel	4.59E+01	1.67E-09	1.91E-10	2.34E-13	2.68E-14	2.29E-12	9.80E-13
Potassium	2.55E+03	9.31E-08	1.06E-08	1.30E-11	1.49E-12	1.27E-10	5.45E-11
Selenium	2.18E+00	7.94E-11	9.08E-12	1.11E-14	1.27E-15	1.09E-13	4.65E-14
Silver	9.37E-01	3.42E-11	3.90E-12	4.78E-15	5.46E-16	4.68E-14	2.00E-14
Sodium	1.58E+03	5.75E-08	6.57E-09	8.04E-12	9.19E-13	7.87E-11	3.37E-11
Thallium	7.01E-01	2.56E-11	2.92E-12	3.57E-15	4.09E-16	3.50E-14	1.50E-14
Vanadium	2.89E+01	1.05E-09	1.20E-10	1.47E-13	1.68E-14	1.44E-12	6.16E-13
Zinc	1.36E+03	4.97E-08	5.68E-09	6.95E-12	7.94E-13	6.80E-11	2.91E-11
Cyanide	6.20E+00	2.26E-10	2.58E-11	3.16E-14	3.61E-15	3.09E-13	1.32E-13
PESTICIDES/PCBs							
PCB-1242	1.66E+01	6.04E-10	6.90E-11	8.44E-14	9.65E-15	8.27E-13	3.54E-13
PCB-1254	3.83E+01	1.40E-09	1.60E-10	1.95E-13	2.23E-14	1.91E-12	8.18E-13
PCB-1260	3.66E+01	1.34E-09	1.53E-10	1.87E-13	2.14E-14	1.83E-12	7.82E-13
PCB-1248	3.44E+01	1.26E-09	1.44E-10	1.76E-13	2.01E-14	1.72E-12	7.35E-13
TOTAL	3.76E+05	1.37E-05	1.57E-06	1.92E-09	2.19E-10	1.88E-08	8.03E-09

Table 4-41 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Parking Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	8.36E-15	4.77E-15	2.23E-15	1.27E-15	1.20E-14	5.14E-15	4.28E-15	2.44E-15
Carbon Disulfide	7.36E-15	4.20E-15	1.96E-15	1.12E-15	1.06E-14	4.52E-15	3.77E-15	2.15E-15
1,1-Dichloroethane	7.36E-15	4.20E-15	1.96E-15	1.12E-15	1.06E-14	4.52E-15	3.77E-15	2.15E-15
1,2-Dichloroethane (total)	1.13E-14	6.44E-15	3.00E-15	1.71E-15	1.62E-14	6.94E-15	5.77E-15	3.30E-15
Ethylbenzene	7.36E-15	4.20E-15	1.96E-15	1.12E-15	1.06E-14	4.52E-15	3.77E-15	2.15E-15
Tetrachloroethene	2.94E-14	1.68E-14	7.82E-15	4.46E-15	4.23E-14	1.81E-14	1.50E-14	8.59E-15
Toluene	7.36E-15	4.20E-15	1.96E-15	1.12E-15	1.06E-14	4.52E-15	3.77E-15	2.15E-15
Trichloroethene	5.20E-14	2.97E-14	1.38E-14	7.90E-15	7.48E-14	3.20E-14	2.66E-14	1.52E-14
Xylene (total)	7.36E-15	4.20E-15	1.96E-15	1.12E-15	1.06E-14	4.52E-15	3.77E-15	2.15E-15
SEMI-VOLATILES								
Acenaphthene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Acenaphthylene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Anthracene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Benzo(a)anthracene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Benzo(b)fluoranthene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Benzo(k)fluoranthene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Benzoic acid	1.54E-12	8.79E-13	4.10E-13	2.34E-13	2.21E-12	9.46E-13	7.87E-13	4.50E-13
Benzo(a)pyrene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Butylbenzylphthalate	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Chrysene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Dibenzo(a,h)anthracene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
2,4-Dimethylphenol	1.47E-12	8.40E-13	3.91E-13	2.23E-13	2.11E-12	9.04E-13	7.53E-13	4.30E-13
bis(2-Ethylhexyl)phthalate	8.52E-13	4.87E-13	2.27E-13	1.29E-13	1.23E-12	5.24E-13	4.36E-13	2.49E-13
Fluoranthene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Fluorene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
Indeno(1,2,3-cd)pyrene	3.17E-13	1.81E-13	8.45E-14	4.82E-14	4.56E-13	1.95E-13	1.62E-13	9.27E-14
2-Methylnaphthalene	7.87E-14	4.49E-14	2.09E-14	1.19E-14	1.13E-13	4.84E-14	4.02E-14	2.30E-14
2-Methylphenol	1.08E-12	6.16E-13	2.87E-13	1.64E-13	1.55E-12	6.63E-13	5.52E-13	3.15E-13
4-Methylphenol	8.10E-12	4.62E-12	2.15E-12	1.23E-12	1.16E-11	4.98E-12	4.14E-12	2.37E-12
Naphthalene	3.21E-13	1.83E-13	8.55E-14	4.88E-14	4.62E-13	1.98E-13	1.64E-13	9.38E-14
Di-n-octylphthalate	3.12E-13	1.78E-13	8.31E-14	4.74E-14	4.49E-13	1.92E-13	1.60E-13	9.12E-14
Phenanthrene	4.71E-14	2.69E-14	1.25E-14	7.16E-15	6.77E-14	2.90E-14	2.41E-14	1.38E-14
Phenol	4.74E-12	2.71E-12	1.26E-12	7.21E-13	6.82E-12	2.92E-12	2.43E-12	1.39E-12
Pyrene	3.12E-13	1.78E-13	8.30E-14	4.74E-14	4.48E-13	1.92E-13	1.60E-13	9.11E-14

Table 4-41 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Parking Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	6.44E-10	3.68E-10	1.71E-10	9.79E-11	9.26E-10	3.96E-10	3.30E-10	1.88E-10
Antimony	3.52E-12	2.01E-12	9.35E-13	5.34E-13	5.05E-12	2.16E-12	1.80E-12	1.03E-12
Arsenic	2.63E-13	1.50E-13	7.00E-14	4.00E-14	3.78E-13	1.62E-13	1.35E-13	7.69E-14
Barium	5.76E-11	3.29E-11	1.53E-11	8.74E-12	8.28E-11	3.54E-11	2.95E-11	1.68E-11
Beryllium	1.19E-13	6.82E-14	3.18E-14	1.81E-14	1.72E-13	7.34E-14	6.11E-14	3.49E-14
Cadmium	1.77E-13	1.01E-13	4.71E-14	2.69E-14	2.54E-13	1.09E-13	9.05E-14	5.17E-14
Calcium	3.96E-09	2.26E-09	1.05E-09	6.02E-10	5.70E-09	2.44E-09	2.03E-09	1.16E-09
Chromium	3.29E-12	1.88E-12	8.76E-13	5.00E-13	4.73E-12	2.03E-12	1.69E-12	9.62E-13
Cobalt	2.52E-13	1.44E-13	6.71E-14	3.83E-14	3.63E-13	1.55E-13	1.29E-13	7.37E-14
Copper	1.20E-11	6.87E-12	3.20E-12	1.83E-12	1.73E-11	7.40E-12	6.16E-12	3.52E-12
Iron	9.75E-10	5.57E-10	2.59E-10	1.48E-10	1.40E-09	5.99E-10	4.99E-10	2.85E-10
Lead	4.65E-11	2.65E-11	1.24E-11	7.06E-12	6.68E-11	2.86E-11	2.38E-11	1.36E-11
Magnesium	1.24E-09	7.09E-10	3.30E-10	1.89E-10	1.79E-09	7.64E-10	6.35E-10	3.63E-10
Manganese	5.39E-11	3.08E-11	1.43E-11	8.18E-12	7.75E-11	3.31E-11	2.76E-11	1.57E-11
Mercury	3.26E-15	1.86E-15	8.68E-16	4.95E-16	4.69E-15	2.01E-15	1.67E-15	9.53E-16
Nickel	8.71E-13	4.97E-13	2.32E-13	1.32E-13	1.25E-12	5.35E-13	4.45E-13	2.54E-13
Potassium	4.84E-11	2.77E-11	1.29E-11	7.36E-12	6.96E-11	2.98E-11	2.48E-11	1.41E-11
Selenium	4.13E-14	2.36E-14	1.10E-14	6.27E-15	5.94E-14	2.54E-14	2.11E-14	1.21E-14
Silver	1.78E-14	1.01E-14	4.73E-15	2.70E-15	2.55E-14	1.09E-14	9.09E-15	5.19E-15
Sodium	2.99E-11	1.71E-11	7.95E-12	4.54E-12	4.30E-11	1.84E-11	1.53E-11	8.73E-12
Thallium	1.33E-14	7.59E-15	3.54E-15	2.02E-15	1.91E-14	8.17E-15	6.80E-15	3.88E-15
Vanadium	5.47E-13	3.12E-13	1.46E-13	8.31E-14	7.87E-13	3.36E-13	2.80E-13	1.60E-13
Zinc	2.58E-11	1.48E-11	6.87E-12	3.92E-12	3.71E-11	1.59E-11	1.32E-11	7.55E-12
Cyanide	1.17E-13	6.71E-14	3.13E-14	1.78E-14	1.69E-13	7.22E-14	6.01E-14	3.43E-14
PESTICIDES/PCBs								
PCB-1242	3.14E-13	1.79E-13	8.36E-14	4.77E-14	4.52E-13	1.93E-13	1.61E-13	9.18E-14
PCB-1254	7.27E-13	4.15E-13	1.93E-13	1.10E-13	1.04E-12	4.47E-13	3.72E-13	2.12E-13
PCB-1260	6.95E-13	3.97E-13	1.85E-13	1.06E-13	9.99E-13	4.27E-13	3.55E-13	2.03E-13
PCB-1248	6.53E-13	3.73E-13	1.74E-13	9.92E-14	9.39E-13	4.02E-13	3.34E-13	1.91E-13
TOTAL	7.13E-09	4.07E-09	1.90E-09	1.08E-09	1.03E-08	4.38E-09	3.65E-09	2.08E-09

The total inhalation exposure doses calculated for recreational and parking traffic on-site are listed in Table 4-42. The total doses presented in Table 4-42 range from $2.62\text{E-}05$ mg/kg-day for children on-site to $2.58\text{E-}09$ mg/kg-day for children at the playground. These doses are six orders of magnitude greater than those calculated for exposure to volatilized contaminants (see Table 4-36).

Tables 4-43 through 4-46 present the inhalation exposure doses calculated for children, residents, commercial populations and unprotected construction workers due to fugitive dust releases from construction traffic on-site. Children are not assumed to be present on-site during construction. Therefore, exposures of children on-site are not evaluated for this scenario. Table 4-43 presents the inhalation exposure doses calculated for fugitive dust releases by construction traffic on-site. The doses presented in Table 4-43 range from $3.58\text{E-}04$ mg/kg-day for unprotected construction workers on-site to $3.31\text{E-}08$ mg/kg-day for residential and commercial populations at Sommer Street. The inhalation exposure doses calculated for fugitive dust releases from construction traffic in Area B are presented in Table 4-44. Review of the table indicates that the doses calculated for this scenario range from $5.71\text{E-}04$ mg/kg-day for unprotected construction workers

Table 4-42
Total Inhalation Exposure Doses Due to
Fugitive Dust Releases From
Recreational Traffic and Parking On-site

Receptor	Recreational Traffic				Parking	TOTAL
	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	Area B (mg/kg-day)	
Children On-Site						
Carcinogenic Dose	1.67E-07	2.67E-07	1.82E-07	8.16E-07	1.57E-06	3.00E-06
Non-Carcinogenic Dose	1.46E-06	2.34E-06	1.59E-06	7.14E-06	1.37E-05	2.62E-05
Children at the Playground						
Carcinogenic Dose	2.92E-11	3.74E-11	5.43E-12	3.86E-12	2.19E-10	2.95E-10
Non-Carcinogenic Dose	2.55E-10	3.27E-10	4.75E-11	3.38E-11	1.92E-09	2.58E-09
Residents at No. Marion Street						
Carcinogenic Dose	7.10E-10	1.37E-09	9.69E-10	9.88E-10	8.03E-09	1.21E-08
Non-Carcinogenic Dose	1.66E-09	3.20E-09	2.27E-09	2.31E-09	1.88E-08	2.82E-08
Commercial Pop. at Robinson St						
Carcinogenic Dose	1.94E-10	6.94E-10	6.22E-10	1.78E-10	4.07E-09	5.76E-09
Non-Carcinogenic Dose	3.40E-10	1.20E-09	1.09E-09	3.12E-10	7.13E-09	1.01E-08
Commercial Pop. at River Road						
Carcinogenic Dose	3.43E-10	1.85E-10	4.51E-11	2.48E-11	1.08E-09	1.68E-09
Non-Carcinogenic Dose	6.01E-10	3.23E-10	7.90E-11	4.35E-11	1.90E-09	2.95E-09
Residents at Sommer Street						
Carcinogenic Dose	3.04E-10	7.48E-10	2.67E-10	2.07E-10	4.38E-09	5.91E-09
Non-Carcinogenic Dose	7.11E-10	1.75E-09	6.23E-10	4.85E-10	1.03E-08	1.39E-08
Commercial Pop. at Sommer St.						
Carcinogenic Dose	1.44E-10	3.55E-10	1.27E-10	9.85E-11	2.08E-09	2.80E-09
Non-Carcinogenic Dose	2.53E-10	6.22E-10	2.22E-10	1.73E-10	3.65E-09	4.92E-09

Table 4-43
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area A

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.13E-01	6.93E-10	9.91E-12	6.47E-14	7.40E-15	1.50E-13	2.14E-15
Carbon Disulfide	1.07E-01	1.80E-10	2.57E-12	1.68E-14	1.92E-15	3.88E-14	5.55E-16
1,1-Dichloroethane	9.30E-01	1.56E-09	2.23E-11	1.46E-13	1.67E-14	3.37E-13	4.82E-15
1,2-Dichloroethene (total)	1.90E-01	3.19E-10	4.56E-12	2.98E-14	3.40E-15	6.89E-14	9.85E-16
Ethylbenzene	5.84E-01	9.80E-10	1.40E-11	9.15E-14	1.05E-14	2.12E-13	3.03E-15
Tetrachloroethene	1.66E-01	2.79E-10	3.98E-12	2.80E-14	2.97E-15	6.02E-14	8.61E-16
Toluene	4.13E-01	6.93E-10	9.91E-12	6.47E-14	7.40E-15	1.50E-13	2.14E-15
Trichloroethene	4.13E-01	6.93E-10	9.91E-12	6.47E-14	7.40E-15	1.50E-13	2.14E-15
Xylene (total)	1.19E+01	2.00E-08	2.86E-10	1.87E-12	2.14E-13	4.32E-12	6.18E-14
SEMI-VOLATILES							
Acenaphthene	1.88E+00	3.15E-09	4.50E-11	2.94E-13	3.36E-14	6.80E-13	9.73E-15
Acenaphthylene	1.70E+00	2.86E-09	4.09E-11	2.67E-13	3.05E-14	6.17E-13	8.83E-15
Anthracene	1.72E+00	2.88E-09	4.12E-11	2.69E-13	3.07E-14	6.22E-13	8.89E-15
Benzo(a)anthracene	1.58E+00	2.65E-09	3.79E-11	2.48E-13	2.83E-14	5.73E-13	8.19E-15
Benzo(b)fluoranthene	1.62E+00	2.72E-09	3.89E-11	2.54E-13	2.90E-14	5.87E-13	8.39E-15
Benzo(k)fluoranthene	1.72E+00	2.88E-09	4.12E-11	2.69E-13	3.08E-14	6.23E-13	8.91E-15
Benzoic acid	8.33E+00	1.40E-08	2.00E-10	1.30E-12	1.49E-13	3.02E-12	4.32E-14
Benzo(a)pyrene	1.60E+00	2.68E-09	3.84E-11	2.50E-13	2.86E-14	5.80E-13	8.29E-15
Butylbenzylphthalate	8.21E-01	1.38E-09	1.97E-11	1.29E-13	1.47E-14	2.98E-13	4.26E-15
Chrysene	1.38E+00	2.31E-09	3.30E-11	2.15E-13	2.46E-14	4.98E-13	7.13E-15
Dibenzo(a,h)anthracene	1.72E+00	2.88E-09	4.12E-11	2.69E-13	3.08E-14	6.23E-13	8.91E-15
2,4-Dimethylphenol	1.75E+00	2.93E-09	4.19E-11	2.74E-13	3.13E-14	6.33E-13	9.05E-15
bis(2-Ethylhexyl)phthalate	3.03E+00	5.08E-09	7.27E-11	4.74E-13	5.42E-14	1.10E-12	1.57E-14
Fluoranthene	2.73E+00	4.58E-09	6.56E-11	4.28E-13	4.89E-14	9.90E-13	1.42E-14
Fluorene	1.75E+00	2.94E-09	4.20E-11	2.74E-13	3.13E-14	6.34E-13	9.07E-15
Indeno(1,2,3-cd)pyrene	1.71E+00	2.87E-09	4.11E-11	2.68E-13	3.06E-14	6.20E-13	8.87E-15
2-Methylnaphthalene	6.77E+00	1.14E-08	1.63E-10	1.06E-12	1.21E-13	2.45E-12	3.51E-14
2-Methylphenol	1.72E+00	2.88E-09	4.12E-11	2.69E-13	3.08E-14	6.23E-13	8.91E-15
4-Methylphenol	1.71E+00	2.87E-09	4.11E-11	2.68E-13	3.07E-14	6.21E-13	8.88E-15
Naphthalene	1.56E+00	2.62E-09	3.74E-11	2.44E-13	2.79E-14	5.65E-13	8.09E-15
Di-n-octylphthalate	1.76E+00	2.96E-09	4.23E-11	2.76E-13	3.16E-14	6.39E-13	9.14E-15
Phenanthrene	3.43E+00	5.75E-09	8.23E-11	5.37E-13	6.14E-14	1.24E-12	1.78E-14
Phenol	1.72E+00	2.88E-09	4.12E-11	2.69E-13	3.08E-14	6.23E-13	8.91E-15
Pyrene	2.17E+00	3.65E-09	5.22E-11	3.41E-13	3.89E-14	7.88E-13	1.13E-14

Table 4-43 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area A

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.12E+04	1.87E-05	2.68E-07	1.75E-09	2.00E-10	4.04E-09	5.78E-11
Antimony	6.79E+00	1.14E-08	1.63E-10	1.06E-12	1.22E-13	2.46E-12	3.52E-14
Arsenic	2.69E+01	4.52E-08	6.47E-10	4.22E-12	4.82E-13	9.76E-12	1.40E-13
Barium	2.02E+02	3.38E-07	4.84E-09	3.16E-11	3.61E-12	7.30E-11	1.04E-12
Beryllium	1.46E+00	2.45E-09	3.50E-11	2.28E-13	2.61E-14	5.28E-13	7.56E-15
Cadmium	1.66E+00	2.78E-09	3.98E-11	2.60E-13	2.97E-14	6.01E-13	8.60E-15
Calcium	1.11E+05	1.87E-04	2.67E-06	1.74E-08	1.99E-09	4.03E-08	5.77E-10
Chromium	2.35E+01	3.94E-08	5.63E-10	3.68E-12	4.20E-13	8.50E-12	1.22E-13
Cobalt	6.96E+00	1.17E-08	1.67E-10	1.09E-12	1.25E-13	2.52E-12	3.61E-14
Copper	8.44E+01	1.42E-07	2.03E-09	1.32E-11	1.51E-12	3.06E-11	4.38E-13
Iron	2.86E+04	4.79E-05	6.85E-07	4.47E-09	5.11E-10	1.03E-08	1.48E-10
Lead	8.98E+02	1.51E-06	2.15E-08	1.41E-10	1.61E-11	3.25E-10	4.65E-12
Magnesium	5.71E+04	9.58E-05	1.37E-06	8.95E-09	1.02E-09	2.07E-08	2.96E-10
Manganese	9.60E+02	1.61E-06	2.30E-08	1.50E-10	1.72E-11	3.48E-10	4.97E-12
Mercury	2.87E-01	4.82E-10	6.89E-12	4.50E-14	5.14E-15	1.04E-13	1.49E-15
Nickel	1.97E+01	3.30E-08	4.72E-10	3.08E-12	3.52E-13	7.13E-12	1.02E-13
Potassium	1.82E+03	3.05E-06	4.37E-08	2.85E-10	3.26E-11	6.59E-10	9.43E-12
Selenium	1.60E+00	2.68E-09	3.83E-11	2.50E-13	2.86E-14	5.78E-13	8.27E-15
Silver	9.27E-01	1.56E-09	2.23E-11	1.45E-13	1.66E-14	3.36E-13	4.81E-15
Sodium	4.79E+02	8.03E-07	1.15E-08	7.50E-11	8.57E-12	1.74E-10	2.48E-12
Thallium	5.24E-01	8.79E-10	1.26E-11	8.21E-14	9.38E-15	1.90E-13	2.72E-15
Vanadium	2.31E+01	3.87E-08	5.54E-10	3.62E-12	4.13E-13	8.36E-12	1.20E-13
Zinc	3.55E+02	5.97E-07	8.53E-09	5.57E-11	6.37E-12	1.29E-10	1.84E-12
Cyanide	8.95E+00	1.50E-08	2.15E-10	1.40E-12	1.60E-13	3.24E-12	4.64E-14
PESTICIDES/PCBS							
PCB-1242	5.17E-01	8.68E-10	1.24E-11	8.10E-14	9.26E-15	1.87E-13	2.68E-15
PCB-1254	1.45E+01	2.43E-08	3.48E-10	2.27E-12	2.59E-13	5.25E-12	7.51E-14
PCB-1260	1.12E+01	1.88E-08	2.69E-10	1.75E-12	2.00E-13	4.06E-12	5.80E-14
PCB-1248	1.68E+01	2.81E-08	4.02E-10	2.62E-12	3.00E-13	6.07E-12	8.68E-14
TOTAL	2.13E+05	3.58E-04	5.11E-06	3.34E-08	3.82E-09	7.72E-08	1.10E-09

Table 4-43 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	8.61E-14	1.23E-15	1.52E-13	2.18E-15	6.41E-14	9.17E-16	6.41E-14	9.17E-16
Carbon Disulfide	2.23E-14	3.19E-16	3.94E-14	5.64E-16	1.66E-14	2.38E-16	1.66E-14	2.38E-16
1,1-Dichloroethane	1.94E-13	2.77E-15	3.43E-13	4.90E-15	1.44E-13	2.07E-15	1.44E-13	2.07E-15
1,2-Dichloroethene (total)	3.96E-14	5.67E-16	7.00E-14	1.00E-15	2.95E-14	4.22E-16	2.95E-14	4.22E-16
Ethylbenzene	1.22E-13	1.74E-15	2.15E-13	3.08E-15	9.07E-14	1.30E-15	9.07E-14	1.30E-15
Tetrachloroethene	3.46E-14	4.95E-16	6.12E-14	8.75E-16	2.58E-14	3.69E-16	2.58E-14	3.69E-16
Toluene	8.61E-14	1.23E-15	1.52E-13	2.18E-15	6.41E-14	9.17E-16	6.41E-14	9.17E-16
Trichloroethene	8.61E-14	1.23E-15	1.52E-13	2.18E-15	6.41E-14	9.17E-16	6.41E-14	9.17E-16
Xylene (total)	2.49E-12	3.56E-14	4.40E-12	6.29E-14	1.85E-12	2.65E-14	1.85E-12	2.65E-14
SEMI-VOLATILES								
Acenaphthene	3.91E-13	5.60E-15	6.91E-13	9.89E-15	2.91E-13	4.17E-15	2.91E-13	4.17E-15
Acenaphthylene	3.55E-13	5.08E-15	6.28E-13	8.98E-15	2.64E-13	3.78E-15	2.64E-13	3.78E-15
Anthracene	3.58E-13	5.12E-15	6.32E-13	9.04E-15	2.66E-13	3.81E-15	2.66E-13	3.81E-15
Benzo(a)anthracene	3.29E-13	4.71E-15	5.82E-13	8.33E-15	2.45E-13	3.51E-15	2.45E-13	3.51E-15
Benzo(b)fluoranthene	3.38E-13	4.83E-15	5.97E-13	8.53E-15	2.51E-13	3.60E-15	2.51E-13	3.60E-15
Benzo(k)fluoranthene	3.58E-13	5.12E-15	6.33E-13	9.06E-15	2.67E-13	3.82E-15	2.67E-13	3.82E-15
Benzoic acid	1.74E-12	2.48E-14	3.07E-12	4.39E-14	1.29E-12	1.85E-14	1.29E-12	1.85E-14
Benzo(a)pyrene	3.33E-13	4.77E-15	5.89E-13	8.43E-15	2.48E-13	3.55E-15	2.48E-13	3.55E-15
Butylbenzylphthalate	1.71E-13	2.45E-15	3.03E-13	4.33E-15	1.28E-13	1.82E-15	1.28E-13	1.82E-15
Chrysene	2.87E-13	4.10E-15	5.07E-13	7.25E-15	2.14E-13	3.05E-15	2.14E-13	3.05E-15
Dibenzo(a,h)anthracene	3.58E-13	5.12E-15	6.33E-13	9.06E-15	2.67E-13	3.82E-15	2.67E-13	3.82E-15
2,4-Dimethylphenol	3.64E-13	5.21E-15	6.43E-13	9.20E-15	2.71E-13	3.88E-15	2.71E-13	3.88E-15
bis(2-Ethylhexyl)phthalate	6.31E-13	9.03E-15	1.12E-12	1.60E-14	4.70E-13	6.73E-15	4.70E-13	6.73E-15
Fluoranthene	5.70E-13	8.15E-15	1.01E-12	1.44E-14	4.24E-13	6.07E-15	4.24E-13	6.07E-15
Fluorene	3.65E-13	5.22E-15	6.44E-13	9.22E-15	2.72E-13	3.89E-15	2.72E-13	3.89E-15
Indeno(1,2,3-cd)pyrene	3.57E-13	5.10E-15	6.30E-13	9.02E-15	2.66E-13	3.80E-15	2.66E-13	3.80E-15
2-Methylnaphthalene	1.41E-12	2.02E-14	2.50E-12	3.57E-14	1.05E-12	1.50E-14	1.05E-12	1.50E-14
2-Methylphenol	3.58E-13	5.12E-15	6.33E-13	9.06E-15	2.67E-13	3.82E-15	2.67E-13	3.82E-15
4-Methylphenol	3.57E-13	5.11E-15	6.31E-13	9.03E-15	2.66E-13	3.81E-15	2.66E-13	3.81E-15
Naphthalene	3.25E-13	4.65E-15	5.75E-13	8.22E-15	2.42E-13	3.47E-15	2.42E-13	3.47E-15
Di-n-octylphthalate	3.68E-13	5.26E-15	6.50E-13	9.29E-15	2.74E-13	3.92E-15	2.74E-13	3.92E-15
Phenanthrene	7.15E-13	1.02E-14	1.26E-12	1.81E-14	5.32E-13	7.62E-15	5.32E-13	7.62E-15
Phenol	3.58E-13	5.12E-15	6.33E-13	9.06E-15	2.67E-13	3.82E-15	2.67E-13	3.82E-15
Pyrene	4.53E-13	6.48E-15	8.01E-13	1.15E-14	3.38E-13	4.83E-15	3.38E-13	4.83E-15

Table 4-68 (part'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	2.33E-09	3.33E-11	4.11E-09	5.88E-11	1.73E-09	2.48E-11	1.73E-09	2.48E-11
Antimony	1.42E-12	2.03E-14	2.50E-12	3.58E-14	1.05E-12	1.51E-14	1.05E-12	1.51E-14
Arsenic	5.62E-12	8.03E-14	9.92E-12	1.42E-13	4.18E-12	5.98E-14	4.18E-12	5.98E-14
Barium	4.20E-11	6.01E-13	7.43E-11	1.06E-12	3.13E-11	4.48E-13	3.13E-11	4.48E-13
Beryllium	3.04E-13	4.35E-15	5.37E-13	7.68E-15	2.26E-13	3.24E-15	2.26E-13	3.24E-15
Cadmium	3.46E-13	4.95E-15	6.11E-13	8.74E-15	2.57E-13	3.68E-15	2.57E-13	3.68E-15
Calcium	2.32E-08	3.32E-10	4.10E-08	5.86E-10	1.73E-08	2.47E-10	1.73E-08	2.47E-10
Chromium	4.89E-12	7.00E-14	8.65E-12	1.24E-13	3.64E-12	5.21E-14	3.64E-12	5.21E-14
Cobalt	1.45E-12	2.08E-14	2.56E-12	3.67E-14	1.08E-12	1.55E-14	1.08E-12	1.55E-14
Copper	1.76E-11	2.52E-13	3.11E-11	4.45E-13	1.31E-11	1.88E-13	1.31E-11	1.88E-13
Iron	5.95E-09	8.52E-11	1.05E-08	1.50E-10	4.43E-09	6.34E-11	4.43E-09	6.34E-11
Lead	1.87E-10	2.68E-12	3.31E-10	4.73E-12	1.39E-10	1.99E-12	1.39E-10	1.99E-12
Magnesium	1.19E-08	1.70E-10	2.10E-08	3.01E-10	8.87E-09	1.27E-10	8.87E-09	1.27E-10
Manganese	2.00E-10	2.86E-12	3.54E-10	5.06E-12	1.49E-10	2.13E-12	1.49E-10	2.13E-12
Mercury	5.98E-14	8.56E-16	1.06E-13	1.51E-15	4.46E-14	6.38E-16	4.46E-14	6.38E-16
Nickel	4.10E-12	5.87E-14	7.25E-12	1.04E-13	3.05E-12	4.37E-14	3.05E-12	4.37E-14
Potassium	3.79E-10	5.43E-12	6.70E-10	9.59E-12	2.82E-10	4.04E-12	2.82E-10	4.04E-12
Selenium	3.33E-13	4.76E-15	5.88E-13	8.41E-15	2.48E-13	3.55E-15	2.48E-13	3.55E-15
Silver	1.93E-13	2.77E-15	3.42E-13	4.89E-15	1.44E-13	2.06E-15	1.44E-13	2.06E-15
Sodium	9.98E-11	1.43E-12	1.76E-10	2.52E-12	7.44E-11	1.06E-12	7.44E-11	1.06E-12
Thallium	1.09E-13	1.56E-15	1.93E-13	2.76E-15	8.14E-14	1.16E-15	8.14E-14	1.16E-15
Vanadium	4.81E-12	6.88E-14	8.50E-12	1.22E-13	3.58E-12	5.13E-14	3.58E-12	5.13E-14
Zinc	7.41E-11	1.06E-12	1.31E-10	1.87E-12	5.52E-11	7.90E-13	5.52E-11	7.90E-13
Cyanide	1.87E-12	2.67E-14	3.30E-12	4.72E-14	1.39E-12	1.99E-14	1.39E-12	1.99E-14
PESTICIDES/PCBS								
PCB-1242	1.08E-13	1.54E-15	1.91E-13	2.73E-15	8.03E-14	1.15E-15	8.03E-14	1.15E-15
PCB-1254	3.02E-12	4.32E-14	5.34E-12	7.63E-14	2.25E-12	3.22E-14	2.25E-12	3.22E-14
PCB-1260	2.33E-12	3.34E-14	4.12E-12	5.90E-14	1.74E-12	2.49E-14	1.74E-12	2.49E-14
PCB-1248	3.49E-12	5.00E-14	6.17E-12	8.83E-14	2.60E-12	3.72E-14	2.60E-12	3.72E-14
TOTAL	4.44E-08	6.36E-10	7.85E-08	1.12E-09	3.31E-08	4.73E-10	3.31E-08	4.73E-10

Table 4-44

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	3.40E+04	5.16E-05	7.38E-07	3.86E-09	4.42E-10	1.35E-08	1.92E-10
Antimony	1.85E+02	2.82E-07	4.03E-09	2.11E-11	2.41E-12	7.34E-11	1.05E-12
Arsenic	1.39E+01	2.11E-08	3.02E-10	1.58E-12	1.80E-13	5.50E-12	7.87E-14
Barium	3.04E+03	4.61E-06	6.59E-08	3.45E-10	3.95E-11	1.20E-09	1.72E-11
Beryllium	6.30E+00	9.56E-09	1.37E-10	7.16E-13	8.18E-14	2.49E-12	3.57E-14
Cadmium	9.33E+00	1.42E-08	2.03E-10	1.06E-12	1.21E-13	3.70E-12	5.29E-14
Calcium	2.09E+05	3.17E-04	4.54E-06	2.38E-08	2.72E-09	8.27E-08	1.18E-09
Chromium	1.74E+02	2.64E-07	3.77E-09	1.97E-11	2.26E-12	6.88E-11	9.84E-13
Cobalt	1.33E+01	2.02E-08	2.89E-10	1.51E-12	1.73E-13	5.27E-12	7.53E-14
Copper	6.35E+02	9.64E-07	1.38E-08	7.22E-11	8.25E-12	2.51E-10	3.60E-12
Iron	5.14E+04	7.81E-05	1.12E-06	5.84E-09	6.68E-10	2.04E-08	2.91E-10
Lead	2.45E+03	3.72E-06	5.33E-08	2.79E-10	3.19E-11	9.71E-10	1.39E-11
Magnesium	6.55E+04	9.94E-05	1.42E-06	7.45E-09	8.51E-10	2.59E-08	3.71E-10
Manganese	2.84E+03	4.31E-06	6.17E-08	3.23E-10	3.69E-11	1.13E-09	1.61E-11
Mercury	1.72E-01	2.61E-10	3.74E-12	1.96E-14	2.24E-15	6.81E-14	9.75E-16
Nickel	4.59E+01	6.97E-08	9.97E-10	5.22E-12	5.97E-13	1.82E-11	2.60E-13
Potassium	2.55E+03	3.88E-06	5.55E-08	2.90E-10	3.32E-11	1.01E-09	1.45E-11
Selenium	2.18E+00	3.31E-09	4.73E-11	2.48E-13	2.83E-14	8.63E-13	1.23E-14
Silver	9.37E-01	1.42E-09	2.04E-11	1.07E-13	1.22E-14	3.71E-13	5.31E-15
Sodium	1.58E+03	2.39E-06	3.42E-08	1.79E-10	2.05E-11	6.24E-10	8.93E-12
Thallium	7.01E-01	1.06E-09	1.52E-11	7.97E-14	9.11E-15	2.78E-13	3.97E-15
Vanadium	2.89E+01	4.38E-08	6.27E-10	3.28E-12	3.75E-13	1.14E-11	1.63E-13
Zinc	1.36E+03	2.07E-06	2.96E-08	1.55E-10	1.77E-11	5.40E-10	7.72E-12
Cyanide	6.20E+00	9.41E-09	1.35E-10	7.04E-13	8.05E-14	2.45E-12	3.51E-14
PESTICIDES/PCBS							
PCB-1242	1.66E+01	2.52E-08	3.60E-10	1.88E-12	2.15E-13	6.56E-12	9.38E-14
PCB-1254	3.83E+01	5.82E-08	8.32E-10	4.36E-12	4.98E-13	1.52E-11	2.17E-13
PCB-1260	3.66E+01	5.56E-08	7.96E-10	4.17E-12	4.76E-13	1.45E-11	2.08E-13
PCB-1248	3.44E+01	5.23E-08	7.48E-10	3.92E-12	4.48E-13	1.36E-11	1.95E-13
TOTAL	3.76E+05	5.71E-04	8.17E-06	4.28E-08	4.89E-09	1.49E-07	2.13E-09

Table 4-44 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area B

	Upper 95% Confidence Arth. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.41E-01	6.70E-10	9.58E-12	5.02E-14	5.73E-15	1.75E-13	2.50E-15
Carbon Disulfide	3.88E-01	5.89E-10	8.43E-12	4.41E-14	5.04E-15	1.54E-13	2.20E-15
1,1-Dichloroethane	3.88E-01	5.89E-10	8.43E-12	4.41E-14	5.04E-15	1.54E-13	2.20E-15
1,2-Dichloroethene (total)	5.95E-01	9.04E-10	1.29E-11	6.77E-14	7.74E-15	2.36E-13	3.37E-15
Ethylbenzene	3.88E-01	5.89E-10	8.43E-12	4.41E-14	5.04E-15	1.54E-13	2.20E-15
Tetrachloroethene	1.55E+00	2.35E-09	3.37E-11	1.76E-13	2.02E-14	6.14E-13	8.78E-15
Toluene	3.88E-01	5.89E-10	8.43E-12	4.41E-14	5.04E-15	1.54E-13	2.20E-15
Trichloroethene	2.74E+00	4.17E-09	5.96E-11	3.12E-13	3.57E-14	1.09E-12	1.55E-14
Xylene (total)	3.88E-01	5.89E-10	8.43E-12	4.41E-14	5.04E-15	1.54E-13	2.20E-15
SEMI-VOLATILES							
Acenaphthene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Acenaphthylene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Anthracene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Benzo(a)anthracene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Benzo(b)fluoranthene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Benzo(k)fluoranthene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Benzoic acid	8.12E+01	1.23E-07	1.76E-09	9.23E-12	1.06E-12	3.21E-11	4.60E-13
Benzo(a)pyrene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Butylbenzylphthalate	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Chrysene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Dibenzo(a,h)anthracene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
2,4-Dimethylphenol	7.76E+01	1.18E-07	1.68E-09	8.82E-12	1.01E-12	3.07E-11	4.39E-13
bis(2-Ethylhexyl)phthalate	4.49E+01	6.82E-08	9.76E-10	5.11E-12	5.84E-13	1.78E-11	2.55E-13
Fluoranthene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Fluorene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
Indeno(1,2,3-cd)pyrene	1.67E+01	2.54E-08	3.64E-10	1.90E-12	2.18E-13	6.63E-12	9.48E-14
2-Methylnaphthalene	4.15E+00	6.30E-09	9.01E-11	4.72E-13	5.39E-14	1.64E-12	2.35E-14
2-Methylphenol	5.69E+01	8.64E-08	1.24E-09	6.47E-12	7.40E-13	2.25E-11	3.22E-13
4-Methylphenol	4.27E+02	6.48E-07	9.27E-09	4.86E-11	5.55E-12	1.69E-10	2.42E-12
Naphthalene	1.69E+01	2.57E-08	3.68E-10	1.93E-12	2.20E-13	6.71E-12	9.60E-14
Di-n-octylphthalate	1.65E+01	2.50E-08	3.58E-10	1.87E-12	2.14E-13	6.52E-12	9.33E-14
Phenanthrene	2.48E+00	3.77E-09	5.40E-11	2.82E-13	3.23E-14	9.84E-13	1.41E-14
Phenol	2.50E+02	3.80E-07	5.43E-09	2.84E-11	3.25E-12	9.91E-11	1.42E-12
Pyrene	1.64E+01	2.50E-08	3.57E-10	1.87E-12	2.14E-13	6.51E-12	9.32E-14

Table 4-44 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	1.86E-13	2.67E-15	4.96E-14	7.10E-16	9.54E-14	1.37E-15	9.54E-14	1.37E-15
Carbon Disulfide	1.64E-13	2.35E-15	4.37E-14	6.24E-16	8.40E-14	1.20E-15	8.40E-14	1.20E-15
1,1-Dichloroethane	1.64E-13	2.35E-15	4.37E-14	6.24E-16	8.40E-14	1.20E-15	8.40E-14	1.20E-15
1,2-Dichloroethene (total)	2.52E-13	3.60E-15	6.69E-14	9.58E-16	1.29E-13	1.84E-15	1.29E-13	1.84E-15
Ethylbenzene	1.64E-13	2.35E-15	4.37E-14	6.24E-16	8.40E-14	1.20E-15	8.40E-14	1.20E-15
Tetrachloroethene	6.55E-13	9.37E-15	1.74E-13	2.49E-15	3.35E-13	4.80E-15	3.35E-13	4.80E-15
Toluene	1.64E-13	2.35E-15	4.37E-14	6.24E-16	8.40E-14	1.20E-15	8.40E-14	1.20E-15
Trichloroethene	1.16E-12	1.66E-14	3.09E-13	4.41E-15	5.94E-13	8.49E-15	5.94E-13	8.49E-15
Xylene (total)	1.64E-13	2.35E-15	4.37E-14	6.24E-16	8.40E-14	1.20E-15	8.40E-14	1.20E-15
SEMI-VOLATILES								
Acenaphthene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Acenaphthylene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Anthracene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Benzo(a)anthracene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Benzo(b)fluoranthene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Benzo(k)fluoranthene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Benzoic acid	3.43E-11	4.91E-13	9.13E-12	1.31E-13	1.76E-11	2.51E-13	1.76E-11	2.51E-13
Benzo(a)pyrene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Butylbenzylphthalate	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Chrysene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Dibenzo(a,h)anthracene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
2,4-Dimethylphenol	3.28E-11	4.69E-13	8.73E-12	1.25E-13	1.68E-11	2.40E-13	1.68E-11	2.40E-13
bis(2-Ethylhexyl)phthalate	1.90E-11	2.72E-13	5.06E-12	7.23E-14	9.73E-12	1.39E-13	9.73E-12	1.39E-13
Fluoranthene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Fluorene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
Indeno(1,2,3-cd)pyrene	7.08E-12	1.01E-13	1.88E-12	2.69E-14	3.62E-12	5.18E-14	3.62E-12	5.18E-14
2-Methylnaphthalene	1.75E-12	2.51E-14	4.67E-13	6.67E-15	8.97E-13	1.28E-14	8.97E-13	1.28E-14
2-Methylphenol	2.41E-11	3.44E-13	6.40E-12	9.15E-14	1.23E-11	1.76E-13	1.23E-11	1.76E-13
4-Methylphenol	1.81E-10	2.58E-12	4.80E-11	6.87E-13	9.24E-11	1.32E-12	9.24E-11	1.32E-12
Naphthalene	7.16E-12	1.02E-13	1.91E-12	2.73E-14	3.67E-12	5.24E-14	3.67E-12	5.24E-14
Di-n-octylphthalate	6.96E-12	9.96E-14	1.85E-12	2.65E-14	3.56E-12	5.10E-14	3.56E-12	5.10E-14
Phenanthrene	1.05E-12	1.50E-14	2.79E-13	4.00E-15	5.38E-13	7.69E-15	5.38E-13	7.69E-15
Phenol	1.06E-10	1.51E-12	2.81E-11	4.03E-13	5.41E-11	7.74E-13	5.41E-11	7.74E-13
Pyrene	6.95E-12	9.94E-14	1.85E-12	2.65E-14	3.56E-12	5.09E-14	3.56E-12	5.09E-14

Table 4-44 (cont'd)
 Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.44E-08	2.05E-10	3.82E-09	5.47E-11	7.35E-09	1.05E-10	7.35E-09	1.05E-10
Antimony	7.84E-11	1.12E-12	2.09E-11	2.98E-13	4.01E-11	5.74E-13	4.01E-11	5.74E-13
Arsenic	5.87E-12	8.40E-14	1.56E-12	2.23E-14	3.00E-12	4.30E-14	3.00E-12	4.30E-14
Barium	1.28E-09	1.84E-11	3.41E-10	4.88E-12	6.57E-10	9.40E-12	6.57E-10	9.40E-12
Beryllium	2.66E-12	3.81E-14	7.08E-13	1.01E-14	1.36E-12	1.95E-14	1.36E-12	1.95E-14
Cadmium	3.95E-12	5.64E-14	1.05E-12	1.50E-14	2.02E-12	2.89E-14	2.02E-12	2.89E-14
Calcium	8.83E-08	1.26E-09	2.35E-08	3.36E-10	4.52E-08	6.47E-10	4.52E-08	6.47E-10
Chromium	7.34E-11	1.05E-12	1.95E-11	2.79E-13	3.76E-11	5.38E-13	3.76E-11	5.38E-13
Cobalt	5.62E-12	8.04E-14	1.50E-12	2.14E-14	2.88E-12	4.12E-14	2.88E-12	4.12E-14
Copper	2.68E-10	3.84E-12	7.14E-11	1.02E-12	1.37E-10	1.97E-12	1.37E-10	1.97E-12
Iron	2.17E-08	3.11E-10	5.78E-09	8.27E-11	1.11E-08	1.59E-10	1.11E-08	1.59E-10
Lead	1.04E-09	1.48E-11	2.76E-10	3.95E-12	5.31E-10	7.59E-12	5.31E-10	7.59E-12
Magnesium	2.77E-08	3.96E-10	7.37E-09	1.05E-10	1.42E-08	2.03E-10	1.42E-08	2.03E-10
Manganese	1.20E-09	1.72E-11	3.20E-10	4.57E-12	6.15E-10	8.80E-12	6.15E-10	8.80E-12
Mercury	7.27E-14	1.04E-15	1.94E-14	2.77E-16	3.72E-14	5.32E-16	3.72E-14	5.32E-16
Nickel	1.94E-11	2.78E-13	5.16E-12	7.39E-14	9.93E-12	1.42E-13	9.93E-12	1.42E-13
Potassium	1.08E-09	1.54E-11	2.87E-10	4.11E-12	5.53E-10	7.91E-12	5.53E-10	7.91E-12
Selenium	9.21E-13	1.32E-14	2.45E-13	3.50E-15	4.71E-13	6.74E-15	4.71E-13	6.74E-15
Silver	3.96E-13	5.67E-15	1.05E-13	1.51E-15	2.03E-13	2.90E-15	2.03E-13	2.90E-15
Sodium	6.67E-10	9.53E-12	1.77E-10	2.54E-12	3.41E-10	4.88E-12	3.41E-10	4.88E-12
Thallium	2.96E-13	4.24E-15	7.89E-14	1.13E-15	1.52E-13	2.17E-15	1.52E-13	2.17E-15
Vanadium	1.22E-11	1.74E-13	3.25E-12	4.64E-14	6.24E-12	8.93E-14	6.24E-12	8.93E-14
Zinc	5.76E-10	8.24E-12	1.53E-10	2.19E-12	2.95E-10	4.22E-12	2.95E-10	4.22E-12
Cyanide	2.62E-12	3.75E-14	6.97E-13	9.97E-15	1.34E-12	1.92E-14	1.34E-12	1.92E-14
PESTICIDES/PCBS								
PCB-1242	7.00E-12	1.00E-13	1.86E-12	2.67E-14	3.58E-12	5.13E-14	3.58E-12	5.13E-14
PCB-1254	1.62E-11	2.32E-13	4.31E-12	6.17E-14	8.29E-12	1.19E-13	8.29E-12	1.19E-13
PCB-1260	1.55E-11	2.22E-13	4.12E-12	5.89E-14	7.93E-12	1.13E-13	7.93E-12	1.13E-13
PCB-1248	1.46E-11	2.08E-13	3.88E-12	5.54E-14	7.45E-12	1.07E-13	7.45E-12	1.07E-13
TOTAL	1.59E-07	2.27E-09	4.23E-08	6.05E-10	8.14E-08	1.16E-09	8.14E-08	1.16E-09

on-site to $4.23\text{E-}08$ mg/kg-day for commercial populations at River Road.

Table 4-45 presents the inhalation exposure doses calculated for populations exposed to fugitive dust releases from construction traffic in Area C. The inhalation doses presented in Table 4-45 range from $3.88\text{E-}04$ mg/kg-day for unprotected construction workers on-site to $6.21\text{E-}09$ mg/kg-day for children at the playground. Similarly, the inhalation doses calculated for fugitive dust releases from construction traffic in Area D (see Table 4-46) range from $1.75\text{E-}04$ mg/kg-day for unprotected construction workers on-site to $4.41\text{E-}09$ mg/kg-day for children at the playground.

Table 4-47 presents the total inhalation exposure doses calculated for fugitive dust releases from construction traffic on-site. The total doses listed in Table 4-47 range from $1.49\text{E-}03$ mg/kg-day for unprotected construction workers on-site to $8.68\text{E-}08$ mg/kg-day for children at the playground. These doses are two to three orders of magnitude greater than those calculated for inhalation of fugitive dusts from recreational traffic on-site and approximately seven orders of magnitude greater than those calculated for volatilization.

Table 4-45

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area C

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.00E-03	1.11E-11	1.58E-13	1.77E-16	2.02E-17	3.00E-15	4.30E-17
Carbon Disulfide	5.00E-03	1.38E-11	1.98E-13	2.21E-16	2.53E-17	3.76E-15	5.37E-17
1,1-Dichloroethane	3.00E-03	8.30E-12	1.19E-13	1.33E-16	1.52E-17	2.25E-15	3.22E-17
1,2-Dichloroethene (total)	6.50E-02	1.80E-10	2.57E-12	2.88E-15	3.29E-16	4.88E-14	6.98E-16
Ethylbenzene	6.00E-03	1.66E-11	2.37E-13	2.66E-16	3.04E-17	4.51E-15	6.45E-17
Tetrachloroethene	7.00E-03	1.94E-11	2.77E-13	3.10E-16	3.54E-17	5.26E-15	7.52E-17
Toluene	1.40E-02	3.87E-11	5.54E-13	6.20E-16	7.06E-17	1.05E-14	1.50E-16
Trichloroethene	1.80E-02	5.25E-11	7.52E-13	8.41E-16	9.61E-17	1.43E-14	2.04E-16
Xylene (total)	3.60E-02	9.96E-11	1.42E-12	1.59E-15	1.82E-16	2.70E-14	3.87E-16
SEMI-VOLATILES							
Acenaphthene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Acenaphthylene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Anthracene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Benzo(a)anthracene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Benzo(b)fluoranthene	1.80E+00	4.98E-09	7.12E-11	7.97E-14	9.11E-15	1.35E-12	1.93E-14
Benzo(k)fluoranthene	8.10E-01	2.24E-09	3.20E-11	3.58E-14	4.10E-15	6.08E-13	8.70E-15
Benzoic acid	6.82E+00	1.88E-08	2.70E-10	3.02E-13	3.45E-14	5.12E-12	7.32E-14
Benzo(a)pyrene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Butylbenzylphthalate	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Chrysene	1.10E+00	3.04E-09	4.35E-11	4.87E-14	5.56E-15	8.26E-13	1.18E-14
Dibenzo(a,h)anthracene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
2,4-Dimethylphenol	7.50E-01	2.07E-09	2.97E-11	3.32E-14	3.79E-15	5.63E-13	8.06E-15
bis(2-Ethylhexyl)phthalate	8.20E+00	2.27E-08	3.24E-10	3.63E-13	4.15E-14	6.16E-12	8.81E-14
Fluoranthene	1.50E+00	4.15E-09	5.93E-11	6.64E-14	7.59E-15	1.13E-12	1.61E-14
Fluorene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Indeno(1,2,3-cd)pyrene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
2-Methylnaphthalene	1.10E+00	3.04E-09	4.35E-11	4.87E-14	5.56E-15	8.26E-13	1.18E-14
2-Methylphenol	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
4-Methylphenol	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Naphthalene	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Di-n-octylphthalate	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Phenanthrene	1.70E+00	4.70E-09	6.72E-11	7.52E-14	8.60E-15	1.28E-12	1.83E-14
Phenol	1.41E+00	3.89E-09	5.56E-11	6.22E-14	7.11E-15	1.06E-12	1.51E-14
Pyrene	1.90E+00	5.25E-09	7.52E-11	8.41E-14	9.61E-15	1.43E-12	2.04E-14

Table 4-45 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area C

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.33E+04	3.68E-05	5.26E-07	5.89E-10	6.73E-11	9.99E-09	1.43E-10
Antimony	4.80E+00	1.33E-08	1.90E-10	2.12E-13	2.43E-14	3.60E-12	5.16E-14
Arsenic	2.12E+01	5.86E-08	8.39E-10	9.38E-13	1.07E-13	1.59E-11	2.28E-13
Barium	2.37E+02	6.55E-07	9.38E-09	1.05E-11	1.20E-12	1.78E-10	2.55E-12
Beryllium	9.70E-01	2.68E-09	3.84E-11	4.29E-14	4.91E-15	7.28E-13	1.04E-14
Cadmium	2.40E+00	6.64E-09	9.49E-11	1.06E-13	1.21E-14	1.80E-12	2.58E-14
Calcium	7.33E+04	2.03E-04	2.90E-06	3.24E-09	3.71E-10	5.51E-08	7.87E-10
Chromium	2.97E+01	8.21E-08	1.17E-09	1.31E-12	1.50E-13	2.23E-11	3.19E-13
Cobalt	8.10E+00	2.24E-08	3.20E-10	3.58E-13	4.10E-14	6.08E-12	8.70E-14
Copper	7.39E+01	2.04E-07	2.92E-09	3.27E-12	3.74E-13	5.55E-11	7.94E-13
Iron	2.38E+04	6.58E-05	9.41E-07	1.05E-09	1.20E-10	1.79E-08	2.56E-10
Lead	7.44E+02	2.06E-06	2.94E-08	3.29E-11	3.76E-12	5.59E-10	7.99E-12
Magnesium	2.53E+04	7.00E-05	1.00E-06	1.12E-09	1.28E-10	1.90E-08	2.72E-10
Manganese	7.45E+02	2.06E-06	2.95E-08	3.30E-11	3.77E-12	5.60E-10	8.00E-12
Mercury	2.30E-01	6.36E-10	9.10E-12	1.02E-14	1.16E-15	1.73E-13	2.47E-15
Nickel	2.24E+01	6.19E-08	8.86E-10	9.91E-13	1.13E-13	1.68E-11	2.41E-13
Potassium	1.99E+03	5.50E-06	7.87E-08	8.81E-11	1.01E-11	1.49E-09	2.14E-11
Selenium	6.70E-01	1.85E-09	2.65E-11	2.96E-14	3.39E-15	5.03E-13	7.20E-15
Silver	8.30E-01	2.30E-09	3.28E-11	3.67E-14	4.20E-15	6.23E-13	8.92E-15
Sodium	3.01E+02	8.32E-07	1.19E-08	1.33E-11	1.52E-12	2.26E-10	3.23E-12
Thallium	4.20E-01	1.16E-09	1.66E-11	1.86E-14	2.12E-15	3.15E-13	4.51E-15
Vanadium	2.17E+01	6.00E-08	8.58E-10	9.60E-13	1.10E-13	1.63E-11	2.33E-13
Zinc	3.43E+02	9.49E-07	1.36E-08	1.52E-11	1.74E-12	2.58E-10	3.68E-12
Cyanide	5.40E-01	1.49E-09	2.14E-11	2.39E-14	2.73E-15	4.06E-13	5.80E-15
PESTICIDES/PCBS							
PCB-1242	1.45E+00	4.02E-09	5.75E-11	6.43E-14	7.36E-15	1.09E-12	1.56E-14
PCB-1254	5.57E+01	1.54E-07	2.20E-09	2.46E-12	2.82E-13	4.18E-11	5.98E-13
PCB-1260	6.23E+00	1.72E-08	2.46E-10	2.75E-13	3.15E-14	4.68E-12	6.69E-14
PCB-1248	3.32E+01	9.19E-08	1.31E-09	1.47E-12	1.68E-13	2.49E-11	3.57E-13
TOTAL	1.40E+05	3.88E-04	5.55E-06	6.21E-09	7.10E-10	1.05E-07	1.51E-09

Table 4-45 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	4.06E-15	5.81E-17	2.94E-16	4.21E-18	8.26E-16	1.18E-17	8.26E-16	1.18E-17
Carbon Disulfide	5.07E-15	7.26E-17	3.68E-16	5.26E-18	1.03E-15	1.48E-17	1.03E-15	1.48E-17
1,1-Dichloroethane	3.04E-15	4.35E-17	2.21E-16	3.16E-18	6.20E-16	8.86E-18	6.20E-16	8.86E-18
1,2-Dichloroethene (total)	6.60E-14	9.44E-16	4.78E-15	6.84E-17	1.34E-14	1.92E-16	1.34E-14	1.92E-16
Ethylbenzene	6.09E-15	8.71E-17	4.42E-16	6.32E-18	1.24E-15	1.77E-17	1.24E-15	1.77E-17
Tetrachloroethene	7.10E-15	1.02E-16	5.15E-16	7.37E-18	1.45E-15	2.07E-17	1.45E-15	2.07E-17
Toluene	1.42E-14	2.03E-16	1.03E-15	1.47E-17	2.89E-15	4.14E-17	2.89E-15	4.14E-17
Trichloroethene	1.93E-14	2.76E-16	1.40E-15	2.00E-17	3.92E-15	5.61E-17	3.92E-15	5.61E-17
Xylene (total)	3.65E-14	5.23E-16	2.65E-15	3.79E-17	7.44E-15	1.06E-16	7.44E-15	1.06E-16
SEMI-VOLATILES								
Acenaphthene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Acenaphthylene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Anthracene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Benzo(a)anthracene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Benzo(b)fluoranthene	1.83E-12	2.61E-14	1.33E-13	1.90E-15	3.72E-13	5.32E-15	3.72E-13	5.32E-15
Benzo(k)fluoranthene	8.22E-13	1.18E-14	5.96E-14	8.53E-16	1.67E-13	2.39E-15	1.67E-13	2.39E-15
Benzoic acid	6.92E-12	9.89E-14	5.02E-13	7.18E-15	1.41E-12	2.01E-14	1.41E-12	2.01E-14
Benzo(a)pyrene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Butylbenzylphthalate	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Chrysene	1.12E-12	1.60E-14	8.10E-14	1.16E-15	2.27E-13	3.25E-15	2.27E-13	3.25E-15
Dibenzo(a,h)anthracene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
2,4-Dimethylphenol	7.61E-13	1.09E-14	5.52E-14	7.90E-16	1.55E-13	2.22E-15	1.55E-13	2.22E-15
bis(2-Ethylhexyl)phthalate	8.32E-12	1.19E-13	6.04E-13	8.63E-15	1.69E-12	2.42E-14	1.69E-12	2.42E-14
Fluoranthene	1.52E-12	2.18E-14	1.10E-13	1.58E-15	3.10E-13	4.43E-15	3.10E-13	4.43E-15
Fluorene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Indeno(1,2,3-cd)pyrene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
2-Methylnaphthalene	1.12E-12	1.60E-14	8.10E-14	1.16E-15	2.27E-13	3.25E-15	2.27E-13	3.25E-15
2-Methylphenol	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
4-Methylphenol	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Naphthalene	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Di-n-octylphthalate	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Phenanthrene	1.73E-12	2.47E-14	1.25E-13	1.79E-15	3.51E-13	5.02E-15	3.51E-13	5.02E-15
Phenol	1.43E-12	2.04E-14	1.03E-13	1.48E-15	2.90E-13	4.15E-15	2.90E-13	4.15E-15
Pyrene	1.93E-12	2.76E-14	1.40E-13	2.00E-15	3.92E-13	5.61E-15	3.92E-13	5.61E-15

Table 4-45 (cont'd)
Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.35E-08	1.93E-10	9.79E-10	1.40E-11	2.75E-09	3.93E-11	2.75E-09	3.93E-11
Antimony	4.87E-12	6.97E-14	3.53E-13	5.05E-15	9.91E-13	1.42E-14	9.91E-13	1.42E-14
Arsenic	2.15E-11	3.08E-13	1.56E-12	2.23E-14	4.38E-12	6.26E-14	4.38E-12	6.26E-14
Barium	2.41E-10	3.44E-12	1.74E-11	2.50E-13	4.89E-11	7.00E-13	4.89E-11	7.00E-13
Beryllium	9.84E-13	1.41E-14	7.14E-14	1.02E-15	2.00E-13	2.87E-15	2.00E-13	2.87E-15
Cadmium	2.44E-12	3.48E-14	1.77E-13	2.53E-15	4.96E-13	7.09E-15	4.96E-13	7.09E-15
Calcium	7.44E-08	1.06E-09	5.40E-09	7.72E-11	1.51E-08	2.17E-10	1.51E-08	2.17E-10
Chromium	3.01E-11	4.31E-13	2.19E-12	3.13E-14	6.13E-12	8.77E-14	6.13E-12	8.77E-14
Cobalt	8.22E-12	1.18E-13	5.96E-13	8.53E-15	1.67E-12	2.39E-14	1.67E-12	2.39E-14
Copper	7.50E-11	1.07E-12	5.44E-12	7.78E-14	1.53E-11	2.18E-13	1.53E-11	2.18E-13
Iron	2.42E-08	3.45E-10	1.75E-09	2.51E-11	4.92E-09	7.03E-11	4.92E-09	7.03E-11
Lead	7.55E-10	1.08E-11	5.48E-11	7.83E-13	1.54E-10	2.20E-12	1.54E-10	2.20E-12
Magnesium	2.57E-08	3.67E-10	1.86E-09	2.66E-11	5.23E-09	7.47E-11	5.23E-09	7.47E-11
Manganese	7.56E-10	1.08E-11	5.48E-11	7.84E-13	1.54E-10	2.20E-12	1.54E-10	2.20E-12
Mercury	2.33E-13	3.34E-15	1.69E-14	2.42E-16	4.75E-14	6.79E-16	4.75E-14	6.79E-16
Nickel	2.27E-11	3.25E-13	1.65E-12	2.36E-14	4.63E-12	6.62E-14	4.63E-12	6.62E-14
Potassium	2.02E-09	2.89E-11	1.46E-10	2.10E-12	4.11E-10	5.88E-12	4.11E-10	5.88E-12
Selenium	6.80E-13	9.73E-15	4.93E-14	7.05E-16	1.38E-13	1.98E-15	1.38E-13	1.98E-15
Silver	8.42E-13	1.20E-14	6.11E-14	8.74E-16	1.71E-13	2.45E-15	1.71E-13	2.45E-15
Sodium	3.05E-10	4.37E-12	2.22E-11	3.17E-13	6.22E-11	8.89E-13	6.22E-11	8.89E-13
Thallium	4.26E-13	6.10E-15	3.09E-14	4.42E-16	8.67E-14	1.24E-15	8.67E-14	1.24E-15
Vanadium	2.20E-11	3.15E-13	1.60E-12	2.28E-14	4.48E-12	6.41E-14	4.48E-12	6.41E-14
Zinc	3.48E-10	4.98E-12	2.52E-11	3.61E-13	7.08E-11	1.01E-12	7.08E-11	1.01E-12
Cyanide	5.48E-13	7.84E-15	3.98E-14	5.69E-16	1.12E-13	1.60E-15	1.12E-13	1.60E-15
PESTICIDES/PCBS								
PCB-1242	1.48E-12	2.11E-14	1.07E-13	1.53E-15	3.00E-13	4.30E-15	3.00E-13	4.30E-15
PCB-1254	5.65E-11	8.08E-13	4.10E-12	5.86E-14	1.15E-11	1.65E-13	1.15E-11	1.65E-13
PCB-1260	6.32E-12	9.04E-14	4.58E-13	6.55E-15	1.29E-12	1.84E-14	1.29E-12	1.84E-14
PCB-1248	3.37E-11	4.82E-13	2.45E-12	3.50E-14	6.86E-12	9.81E-14	6.86E-12	9.81E-14
TOTAL	1.42E-07	2.04E-09	1.03E-08	1.48E-10	2.90E-08	4.15E-10	2.90E-08	4.15E-10

Table 4-46
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction Traffic On-Site
Surficial Soil - Area D

		Constr. Wrkrs On-Site	Constr. Wrkrs On-Site	Children Playground	Children Playground	Residential N. Marion St.	Residential N. Marion St.
	Soil Conc. (mg/kg)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)
VOLATILES							
Benzene	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Carbon Disulfide	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
1,1-Dichloroethane	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
1,2-Dichloroethene (total)	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Ethylbenzene	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Tetrachloroethene	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Toluene	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Trichloroethene	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
Xylene (total)	3.00E-03	4.53E-12	6.48E-14	1.15E-16	1.31E-17	2.79E-15	3.99E-17
SEMI-VOLATILES							
Acenaphthene	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Acenaphthylene	1.40E-01	2.11E-10	3.02E-12	5.35E-15	6.11E-16	1.30E-13	1.86E-15
Anthracene	8.70E-02	1.31E-10	1.88E-12	3.32E-15	3.80E-16	8.09E-14	1.16E-15
Benzo(a)anthracene	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Benzo(b)fluoranthene	1.50E+00	2.27E-09	3.24E-11	5.73E-14	6.55E-15	1.39E-12	2.00E-14
Benzo(k)fluoranthene	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Benzoic acid	2.00E-01	3.02E-10	4.32E-12	7.64E-15	8.73E-16	1.86E-13	2.66E-15
Benzo(a)pyrene	9.90E-01	1.50E-09	2.14E-11	3.78E-14	4.32E-15	9.21E-13	1.32E-14
Butylbenzylphthalate	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Chrysene	1.20E+00	1.81E-09	2.59E-11	4.58E-14	5.24E-15	1.12E-12	1.60E-14
Dibenzo(a,h)anthracene	1.20E-01	1.81E-10	2.59E-12	4.58E-15	5.24E-16	1.12E-13	1.60E-15
2,4-Dimethylphenol	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
bis(2-Ethylhexyl)phthalate	3.30E+00	4.98E-09	7.13E-11	1.26E-13	1.44E-14	3.07E-12	4.39E-14
Fluoranthene	2.20E+00	3.32E-09	4.75E-11	8.40E-14	9.61E-15	2.05E-12	2.93E-14
Fluorene	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Indeno(1,2,3-cd)pyrene	9.00E-01	1.36E-09	1.94E-11	3.44E-14	3.93E-15	8.37E-13	1.20E-14
2-Methylnaphthalene	1.20E-01	1.81E-10	2.59E-12	4.58E-15	5.24E-16	1.12E-13	1.60E-15
2-Methylphenol	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
4-Methylphenol	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Naphthalene	6.80E-02	1.03E-10	1.47E-12	2.60E-15	2.97E-16	6.32E-14	9.04E-16
Di-n-octylphthalate	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Phenanthrene	6.20E-01	9.36E-10	1.34E-11	2.37E-14	2.71E-15	5.76E-13	8.25E-15
Phenol	4.06E-01	6.13E-10	8.77E-12	1.55E-14	1.77E-15	3.78E-13	5.40E-15
Pyrene	1.30E+00	1.96E-09	2.81E-11	4.97E-14	5.68E-15	1.21E-12	1.73E-14

Table 4-46 (cont'd)
Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area D

		Constr. Wrkrs On-Site	Constr. Wrkrs On-Site	Children Playground	Children Playground	Residential N. Marion St.	Residential N. Marion St.
	Soil Conc. (mg/kg)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)	Non-Carc. Inhal.Dose (mg/kg-day)	Carcinogenic Inhal.Dose (mg/kg-day)
INORGANICS							
Aluminum	1.54E+04	2.33E-05	3.33E-07	5.88E-10	6.72E-11	1.43E-08	2.05E-10
Antimony	4.20E+00	6.34E-09	9.07E-11	1.60E-13	1.83E-14	3.91E-12	5.59E-14
Arsenic	8.07E+01	1.22E-07	1.74E-09	3.08E-12	3.52E-13	7.50E-11	1.07E-12
Barium	2.81E+02	4.24E-07	6.07E-09	1.07E-11	1.23E-12	2.61E-10	3.74E-12
Beryllium	9.90E-01	1.50E-09	2.14E-11	3.78E-14	4.32E-15	9.21E-13	1.32E-14
Cadmium	2.90E+00	4.38E-09	6.26E-11	1.11E-13	1.27E-14	2.70E-12	3.86E-14
Calcium	2.58E+04	3.90E-05	5.57E-07	9.85E-10	1.13E-10	2.40E-08	3.43E-10
Chromium	3.12E+01	4.71E-08	6.74E-10	1.19E-12	1.36E-13	2.90E-11	4.15E-13
Cobalt	1.54E+01	2.33E-08	3.33E-10	5.88E-13	6.72E-14	1.43E-11	2.05E-13
Copper	8.99E+01	1.36E-07	1.94E-09	3.43E-12	3.93E-13	8.36E-11	1.20E-12
Iron	5.65E+04	8.53E-05	1.22E-06	2.16E-09	2.47E-10	5.25E-08	7.51E-10
Lead	4.69E+02	7.08E-07	1.01E-08	1.79E-11	2.05E-12	4.36E-10	6.24E-12
Magnesium	1.24E+04	1.87E-05	2.68E-07	4.74E-10	5.41E-11	1.15E-08	1.65E-10
Manganese	7.51E+02	1.13E-06	1.62E-08	2.87E-11	3.28E-12	6.98E-10	9.99E-12
Mercury	3.10E-01	4.68E-10	6.70E-12	1.18E-14	1.35E-15	2.88E-13	4.12E-15
Nickel	2.90E+01	4.38E-08	6.26E-10	1.11E-12	1.27E-13	2.70E-11	3.86E-13
Potassium	2.42E+03	3.65E-06	5.23E-08	9.24E-11	1.06E-11	2.25E-09	3.22E-11
Selenium	1.50E+00	2.27E-09	3.24E-11	5.73E-14	6.55E-15	1.39E-12	2.00E-14
Silver	9.30E-01	1.40E-09	2.01E-11	3.55E-14	4.06E-15	8.65E-13	1.24E-14
Sodium	2.86E+02	4.32E-07	6.18E-09	1.09E-11	1.25E-12	2.66E-10	3.80E-12
Thallium	6.20E-01	9.36E-10	1.34E-11	2.37E-14	2.71E-15	5.76E-13	8.25E-15
Vanadium	4.56E+01	6.89E-08	9.85E-10	1.74E-12	1.99E-13	4.24E-11	6.06E-13
Zinc	9.40E+02	1.42E-06	2.03E-08	3.59E-11	4.10E-12	8.74E-10	1.25E-11
Cyanide	7.50E-01	1.13E-09	1.62E-11	2.86E-14	3.27E-15	6.97E-13	9.98E-15
PESTICIDES/PCBS *							
PCB-1242	9.80E-02	1.48E-10	2.12E-12	3.74E-15	4.28E-16	9.11E-14	1.30E-15
PCB-1254	1.98E-01	2.99E-10	4.28E-12	7.56E-15	8.65E-16	1.84E-13	2.63E-15
PCB-1260	1.98E-01	2.99E-10	4.28E-12	7.56E-15	8.65E-16	1.84E-13	2.63E-15
PCB-1248	9.80E-02	1.48E-10	2.12E-12	3.74E-15	4.28E-16	9.11E-14	1.30E-15
TOTAL	1.16E+05	1.75E-04	2.50E-06	4.41E-09	5.05E-10	1.07E-07	1.54E-09

* 95% Confidence Arithmetic Mean used for Pesticides/PCBs

Table 4-46 (cont'd)

Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal.Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal.Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal.Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal.Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal.Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal.Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal.Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal.Dose (mg/kg-day)
VOLATILES								
Benzene	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Carbon Disulfide	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
1,1-Dichloroethane	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
1,2-Dichloroethene (total)	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Ethylbenzene	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Tetrachloroethene	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Toluene	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Trichloroethene	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
Xylene (total)	1.06E-15	1.51E-17	1.48E-16	2.11E-18	5.85E-16	8.37E-18	5.85E-16	8.37E-18
SEMI-VOLATILES								
Acenaphthene	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Acenaphthylene	4.94E-14	7.06E-16	6.89E-15	9.85E-17	2.73E-14	3.91E-16	2.73E-14	3.91E-16
Anthracene	3.07E-14	4.39E-16	4.28E-15	6.12E-17	1.70E-14	2.43E-16	1.70E-14	2.43E-16
Benzo(a)anthracene	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Benzo(b)fluoranthene	5.29E-13	7.56E-15	7.38E-14	1.06E-15	2.93E-13	4.19E-15	2.93E-13	4.19E-15
Benzo(k)fluoranthene	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Benzoic acid	7.05E-14	1.01E-15	9.84E-15	1.41E-16	3.90E-14	5.58E-16	3.90E-14	5.58E-16
Benzo(a)pyrene	3.49E-13	4.99E-15	4.87E-14	6.97E-16	1.93E-13	2.76E-15	1.93E-13	2.76E-15
Butylbenzylphthalate	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Chrysene	4.23E-13	6.05E-15	5.90E-14	8.44E-16	2.34E-13	3.35E-15	2.34E-13	3.35E-15
Dibenzo(a,h)anthracene	4.23E-14	6.05E-16	5.90E-15	8.44E-17	2.34E-14	3.35E-16	2.34E-14	3.35E-16
2,4-Dimethylphenol	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
bis(2-Ethylhexyl)phthalate	1.16E-12	1.66E-14	1.62E-13	2.32E-15	6.44E-13	9.21E-15	6.44E-13	9.21E-15
Fluoranthene	7.76E-13	1.11E-14	1.08E-13	1.55E-15	4.29E-13	6.14E-15	4.29E-13	6.14E-15
Fluorene	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Indeno(1,2,3-cd)pyrene	3.17E-13	4.54E-15	4.43E-14	6.33E-16	1.76E-13	2.51E-15	1.76E-13	2.51E-15
2-Methylnaphthalene	4.23E-14	6.05E-16	5.90E-15	8.44E-17	2.34E-14	3.35E-16	2.34E-14	3.35E-16
2-Methylphenol	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
4-Methylphenol	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Naphthalene	2.40E-14	3.43E-16	3.35E-15	4.79E-17	1.33E-14	1.90E-16	1.33E-14	1.90E-16
Di-n-octylphthalate	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Phenanthrene	2.19E-13	3.13E-15	3.05E-14	4.36E-16	1.21E-13	1.73E-15	1.21E-13	1.73E-15
Phenol	1.43E-13	2.05E-15	2.00E-14	2.86E-16	7.92E-14	1.13E-15	7.92E-14	1.13E-15
Pyrene	4.58E-13	6.56E-15	6.40E-14	9.15E-16	2.54E-13	3.63E-15	2.54E-13	3.63E-15

Table 4-46 (cont'd)
Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction Traffic On-Site
 Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal.Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal.Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal.Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal.Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal.Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal.Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal.Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal.Dose (mg/kg-day)
INORGANICS								
Aluminum	5.43E-09	7.77E-11	7.58E-10	1.08E-11	3.01E-09	4.30E-11	3.01E-09	4.30E-11
Antimony	1.48E-12	2.12E-14	2.07E-13	2.96E-15	8.20E-13	1.17E-14	8.20E-13	1.17E-14
Arsenic	2.85E-11	4.07E-13	3.97E-12	5.68E-14	1.57E-11	2.25E-13	1.57E-11	2.25E-13
Barium	9.91E-11	1.42E-12	1.38E-11	1.98E-13	5.48E-11	7.84E-13	5.48E-11	7.84E-13
Beryllium	3.49E-13	4.99E-15	4.87E-14	6.97E-16	1.93E-13	2.76E-15	1.93E-13	2.76E-15
Cadmium	1.02E-12	1.46E-14	1.43E-13	2.04E-15	5.66E-13	8.09E-15	5.66E-13	8.09E-15
Calcium	9.10E-09	1.30E-10	1.27E-09	1.82E-11	5.03E-09	7.20E-11	5.03E-09	7.20E-11
Chromium	1.10E-11	1.57E-13	1.53E-12	2.20E-14	6.09E-12	8.71E-14	6.09E-12	8.71E-14
Cobalt	5.43E-12	7.77E-14	7.58E-13	1.08E-14	3.01E-12	4.30E-14	3.01E-12	4.30E-14
Copper	3.17E-11	4.53E-13	4.42E-12	6.33E-14	1.75E-11	2.51E-13	1.75E-11	2.51E-13
Iron	1.99E-08	2.85E-10	2.78E-09	3.98E-11	1.10E-08	1.58E-10	1.10E-08	1.58E-10
Lead	1.65E-10	2.37E-12	2.31E-11	3.30E-13	9.15E-11	1.31E-12	9.15E-11	1.31E-12
Magnesium	4.37E-09	6.25E-11	6.10E-10	8.73E-12	2.42E-09	3.46E-11	2.42E-09	3.46E-11
Manganese	2.65E-10	3.79E-12	3.69E-11	5.28E-13	1.47E-10	2.10E-12	1.47E-10	2.10E-12
Mercury	1.09E-13	1.56E-15	1.53E-14	2.18E-16	6.05E-14	8.65E-16	6.05E-14	8.65E-16
Nickel	1.02E-11	1.46E-13	1.43E-12	2.04E-14	5.66E-12	8.09E-14	5.66E-12	8.09E-14
Potassium	8.53E-10	1.22E-11	1.19E-10	1.70E-12	4.72E-10	6.75E-12	4.72E-10	6.75E-12
Selenium	5.29E-13	7.56E-15	7.38E-14	1.06E-15	2.93E-13	4.19E-15	2.93E-13	4.19E-15
Silver	3.28E-13	4.69E-15	4.58E-14	6.54E-16	1.81E-13	2.60E-15	1.81E-13	2.60E-15
Sodium	1.01E-10	1.44E-12	1.41E-11	2.01E-13	5.58E-11	7.98E-13	5.58E-11	7.98E-13
Thallium	2.19E-13	3.13E-15	3.05E-14	4.36E-16	1.21E-13	1.73E-15	1.21E-13	1.73E-15
Vanadium	1.61E-11	2.30E-13	2.24E-12	3.21E-14	8.90E-12	1.27E-13	8.90E-12	1.27E-13
Zinc	3.31E-10	4.74E-12	4.62E-11	6.61E-13	1.83E-10	2.62E-12	1.83E-10	2.62E-12
Cyanide	2.64E-13	3.78E-15	3.69E-14	5.28E-16	1.46E-13	2.09E-15	1.46E-13	2.09E-15
PESTICIDES/PCBS *								
PCB-1242	3.46E-14	4.94E-16	4.82E-15	6.90E-17	1.91E-14	2.74E-16	1.91E-14	2.74E-16
PCB-1254	6.98E-14	9.99E-16	9.74E-15	1.39E-16	3.86E-14	5.53E-16	3.86E-14	5.53E-16
PCB-1260	6.98E-14	9.99E-16	9.74E-15	1.39E-16	3.86E-14	5.53E-16	3.86E-14	5.53E-16
PCB-1248	3.46E-14	4.94E-16	4.82E-15	6.90E-17	1.91E-14	2.74E-16	1.91E-14	2.74E-16
TOTAL	4.07E-08	5.83E-10	5.69E-09	8.13E-11	2.26E-08	3.23E-10	2.26E-08	3.23E-10

Table 4-47
Total Inhalation Exposure Doses Due to
Fugitive Dust Releases From
Construction Traffic On-site

Receptor	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	5.11E-06	8.17E-06	5.55E-06	2.50E-06	2.13E-05
Non-Carcinogenic Dose	3.58E-04	5.71E-04	3.88E-04	1.75E-04	1.49E-03
Children at the Playground					
Carcinogenic Dose	3.82E-09	4.89E-09	7.10E-10	5.05E-10	9.93E-09
Non-Carcinogenic Dose	3.34E-08	4.28E-08	6.21E-09	4.41E-09	8.68E-08
Residents at No. Marion Street					
Carcinogenic Dose	1.10E-09	2.13E-09	1.51E-09	1.54E-09	6.28E-09
Non-Carcinogenic Dose	7.72E-08	1.49E-07	1.05E-07	1.07E-07	4.38E-07
Commercial Pop. at Robinson St.					
Carcinogenic Dose	6.36E-10	2.27E-09	2.04E-09	5.83E-10	5.53E-09
Non-Carcinogenic Dose	4.44E-08	1.59E-07	1.42E-07	4.07E-08	3.86E-07
Commercial Pop. at River Road					
Carcinogenic Dose	1.12E-09	6.05E-10	1.48E-10	8.13E-11	1.95E-09
Non-Carcinogenic Dose	7.85E-08	4.23E-08	1.03E-08	5.69E-09	1.37E-07
Residents at Sommer Street					
Carcinogenic Dose	4.73E-10	1.16E-09	4.15E-10	3.23E-10	2.37E-09
Non-Carcinogenic Dose	3.31E-08	8.14E-08	2.90E-08	2.26E-08	1.66E-07
Commercial Pop. at Sommer St.					
Carcinogenic Dose	4.73E-10	1.16E-09	4.15E-10	3.23E-10	2.37E-09
Non-Carcinogenic Dose	3.31E-08	8.14E-08	2.90E-08	2.26E-08	1.66E-07

Tables 4-48 through 4-51 present the inhalation exposure doses calculated for children, residents, commercial populations and unprotected construction workers to fugitive dust emissions from construction activities on-site. Table 4-48 presents the inhalation exposure doses calculated for construction emissions from Area A. The doses presented in Table 4-48 range from $7.66\text{E-}01$ mg/kg-day for unprotected construction workers on-site to $7.09\text{E-}05$ mg/kg-day for residential and commercial populations at Sommer Street. The inhalation exposure doses calculated for fugitive dust emissions from construction in Area B are presented in Table 4-49. Review of the table indicates that the doses calculated for this exposure scenario range from 1.22 mg/kg-day for unprotected construction workers on-site to $9.07\text{E-}05$ mg/kg-day for commercial populations at River Road.

Table 4-50 presents the inhalation exposure doses calculated for fugitive dust emissions during construction in Area C. The doses presented in Table 4-50 range from $8.32\text{E-}01$ mg/kg-day for unprotected construction workers on-site to $1.33\text{E-}05$ mg/kg-day for children at the playground. Similarly, the inhalation doses calculated for fugitive dust emissions from construction in Area D (see Table 4-51) range from $3.74\text{E-}01$ mg/kg-day for unprotected construction workers on-site to $9.46\text{E-}06$ mg/kg-day for children at the playground.

BOS2REPa/bos-t2
February 26, 1991

Table 4-48

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area A

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.13E-01	1.49E-06	2.13E-08	1.39E-10	1.59E-11	3.21E-10	4.59E-12
Carbon Disulfide	1.07E-01	3.85E-07	5.51E-09	3.59E-11	4.11E-12	8.31E-11	1.19E-12
1,1-Dichloroethane	9.30E-01	3.35E-06	4.79E-08	3.12E-10	3.57E-11	7.23E-10	1.03E-11
1,2-Dichloroethene (total)	1.90E-01	6.83E-07	9.78E-09	6.38E-11	7.29E-12	1.48E-10	2.11E-12
Ethylbenzene	5.84E-01	2.10E-06	3.01E-08	1.96E-10	2.24E-11	4.54E-10	6.49E-12
Tetrachloroethene	1.66E-01	5.97E-07	8.54E-09	5.57E-11	6.37E-12	1.29E-10	1.84E-12
Toluene	4.13E-01	1.49E-06	2.13E-08	1.39E-10	1.59E-11	3.21E-10	4.59E-12
Trichloroethene	4.13E-01	1.49E-06	2.13E-08	1.39E-10	1.59E-11	3.21E-10	4.59E-12
Xylene (total)	1.19E+01	4.29E-05	6.14E-07	4.01E-09	4.58E-10	9.27E-09	1.33E-10
SEMI-VOLATILES							
Acenaphthene	1.88E+00	6.75E-06	9.65E-08	6.30E-10	7.20E-11	1.46E-09	2.08E-11
Acenaphthylene	1.70E+00	6.13E-06	8.76E-08	5.72E-10	6.54E-11	1.32E-09	1.89E-11
Anthracene	1.72E+00	6.17E-06	8.82E-08	5.76E-10	6.58E-11	1.33E-09	1.91E-11
Benzo(a)anthracene	1.58E+00	5.68E-06	8.13E-08	5.31E-10	6.07E-11	1.23E-09	1.76E-11
Benzo(b)fluoranthene	1.62E+00	5.82E-06	8.33E-08	5.44E-10	6.22E-11	1.26E-09	1.80E-11
Benzo(k)fluoranthene	1.72E+00	6.18E-06	8.84E-08	5.77E-10	6.60E-11	1.33E-09	1.91E-11
Benzoic acid	8.33E+00	3.00E-05	4.28E-07	2.80E-09	3.20E-10	6.47E-09	9.25E-11
Benzo(a)pyrene	1.60E+00	5.75E-06	8.23E-08	5.37E-10	6.14E-11	1.24E-09	1.78E-11
Butylbenzylphthalate	8.21E-01	2.95E-06	4.22E-08	2.76E-10	3.15E-11	6.38E-10	9.12E-12
Chrysene	1.38E+00	4.95E-06	7.08E-08	4.62E-10	5.28E-11	1.07E-09	1.53E-11
Dibenzo(a,h)anthracene	1.72E+00	6.18E-06	8.84E-08	5.77E-10	6.60E-11	1.33E-09	1.91E-11
2,4-Dimethylphenol	1.75E+00	6.28E-06	8.98E-08	5.86E-10	6.70E-11	1.36E-09	1.94E-11
bis(2-Ethylhexyl)phthalate	3.03E+00	1.09E-05	1.56E-07	1.02E-09	1.16E-10	2.35E-09	3.37E-11
Fluoranthene	2.73E+00	9.83E-06	1.41E-07	9.17E-10	1.05E-10	2.12E-09	3.04E-11
Fluorene	1.75E+00	6.29E-06	9.00E-08	5.87E-10	6.71E-11	1.36E-09	1.94E-11
Indeno(1,2,3-cd)pyrene	1.71E+00	6.15E-06	8.80E-08	5.75E-10	6.57E-11	1.33E-09	1.90E-11
2-Methylnaphthalene	6.77E+00	2.44E-05	3.48E-07	2.27E-09	2.60E-10	5.26E-09	7.53E-11
2-Methylphenol	1.72E+00	6.18E-06	8.84E-08	5.77E-10	6.60E-11	1.33E-09	1.91E-11
4-Methylphenol	1.71E+00	6.16E-06	8.81E-08	5.75E-10	6.58E-11	1.33E-09	1.90E-11
Naphthalene	1.56E+00	5.61E-06	8.03E-08	5.24E-10	5.99E-11	1.21E-09	1.73E-11
Di-n-octylphthalate	1.76E+00	6.34E-06	9.07E-08	5.92E-10	6.77E-11	1.37E-09	1.96E-11
Phenanthrene	3.43E+00	1.23E-05	1.76E-07	1.15E-09	1.32E-10	2.66E-09	3.81E-11
Phenol	1.72E+00	6.18E-06	8.84E-08	5.77E-10	6.60E-11	1.33E-09	1.91E-11
Pyrene	2.17E+00	7.82E-06	1.12E-07	7.30E-10	8.35E-11	1.69E-09	2.42E-11

Table 4-48 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area A

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrks On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrks On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.12E+04	4.01E-02	5.74E-04	3.75E-06	4.28E-07	8.67E-06	1.24E-07
Antimony	6.79E+00	2.44E-05	3.50E-07	2.28E-09	2.61E-10	5.28E-09	7.55E-11
Arsenic	2.69E+01	9.69E-05	1.39E-06	9.04E-09	1.03E-09	2.09E-08	2.99E-10
Barium	2.02E+02	7.25E-04	1.04E-05	6.77E-08	7.74E-09	1.57E-07	2.24E-09
Beryllium	1.46E+00	5.24E-06	7.50E-08	4.90E-10	5.60E-11	1.13E-09	1.62E-11
Cadmium	1.66E+00	5.96E-06	8.53E-08	5.57E-10	6.37E-11	1.29E-09	1.84E-11
Calcium	1.11E+05	4.00E-01	5.72E-03	3.73E-05	4.27E-06	8.64E-05	1.24E-06
Chromium	2.35E+01	8.44E-05	1.21E-06	7.88E-09	9.01E-10	1.82E-08	2.61E-10
Cobalt	6.96E+00	2.50E-05	3.58E-07	2.34E-09	2.67E-10	5.41E-09	7.73E-11
Copper	8.44E+01	3.04E-04	4.34E-06	2.84E-08	3.24E-09	6.56E-08	9.38E-10
Iron	2.86E+04	1.03E-01	1.47E-03	9.59E-06	1.10E-06	2.22E-05	3.17E-07
Lead	8.98E+02	3.23E-03	4.62E-05	3.01E-07	3.45E-08	6.97E-07	9.98E-09
Magnesium	5.71E+04	2.05E-01	2.94E-03	1.92E-05	2.19E-06	4.44E-05	6.35E-07
Manganese	9.60E+02	3.45E-03	4.94E-05	3.22E-07	3.68E-08	7.45E-07	1.07E-08
Mercury	2.87E-01	1.03E-06	1.48E-08	9.64E-11	1.10E-11	2.23E-10	3.19E-12
Nickel	1.97E+01	7.07E-05	1.01E-06	6.60E-09	7.55E-10	1.53E-08	2.19E-10
Potassium	1.82E+03	6.54E-03	9.36E-05	6.11E-07	6.98E-08	1.41E-06	2.02E-08
Selenium	1.60E+00	5.74E-06	8.21E-08	5.36E-10	6.13E-11	1.24E-09	1.77E-11
Silver	9.27E-01	3.33E-06	4.77E-08	3.11E-10	3.56E-11	7.20E-10	1.03E-11
Sodium	4.79E+02	1.72E-03	2.46E-05	1.61E-07	1.84E-08	3.72E-07	5.32E-09
Thallium	5.24E-01	1.88E-06	2.70E-08	1.76E-10	2.01E-11	4.07E-10	5.82E-12
Vanadium	2.31E+01	8.30E-05	1.19E-06	7.75E-09	8.86E-10	1.79E-08	2.56E-10
Zinc	3.55E+02	1.28E-03	1.83E-05	1.19E-07	1.36E-08	2.76E-07	3.95E-09
Cyanide	8.95E+00	3.22E-05	4.61E-07	3.01E-09	3.44E-10	6.95E-09	9.95E-11
PESTICIDES/PCBS							
PCB-1242	5.17E-01	1.86E-06	2.66E-08	1.74E-10	1.98E-11	4.02E-10	5.75E-12
PCB-1254	1.45E+01	5.21E-05	7.45E-07	4.86E-09	5.56E-10	1.13E-08	1.61E-10
PCB-1260	1.12E+01	4.03E-05	5.76E-07	3.76E-09	4.30E-10	8.70E-09	1.24E-10
PCB-1248	1.68E+01	6.03E-05	8.62E-07	5.63E-09	6.43E-10	1.30E-08	1.86E-10
TOTAL	2.13E+05	7.66E-01	1.10E-02	7.15E-05	8.18E-06	1.66E-04	2.37E-06

Table 4-48 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	1.85E-10	2.64E-12	3.26E-10	4.67E-12	1.38E-10	1.97E-12	1.38E-10	1.97E-12
Carbon Disulfide	4.78E-11	6.84E-13	8.46E-11	1.21E-12	3.56E-11	5.10E-13	3.56E-11	5.10E-13
1,1-Dichloroethane	4.16E-10	5.94E-12	7.35E-10	1.05E-11	3.10E-10	4.43E-12	3.10E-10	4.43E-12
1,2-Dichloroethene (total)	8.49E-11	1.21E-12	1.50E-10	2.15E-12	6.33E-11	9.05E-13	6.33E-11	9.05E-13
Ethylbenzene	2.61E-10	3.73E-12	4.62E-10	6.60E-12	1.94E-10	2.78E-12	1.94E-10	2.78E-12
Tetrachloroethene	7.42E-11	1.06E-12	1.31E-10	1.88E-12	5.53E-11	7.91E-13	5.53E-11	7.91E-13
Toluene	1.85E-10	2.64E-12	3.26E-10	4.67E-12	1.38E-10	1.97E-12	1.38E-10	1.97E-12
Trichloroethene	1.85E-10	2.64E-12	3.26E-10	4.67E-12	1.38E-10	1.97E-12	1.38E-10	1.97E-12
Xylene (total)	5.33E-09	7.62E-11	9.43E-09	1.35E-10	3.97E-09	5.68E-11	3.97E-09	5.68E-11
SEMI-VOLATILES								
Acenaphthene	8.38E-10	1.20E-11	1.48E-09	2.12E-11	6.25E-10	8.93E-12	6.25E-10	8.93E-12
Acenaphthylene	7.61E-10	1.09E-11	1.35E-09	1.93E-11	5.67E-10	8.11E-12	5.67E-10	8.11E-12
Anthracene	7.66E-10	1.10E-11	1.36E-09	1.94E-11	5.71E-10	8.17E-12	5.71E-10	8.17E-12
Benzo(a)anthracene	7.06E-10	1.01E-11	1.25E-09	1.79E-11	5.26E-10	7.52E-12	5.26E-10	7.52E-12
Benzo(b)fluoranthene	7.23E-10	1.03E-11	1.28E-09	1.83E-11	5.39E-10	7.71E-12	5.39E-10	7.71E-12
Benzo(k)fluoranthene	7.68E-10	1.10E-11	1.36E-09	1.94E-11	5.72E-10	8.18E-12	5.72E-10	8.18E-12
Benzoic acid	3.72E-09	5.32E-11	6.58E-09	9.41E-11	2.77E-09	3.97E-11	2.77E-09	3.97E-11
Benzo(a)pyrene	7.14E-10	1.02E-11	1.26E-09	1.81E-11	5.32E-10	7.61E-12	5.32E-10	7.61E-12
Butylbenzylphthalate	3.67E-10	5.25E-12	6.49E-10	9.28E-12	2.73E-10	3.91E-12	2.73E-10	3.91E-12
Chrysene	6.14E-10	8.79E-12	1.09E-09	1.55E-11	4.58E-10	6.55E-12	4.58E-10	6.55E-12
Dibenzo(a,h)anthracene	7.68E-10	1.10E-11	1.36E-09	1.94E-11	5.72E-10	8.18E-12	5.72E-10	8.18E-12
2,4-Dimethylphenol	7.80E-10	1.12E-11	1.38E-09	1.97E-11	5.81E-10	8.31E-12	5.81E-10	8.31E-12
bis(2-Ethylhexyl)phthalate	1.35E-09	1.94E-11	2.39E-09	3.42E-11	1.01E-09	1.44E-11	1.01E-09	1.44E-11
Fluoranthene	1.22E-09	1.75E-11	2.16E-09	3.09E-11	9.10E-10	1.30E-11	9.10E-10	1.30E-11
Fluorene	7.82E-10	1.12E-11	1.38E-09	1.98E-11	5.82E-10	8.33E-12	5.82E-10	8.33E-12
Indeno(1,2,3-cd)pyrene	7.65E-10	1.09E-11	1.35E-09	1.93E-11	5.70E-10	8.15E-12	5.70E-10	8.15E-12
2-Methylnaphthalene	3.03E-09	4.33E-11	5.35E-09	7.65E-11	2.25E-09	3.23E-11	2.25E-09	3.23E-11
2-Methylphenol	7.68E-10	1.10E-11	1.36E-09	1.94E-11	5.72E-10	8.18E-12	5.72E-10	8.18E-12
4-Methylphenol	7.65E-10	1.09E-11	1.35E-09	1.94E-11	5.70E-10	8.16E-12	5.70E-10	8.16E-12
Naphthalene	6.97E-10	9.97E-12	1.23E-09	1.76E-11	5.19E-10	7.43E-12	5.19E-10	7.43E-12
Di-n-octylphthalate	7.88E-10	1.13E-11	1.39E-09	1.99E-11	5.87E-10	8.40E-12	5.87E-10	8.40E-12
Phenanthrene	1.53E-09	2.19E-11	2.71E-09	3.87E-11	1.14E-09	1.63E-11	1.14E-09	1.63E-11
Phenol	7.68E-10	1.10E-11	1.36E-09	1.94E-11	5.72E-10	8.18E-12	5.72E-10	8.18E-12
Pyrene	9.71E-10	1.39E-11	1.72E-09	2.46E-11	7.24E-10	1.04E-11	7.24E-10	1.04E-11

Table 4-48 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area A

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	4.99E-06	7.13E-08	8.82E-06	1.26E-07	3.71E-06	5.31E-08	3.71E-06	5.31E-08
Antimony	3.04E-09	4.34E-11	5.37E-09	7.68E-11	2.26E-09	3.24E-11	2.26E-09	3.24E-11
Arsenic	1.20E-08	1.72E-10	2.13E-08	3.04E-10	8.97E-09	1.28E-10	8.97E-09	1.28E-10
Barium	9.00E-08	1.29E-09	1.59E-07	2.28E-09	6.71E-08	9.60E-10	6.71E-08	9.60E-10
Beryllium	6.51E-10	9.32E-12	1.15E-09	1.65E-11	4.85E-10	6.94E-12	4.85E-10	6.94E-12
Cadmium	7.41E-10	1.06E-11	1.31E-09	1.87E-11	5.52E-10	7.90E-12	5.52E-10	7.90E-12
Calcium	4.97E-05	7.11E-07	8.79E-05	1.26E-06	3.70E-05	5.30E-07	3.70E-05	5.30E-07
Chromium	1.05E-08	1.50E-10	1.85E-08	2.65E-10	7.81E-09	1.12E-10	7.81E-09	1.12E-10
Cobalt	3.11E-09	4.45E-11	5.50E-09	7.87E-11	2.32E-09	3.31E-11	2.32E-09	3.31E-11
Copper	3.77E-08	5.40E-10	6.67E-08	9.54E-10	2.81E-08	4.02E-10	2.81E-08	4.02E-10
Iron	1.28E-05	1.82E-07	2.26E-05	3.23E-07	9.51E-06	1.36E-07	9.51E-06	1.36E-07
Lead	4.01E-07	5.74E-09	7.09E-07	1.01E-08	2.99E-07	4.27E-09	2.99E-07	4.27E-09
Magnesium	2.55E-05	3.65E-07	4.51E-05	6.46E-07	1.90E-05	2.72E-07	1.90E-05	2.72E-07
Manganese	4.29E-07	6.13E-09	7.58E-07	1.08E-08	3.19E-07	4.57E-09	3.19E-07	4.57E-09
Mercury	1.28E-10	1.83E-12	2.27E-10	3.24E-12	9.56E-11	1.37E-12	9.56E-11	1.37E-12
Nickel	8.79E-09	1.26E-10	1.55E-08	2.22E-10	6.55E-09	9.36E-11	6.55E-09	9.36E-11
Potassium	8.13E-07	1.16E-08	1.44E-06	2.06E-08	6.06E-07	8.66E-09	6.06E-07	8.66E-09
Selenium	7.13E-10	1.02E-11	1.26E-09	1.80E-11	5.31E-10	7.60E-12	5.31E-10	7.60E-12
Silver	4.14E-10	5.92E-12	7.33E-10	1.05E-11	3.09E-10	4.41E-12	3.09E-10	4.41E-12
Sodium	2.14E-07	3.06E-09	3.78E-07	5.41E-09	1.59E-07	2.28E-09	1.59E-07	2.28E-09
Thallium	2.34E-10	3.35E-12	4.14E-10	5.92E-12	1.74E-10	2.50E-12	1.74E-10	2.50E-12
Vanadium	1.03E-08	1.48E-10	1.82E-08	2.61E-10	7.68E-09	1.10E-10	7.68E-09	1.10E-10
Zinc	1.59E-07	2.27E-09	2.81E-07	4.02E-09	1.18E-07	1.69E-09	1.18E-07	1.69E-09
Cyanide	4.00E-09	5.72E-11	7.07E-09	1.01E-10	2.98E-09	4.26E-11	2.98E-09	4.26E-11
PESTICIDES/PCBS								
PCB-1242	2.31E-10	3.30E-12	4.09E-10	5.84E-12	1.72E-10	2.46E-12	1.72E-10	2.46E-12
PCB-1254	6.47E-09	9.26E-11	1.14E-08	1.64E-10	4.82E-09	6.90E-11	4.82E-09	6.90E-11
PCB-1260	5.00E-09	7.15E-11	8.85E-09	1.27E-10	3.73E-09	5.33E-11	3.73E-09	5.33E-11
PCB-1248	7.49E-09	1.07E-10	1.32E-08	1.89E-10	5.58E-09	7.98E-11	5.58E-09	7.98E-11
TOTAL	9.52E-05	1.36E-06	1.68E-04	2.41E-06	7.09E-05	1.01E-06	7.09E-05	1.01E-06

Table 4-49

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.41E-01	1.44E-06	2.05E-08	1.07E-10	1.23E-11	3.74E-10	5.36E-12
Carbon Disulfide	3.88E-01	1.26E-06	1.81E-08	9.45E-11	1.08E-11	3.29E-10	4.71E-12
1,1-Dichloroethane	3.88E-01	1.26E-06	1.81E-08	9.45E-11	1.08E-11	3.29E-10	4.71E-12
1,2-Dichloroethene (total)	5.95E-01	1.94E-06	2.77E-08	1.45E-10	1.66E-11	5.05E-10	7.23E-12
Ethylbenzene	3.88E-01	1.26E-06	1.81E-08	9.45E-11	1.08E-11	3.29E-10	4.71E-12
Tetrachloroethene	1.55E+00	5.05E-06	7.22E-08	3.78E-10	4.32E-11	1.32E-09	1.88E-11
Toluene	3.88E-01	1.26E-06	1.81E-08	9.45E-11	1.08E-11	3.29E-10	4.71E-12
Trichloroethene	2.74E+00	8.93E-06	1.28E-07	6.68E-10	7.64E-11	2.33E-09	3.33E-11
Xylene (total)	3.88E-01	1.26E-06	1.81E-08	9.45E-11	1.08E-11	3.29E-10	4.71E-12
SEMI-VOLATILES							
Acenaphthene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Acenaphthylene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Anthracene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Benzo(a)anthracene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Benzo(b)fluoranthene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Benzo(k)fluoranthene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Benzoic acid	8.12E+01	2.64E-04	3.78E-06	1.98E-08	2.26E-09	6.89E-08	9.86E-10
Benzo(a)pyrene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Butylbenzylphthalate	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Chrysene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Dibenzo(a,h)anthracene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
2,4-Dimethylphenol	7.76E+01	2.52E-04	3.61E-06	1.89E-08	2.16E-09	6.58E-08	9.42E-10
bis(2-Ethylhexyl)phthalate	4.49E+01	1.46E-04	2.09E-06	1.10E-08	1.25E-09	3.82E-08	5.46E-10
Fluoranthene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Fluorene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
Indeno(1,2,3-cd)pyrene	1.67E+01	5.45E-05	7.79E-07	4.08E-09	4.66E-10	1.42E-08	2.03E-10
2-Methylnaphthalene	4.15E+00	1.35E-05	1.93E-07	1.01E-09	1.16E-10	3.52E-09	5.04E-11
2-Methylphenol	5.69E+01	1.85E-04	2.65E-06	1.39E-08	1.58E-09	4.83E-08	6.91E-10
4-Methylphenol	4.27E+02	1.39E-03	1.99E-05	1.04E-07	1.19E-08	3.62E-07	5.18E-09
Naphthalene	1.69E+01	5.51E-05	7.89E-07	4.13E-09	4.72E-10	1.44E-08	2.06E-10
Di-n-octylphthalate	1.65E+01	5.36E-05	7.66E-07	4.01E-09	4.59E-10	1.40E-08	2.00E-10
Phenanthrene	2.48E+00	8.09E-06	1.16E-07	6.05E-10	6.92E-11	2.11E-09	3.02E-11
Phenol	2.50E+02	8.14E-04	1.16E-05	6.10E-08	6.97E-09	2.12E-07	3.04E-09
Pyrene	1.64E+01	5.35E-05	7.65E-07	4.01E-09	4.58E-10	1.40E-08	2.00E-10

Table 4-49 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area B

	Upper 95% Confidence Arith. Mean Soil Conc. (mg/kg)	Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	3.40E+04	1.11E-01	1.58E-03	8.28E-06	9.46E-07	2.88E-05	4.13E-07
Antimony	1.85E+02	6.03E-04	8.63E-06	4.52E-08	5.16E-09	1.57E-07	2.25E-09
Arsenic	1.39E+01	4.52E-05	6.46E-07	3.38E-09	3.87E-10	1.18E-08	1.69E-10
Barium	3.04E+03	9.88E-03	1.41E-04	7.40E-07	8.46E-08	2.58E-06	3.69E-08
Beryllium	6.30E+00	2.05E-05	2.93E-07	1.53E-09	1.75E-10	5.34E-09	7.64E-11
Cadmium	9.33E+00	3.04E-05	4.34E-07	2.27E-09	2.60E-10	7.92E-09	1.13E-10
Calcium	2.09E+05	6.80E-01	9.73E-03	5.09E-05	5.82E-06	1.77E-04	2.54E-06
Chromium	1.74E+02	5.65E-04	8.09E-06	4.23E-08	4.84E-09	1.47E-07	2.11E-09
Cobalt	1.33E+01	4.33E-05	6.19E-07	3.24E-09	3.70E-10	1.13E-08	1.61E-10
Copper	6.35E+02	2.07E-03	2.96E-05	1.55E-07	1.77E-08	5.39E-07	7.71E-09
Iron	5.14E+04	1.67E-01	2.39E-03	1.25E-05	1.43E-06	4.36E-05	6.24E-07
Lead	2.45E+03	7.98E-03	1.14E-04	5.97E-07	6.83E-08	2.08E-06	2.98E-08
Magnesium	6.55E+04	2.13E-01	3.05E-03	1.60E-05	1.82E-06	5.56E-05	7.95E-07
Manganese	2.84E+03	9.25E-03	1.32E-04	6.92E-07	7.92E-08	2.41E-06	3.45E-08
Mercury	1.72E-01	5.60E-07	8.01E-09	4.19E-11	4.79E-12	1.46E-10	2.09E-12
Nickel	4.59E+01	1.49E-04	2.14E-06	1.12E-08	1.28E-09	3.90E-08	5.57E-10
Potassium	2.55E+03	8.31E-03	1.19E-04	6.22E-07	7.11E-08	2.17E-06	3.10E-08
Selenium	2.18E+00	7.09E-06	1.01E-07	5.31E-10	6.07E-11	1.85E-09	2.64E-11
Silver	9.37E-01	3.05E-06	4.36E-08	2.28E-10	2.61E-11	7.95E-10	1.14E-11
Sodium	1.58E+03	5.13E-03	7.34E-05	3.84E-07	4.39E-08	1.34E-06	1.91E-08
Thallium	7.01E-01	2.28E-06	3.26E-08	1.71E-10	1.95E-11	5.95E-10	8.51E-12
Vanadium	2.89E+01	9.39E-05	1.34E-06	7.03E-09	8.04E-10	2.45E-08	3.50E-10
Zinc	1.36E+03	4.43E-03	6.34E-05	3.32E-07	3.80E-08	1.16E-06	1.65E-08
Cyanide	6.20E+00	2.02E-05	2.88E-07	1.51E-09	1.73E-10	5.26E-09	7.52E-11
PESTICIDES/PCBS							
PCB-1242	1.66E+01	5.39E-05	7.71E-07	4.04E-09	4.61E-10	1.41E-08	2.01E-10
PCB-1254	3.83E+01	1.25E-04	1.78E-06	9.34E-09	1.07E-09	3.25E-08	4.65E-10
PCB-1260	3.66E+01	1.19E-04	1.71E-06	8.93E-09	1.02E-09	3.11E-08	4.45E-10
PCB-1248	3.44E+01	1.12E-04	1.60E-06	8.39E-09	9.60E-10	2.92E-08	4.18E-10
TOTAL	3.76E+05	1.22E+00	1.75E-02	9.16E-05	1.05E-05	3.19E-04	4.57E-06

Table 4-49 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	4.00E-10	5.72E-12	1.06E-10	1.52E-12	2.05E-10	2.93E-12	2.05E-10	2.93E-12
Carbon Disulfide	3.52E-10	5.03E-12	9.36E-11	1.34E-12	1.80E-10	2.57E-12	1.80E-10	2.57E-12
1,1-Dichloroethane	3.52E-10	5.03E-12	9.36E-11	1.34E-12	1.80E-10	2.57E-12	1.80E-10	2.57E-12
1,2-Dichloroethene (total)	5.39E-10	7.72E-12	1.43E-10	2.05E-12	2.76E-10	3.95E-12	2.76E-10	3.95E-12
Ethylbenzene	3.52E-10	5.03E-12	9.36E-11	1.34E-12	1.80E-10	2.57E-12	1.80E-10	2.57E-12
Tetrachloroethene	1.41E-09	2.01E-11	3.74E-10	5.35E-12	7.19E-10	1.03E-11	7.19E-10	1.03E-11
Toluene	3.52E-10	5.03E-12	9.36E-11	1.34E-12	1.80E-10	2.57E-12	1.80E-10	2.57E-12
Trichloroethene	2.49E-09	3.56E-11	6.62E-10	9.46E-12	1.27E-09	1.82E-11	1.27E-09	1.82E-11
Xylene (total)	3.52E-10	5.03E-12	9.36E-11	1.34E-12	1.80E-10	2.57E-12	1.80E-10	2.57E-12
SEMI-VOLATILES								
Acenaphthene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Acenaphthylene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Anthracene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Benzo(a)anthracene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Benzo(b)fluoranthene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Benzo(k)fluoranthene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Benzoic acid	7.36E-08	1.05E-09	1.96E-08	2.80E-10	3.76E-08	5.38E-10	3.76E-08	5.38E-10
Benzo(a)pyrene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Butylbenzylphthalate	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Chrysene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Dibenzo(a,h)anthracene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
2,4-Dimethylphenol	7.03E-08	1.01E-09	1.87E-08	2.68E-10	3.60E-08	5.15E-10	3.60E-08	5.15E-10
bis(2-Ethylhexyl)phthalate	4.07E-08	5.83E-10	1.08E-08	1.55E-10	2.08E-08	2.98E-10	2.08E-08	2.98E-10
Fluoranthene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Fluorene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
Indeno(1,2,3-cd)pyrene	1.52E-08	2.17E-10	4.04E-09	5.77E-11	7.76E-09	1.11E-10	7.76E-09	1.11E-10
2-Methylnaphthalene	3.76E-09	5.38E-11	1.00E-09	1.43E-11	1.92E-09	2.75E-11	1.92E-09	2.75E-11
2-Methylphenol	5.16E-08	7.38E-10	1.37E-08	1.96E-10	2.64E-08	3.77E-10	2.64E-08	3.77E-10
4-Methylphenol	3.87E-07	5.54E-09	1.03E-07	1.47E-09	1.98E-07	2.83E-09	1.98E-07	2.83E-09
Naphthalene	1.54E-08	2.20E-10	4.09E-09	5.84E-11	7.86E-09	1.12E-10	7.86E-09	1.12E-10
Di-n-octylphthalate	1.49E-08	2.13E-10	3.97E-09	5.68E-11	7.64E-09	1.09E-10	7.64E-09	1.09E-10
Phenanthrene	2.25E-09	3.22E-11	5.99E-10	8.57E-12	1.15E-09	1.65E-11	1.15E-09	1.65E-11
Phenol	2.27E-07	3.24E-09	6.03E-08	8.63E-10	1.16E-07	1.66E-09	1.16E-07	1.66E-09
Pyrene	1.49E-08	2.13E-10	3.96E-09	5.67E-11	7.63E-09	1.09E-10	7.63E-09	1.09E-10

Table 4-40 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area B

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	3.08E-05	4.41E-07	8.19E-06	1.17E-07	1.58E-05	2.25E-07	1.58E-05	2.25E-07
Antimony	1.68E-07	2.40E-09	4.47E-08	6.40E-10	8.60E-08	1.23E-09	8.60E-08	1.23E-09
Arsenic	1.26E-08	1.80E-10	3.35E-09	4.79E-11	6.44E-09	9.21E-11	6.44E-09	9.21E-11
Barium	2.75E-06	3.94E-08	7.32E-07	1.05E-08	1.41E-06	2.01E-08	1.41E-06	2.01E-08
Beryllium	5.71E-09	8.16E-11	1.52E-09	2.17E-11	2.92E-09	4.18E-11	2.92E-09	4.18E-11
Cadmium	8.46E-09	1.21E-10	2.25E-09	3.22E-11	4.33E-09	6.19E-11	4.33E-09	6.19E-11
Calcium	1.89E-04	2.71E-06	5.04E-05	7.21E-07	9.69E-05	1.39E-06	9.69E-05	1.39E-06
Chromium	1.57E-07	2.25E-09	4.19E-08	5.99E-10	8.06E-08	1.15E-09	8.06E-08	1.15E-09
Cobalt	1.21E-08	1.72E-10	3.21E-09	4.59E-11	6.17E-09	8.82E-11	6.17E-09	8.82E-11
Copper	5.75E-07	8.23E-09	1.53E-07	2.19E-09	2.94E-07	4.21E-09	2.94E-07	4.21E-09
Iron	4.66E-05	6.66E-07	1.24E-05	1.77E-07	2.38E-05	3.41E-07	2.38E-05	3.41E-07
Lead	2.22E-06	3.18E-08	5.91E-07	8.46E-09	1.14E-06	1.63E-08	1.14E-06	1.63E-08
Magnesium	5.94E-05	8.49E-07	1.58E-05	2.26E-07	3.04E-05	4.34E-07	3.04E-05	4.34E-07
Manganese	2.58E-06	3.68E-08	6.85E-07	9.80E-09	1.32E-06	1.89E-08	1.32E-06	1.89E-08
Mercury	1.56E-10	2.23E-12	4.15E-11	5.93E-13	7.98E-11	1.14E-12	7.98E-11	1.14E-12
Nickel	4.16E-08	5.95E-10	1.11E-08	1.58E-10	2.13E-08	3.05E-10	2.13E-08	3.05E-10
Potassium	2.32E-06	3.31E-08	6.16E-07	8.81E-09	1.18E-06	1.69E-08	1.18E-06	1.69E-08
Selenium	1.97E-09	2.82E-11	5.25E-10	7.51E-12	1.01E-09	1.45E-11	1.01E-09	1.45E-11
Silver	8.49E-10	1.21E-11	2.26E-10	3.23E-12	4.35E-10	6.22E-12	4.35E-10	6.22E-12
Sodium	1.43E-06	2.04E-08	3.80E-07	5.44E-09	7.31E-07	1.05E-08	7.31E-07	1.05E-08
Thallium	6.35E-10	9.09E-12	1.69E-10	2.42E-12	3.25E-10	4.65E-12	3.25E-10	4.65E-12
Vanadium	2.62E-08	3.74E-10	6.96E-09	9.95E-11	1.34E-08	1.91E-10	1.34E-08	1.91E-10
Zinc	1.24E-06	1.77E-08	3.29E-07	4.70E-09	6.32E-07	9.04E-09	6.32E-07	9.04E-09
Cyanide	5.62E-09	8.03E-11	1.49E-09	2.14E-11	2.87E-09	4.11E-11	2.87E-09	4.11E-11
PESTICIDES/PCBS								
PCB-1242	1.50E-08	2.15E-10	3.99E-09	5.71E-11	7.68E-09	1.10E-10	7.68E-09	1.10E-10
PCB-1254	3.47E-08	4.97E-10	9.24E-09	1.32E-10	1.78E-08	2.54E-10	1.78E-08	2.54E-10
PCB-1260	3.32E-08	4.75E-10	8.83E-09	1.26E-10	1.70E-08	2.43E-10	1.70E-08	2.43E-10
PCB-1248	3.12E-08	4.47E-10	8.31E-09	1.19E-10	1.60E-08	2.29E-10	1.60E-08	2.29E-10
TOTAL	3.41E-04	4.88E-06	9.07E-05	1.30E-06	1.74E-04	2.49E-06	1.74E-04	2.49E-06

Table 4-50
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area C

		Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	4.00E-03	2.37E-08	3.39E-10	3.79E-13	4.34E-14	6.44E-12	9.21E-14
Carbon Disulfide	5.00E-03	2.96E-08	4.24E-10	4.74E-13	5.42E-14	8.05E-12	1.15E-13
1,1-Dichloroethane	3.00E-03	1.78E-08	2.54E-10	2.85E-13	3.25E-14	4.83E-12	6.91E-14
1,2-Dichloroethene (total)	6.50E-02	3.85E-07	5.51E-09	6.17E-12	7.05E-13	1.05E-10	1.50E-12
Ethylbenzene	6.00E-03	3.56E-08	5.09E-10	5.69E-13	6.51E-14	9.66E-12	1.38E-13
Tetrachloroethene	7.00E-03	4.15E-08	5.94E-10	6.64E-13	7.59E-14	1.13E-11	1.61E-13
Toluene	1.40E-02	8.30E-08	1.19E-09	1.33E-12	1.52E-13	2.25E-11	3.22E-13
Trichloroethene	1.90E-02	1.13E-07	1.61E-09	1.80E-12	2.06E-13	3.06E-11	4.38E-13
Xylene (total)	3.60E-02	2.13E-07	3.05E-09	3.42E-12	3.90E-13	5.80E-11	8.29E-13
SEMI-VOLATILES							
Acenaphthene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Acenaphthylene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Anthracene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Benzo(a)anthracene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Benzo(b)fluoranthene	1.80E+00	1.07E-05	1.53E-07	1.71E-10	1.95E-11	2.90E-09	4.14E-11
Benzo(k)fluoranthene	8.10E-01	4.80E-06	6.87E-08	7.68E-11	8.78E-12	1.30E-09	1.87E-11
Benzoic acid	6.82E+00	4.04E-05	5.78E-07	6.47E-10	7.39E-11	1.10E-08	1.57E-10
Benzo(a)pyrene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Butylbenzylphthalate	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Chrysene	1.10E+00	6.52E-06	9.33E-08	1.04E-10	1.19E-11	1.77E-09	2.53E-11
Dibenzo(a,h)anthracene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
2,4-Dimethylphenol	7.50E-01	4.45E-06	6.36E-08	7.11E-11	8.13E-12	1.21E-09	1.73E-11
bis(2-Ethylhexyl)phthalate	8.20E+00	4.86E-05	6.95E-07	7.78E-10	8.89E-11	1.32E-08	1.89E-10
Fluoranthene	1.50E+00	8.89E-06	1.27E-07	1.42E-10	1.63E-11	2.41E-09	3.45E-11
Fluorene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Indeno(1,2,3-cd)pyrene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
2-Methylnaphthalene	1.10E+00	6.52E-06	9.33E-08	1.04E-10	1.19E-11	1.77E-09	2.53E-11
2-Methylphenol	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
4-Methylphenol	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Naphthalene	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Di-n-octylphthalate	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Phenanthrene	1.70E+00	1.01E-05	1.44E-07	1.61E-10	1.84E-11	2.74E-09	3.91E-11
Phenol	1.41E+00	8.33E-06	1.19E-07	1.33E-10	1.52E-11	2.26E-09	3.24E-11
Pyrene	1.90E+00	1.13E-05	1.61E-07	1.80E-10	2.06E-11	3.06E-09	4.38E-11

Table 4-50 (cont'd)
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area C

		Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS							
Aluminum	1.33E+04	7.88E-02	1.13E-03	1.26E-06	1.44E-07	2.14E-05	3.06E-07
Antimony	4.80E+00	2.85E-05	4.07E-07	4.55E-10	5.21E-11	7.73E-09	1.11E-10
Arsenic	2.12E+01	1.26E-04	1.80E-06	2.01E-09	2.30E-10	3.41E-08	4.88E-10
Barium	2.37E+02	1.40E-03	2.01E-05	2.25E-08	2.57E-09	3.82E-07	5.46E-09
Beryllium	9.70E-01	5.75E-06	8.22E-08	9.20E-11	1.05E-11	1.56E-09	2.23E-11
Cadmium	2.40E+00	1.42E-05	2.03E-07	2.28E-10	2.60E-11	3.86E-09	5.53E-11
Calcium	7.33E+04	4.35E-01	6.22E-03	6.95E-06	7.95E-07	1.18E-04	1.69E-06
Chromium	2.97E+01	1.76E-04	2.52E-06	2.82E-09	3.22E-10	4.78E-08	6.84E-10
Cobalt	8.10E+00	4.80E-05	6.87E-07	7.68E-10	8.78E-11	1.30E-08	1.87E-10
Copper	7.39E+01	4.38E-04	6.27E-06	7.01E-09	8.01E-10	1.19E-07	1.70E-09
Iron	2.38E+04	1.41E-01	2.02E-03	2.26E-06	2.58E-07	3.83E-05	5.48E-07
Lead	7.44E+02	4.41E-03	6.31E-05	7.06E-08	8.07E-09	1.20E-06	1.71E-08
Magnesium	2.53E+04	1.50E-01	2.15E-03	2.40E-06	2.74E-07	4.07E-05	5.83E-07
Manganese	7.45E+02	4.42E-03	6.32E-05	7.07E-08	8.08E-09	1.20E-06	1.72E-08
Mercury	2.30E-01	1.36E-06	1.95E-08	2.18E-11	2.49E-12	3.70E-10	5.30E-12
Nickel	2.24E+01	1.33E-04	1.90E-06	2.12E-09	2.43E-10	3.61E-08	5.16E-10
Potassium	1.99E+03	1.18E-02	1.69E-04	1.89E-07	2.16E-08	3.20E-06	4.58E-08
Selenium	6.70E-01	3.97E-06	5.68E-08	6.36E-11	7.27E-12	1.08E-09	1.54E-11
Silver	8.30E-01	4.92E-06	7.04E-08	7.87E-11	9.00E-12	1.34E-09	1.91E-11
Sodium	3.01E+02	1.78E-03	2.55E-05	2.86E-08	3.26E-09	4.85E-07	6.93E-09
Thallium	4.20E-01	2.49E-06	3.56E-08	3.98E-11	4.55E-12	6.76E-10	9.67E-12
Vanadium	2.17E+01	1.29E-04	1.84E-06	2.06E-09	2.35E-10	3.49E-08	5.00E-10
Zinc	3.43E+02	2.03E-03	2.91E-05	3.25E-08	3.72E-09	5.52E-07	7.90E-09
Cyanide	5.40E-01	3.20E-06	4.58E-08	5.12E-11	5.86E-12	8.69E-10	1.24E-11
PESTICIDES/PCBS *							
PCB-1242	1.45E+00	8.62E-06	1.23E-07	1.38E-10	1.58E-11	2.34E-09	3.35E-11
PCB-1254	5.57E+01	3.30E-04	4.72E-06	5.28E-09	6.04E-10	8.97E-08	1.28E-09
PCB-1260	6.23E+00	3.69E-05	5.28E-07	5.91E-10	6.75E-11	1.00E-08	1.43E-10
PCB-1248	3.32E+01	1.97E-04	2.82E-06	3.15E-09	3.60E-10	5.35E-08	7.65E-10
TOTAL	1.40E+05	8.32E-01	1.19E-02	1.33E-05	1.52E-06	2.26E-04	3.23E-06

* 95% Confidence Arithmetic Mean Used for Pesticides/PCB's

Table 4-50 (cont'd)
Inhalation Exposure Doses
 Due to Fugitive Dust Releases
 From Construction On-Site
 Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	8.70E-12	1.24E-13	6.31E-13	9.03E-15	1.77E-12	2.53E-14	1.77E-12	2.53E-14
Carbon Disulfide	1.09E-11	1.56E-13	7.89E-13	1.13E-14	2.21E-12	3.17E-14	2.21E-12	3.17E-14
1,1-Dichloroethane	6.53E-12	9.33E-14	4.73E-13	6.77E-15	1.33E-12	1.90E-14	1.33E-12	1.90E-14
1,2-Dichloroethene (total)	1.41E-10	2.02E-12	1.03E-11	1.47E-13	2.88E-11	4.12E-13	2.88E-11	4.12E-13
Ethylbenzene	1.31E-11	1.87E-13	9.47E-13	1.35E-14	2.66E-12	3.80E-14	2.66E-12	3.80E-14
Tetrachloroethene	1.52E-11	2.18E-13	1.10E-12	1.58E-14	3.10E-12	4.43E-14	3.10E-12	4.43E-14
Toluene	3.05E-11	4.36E-13	2.21E-12	3.16E-14	6.20E-12	8.87E-14	6.20E-12	8.87E-14
Trichloroethene	4.13E-11	5.91E-13	3.00E-12	4.29E-14	8.41E-12	1.20E-13	8.41E-12	1.20E-13
Xylene (total)	7.83E-11	1.12E-12	5.68E-12	8.13E-14	1.59E-11	2.28E-13	1.59E-11	2.28E-13
SEMI-VOLATILES								
Acenaphthene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Acenaphthylene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Anthracene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Benzo(a)anthracene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Benzo(b)fluoranthene	3.92E-09	5.60E-11	2.84E-10	4.06E-12	7.97E-10	1.14E-11	7.97E-10	1.14E-11
Benzo(k)fluoranthene	1.76E-09	2.52E-11	1.28E-10	1.83E-12	3.59E-10	5.13E-12	3.59E-10	5.13E-12
Benzoic acid	1.48E-08	2.12E-10	1.08E-09	1.54E-11	3.02E-09	4.32E-11	3.02E-09	4.32E-11
Benzo(a)pyrene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Butylbenzylphthalate	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Chrysene	2.39E-09	3.42E-11	1.74E-10	2.48E-12	4.87E-10	6.97E-12	4.87E-10	6.97E-12
Dibenzo(a,h)anthracene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
2,4-Dimethylphenol	1.63E-09	2.33E-11	1.18E-10	1.69E-12	3.32E-10	4.75E-12	3.32E-10	4.75E-12
bis(2-Ethylhexyl)phthalate	1.78E-08	2.55E-10	1.29E-09	1.85E-11	3.63E-09	5.19E-11	3.63E-09	5.19E-11
Fluoranthene	3.26E-09	4.67E-11	2.37E-10	3.39E-12	6.64E-10	9.50E-12	6.64E-10	9.50E-12
Fluorene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Indeno(1,2,3-cd)pyrene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
2-Methylnaphthalene	2.39E-09	3.42E-11	1.74E-10	2.48E-12	4.87E-10	6.97E-12	4.87E-10	6.97E-12
2-Methylphenol	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
4-Methylphenol	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Naphthalene	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Di-n-octylphthalate	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Phenanthrene	3.70E-09	5.29E-11	2.68E-10	3.84E-12	7.53E-10	1.08E-11	7.53E-10	1.08E-11
Phenol	3.06E-09	4.37E-11	2.22E-10	3.17E-12	6.23E-10	8.90E-12	6.23E-10	8.90E-12
Pyrene	4.13E-09	5.91E-11	3.00E-10	4.29E-12	8.41E-10	1.20E-11	8.41E-10	1.20E-11

Table 4-50 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area C

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	2.89E-05	4.14E-07	2.10E-06	3.00E-08	5.89E-06	8.42E-08	5.89E-06	8.42E-08
Antimony	1.04E-08	1.49E-10	7.57E-10	1.08E-11	2.13E-09	3.04E-11	2.13E-09	3.04E-11
Arsenic	4.61E-08	6.60E-10	3.35E-09	4.78E-11	9.39E-09	1.34E-10	9.39E-09	1.34E-10
Barium	5.16E-07	7.37E-09	3.74E-08	5.35E-10	1.05E-07	1.50E-09	1.05E-07	1.50E-09
Beryllium	2.11E-09	3.02E-11	1.53E-10	2.19E-12	4.29E-10	6.14E-12	4.29E-10	6.14E-12
Cadmium	5.22E-09	7.47E-11	3.79E-10	5.42E-12	1.06E-09	1.52E-11	1.06E-09	1.52E-11
Calcium	1.59E-04	2.28E-06	1.16E-05	1.65E-07	3.25E-05	4.64E-07	3.25E-05	4.64E-07
Chromium	6.46E-08	9.24E-10	4.69E-09	6.70E-11	1.32E-08	1.88E-10	1.32E-08	1.88E-10
Cobalt	1.76E-08	2.52E-10	1.28E-09	1.83E-11	3.59E-09	5.13E-11	3.59E-09	5.13E-11
Copper	1.61E-07	2.30E-09	1.17E-08	1.67E-10	3.27E-08	4.68E-10	3.27E-08	4.68E-10
Iron	5.18E-05	7.41E-07	3.76E-06	5.37E-08	1.05E-05	1.51E-07	1.05E-05	1.51E-07
Lead	1.62E-06	2.31E-08	1.17E-07	1.68E-09	3.29E-07	4.71E-09	3.29E-07	4.71E-09
Magnesium	5.50E-05	7.87E-07	3.99E-06	5.71E-08	1.12E-05	1.60E-07	1.12E-05	1.60E-07
Manganese	1.62E-06	2.32E-08	1.18E-07	1.68E-09	3.30E-07	4.72E-09	3.30E-07	4.72E-09
Mercury	5.00E-10	7.16E-12	3.63E-11	5.19E-13	1.02E-10	1.46E-12	1.02E-10	1.46E-12
Nickel	4.87E-08	6.97E-10	3.53E-09	5.06E-11	9.92E-09	1.42E-10	9.92E-09	1.42E-10
Potassium	4.33E-06	6.19E-08	3.14E-07	4.49E-09	8.81E-07	1.26E-08	8.81E-07	1.26E-08
Selenium	1.46E-09	2.08E-11	1.06E-10	1.51E-12	2.97E-10	4.24E-12	2.97E-10	4.24E-12
Silver	1.81E-09	2.58E-11	1.31E-10	1.87E-12	3.68E-10	5.26E-12	3.68E-10	5.26E-12
Sodium	6.55E-07	9.37E-09	4.75E-08	6.79E-10	1.33E-07	1.91E-09	1.33E-07	1.91E-09
Thallium	9.14E-10	1.31E-11	6.63E-11	9.48E-13	1.86E-10	2.66E-12	1.86E-10	2.66E-12
Vanadium	4.72E-08	6.75E-10	3.42E-09	4.90E-11	9.61E-09	1.37E-10	9.61E-09	1.37E-10
Zinc	7.46E-07	1.07E-08	5.41E-08	7.74E-10	1.52E-07	2.17E-09	1.52E-07	2.17E-09
Cyanide	1.17E-09	1.68E-11	8.52E-11	1.22E-12	2.39E-10	3.42E-12	2.39E-10	3.42E-12
PESTICIDES/PCBS *								
PCB-1242	3.16E-09	4.52E-11	2.29E-10	3.28E-12	6.44E-10	9.21E-12	6.44E-10	9.21E-12
PCB-1254	1.21E-07	1.73E-09	8.79E-09	1.26E-10	2.47E-08	3.53E-10	2.47E-08	3.53E-10
PCB-1260	1.35E-08	1.94E-10	9.82E-10	1.41E-11	2.76E-09	3.94E-11	2.76E-09	3.94E-11
PCB-1248	7.23E-08	1.03E-09	5.24E-09	7.50E-11	1.47E-08	2.10E-10	1.47E-08	2.10E-10
TOTAL	3.05E-04	4.37E-06	2.22E-05	3.17E-07	6.22E-05	8.89E-07	6.22E-05	8.89E-07

Table 4-51
Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area D

		Constr. Wrkrs On-Site	Constr. Wrkrs On-Site	Children Playground	Children Playground	Residential N. Marion St.	Residential N. Marion St.
	Soil Conc.	Non-Carc.	Carcinogenic	Non-Carc.	Carcinogenic	Non-Carc.	Carcinogenic
	(mg/kg)	Inhal. Dose (mg/kg-day)	Inhal. Dose (mg/kg-day)	Inhal. Dose (mg/kg-day)	Inhal. Dose (mg/kg-day)	Inhal. Dose (mg/kg-day)	Inhal. Dose (mg/kg-day)
VOLATILES							
Benzene	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Carbon Disulfide	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
1,1-Dichloroethane	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
1,2-Dichloroethene (total)	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Ethylbenzene	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Tetrachloroethene	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Toluene	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Trichloroethene	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
Xylene (total)	3.00E-03	9.71E-09	1.39E-10	2.46E-13	2.81E-14	5.98E-12	8.55E-14
SEMI-VOLATILES							
Acenaphthene	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Acenaphthylene	1.40E-01	4.53E-07	6.48E-09	1.15E-11	1.31E-12	2.79E-10	3.99E-12
Anthracene	8.70E-02	2.82E-07	4.03E-09	7.12E-12	8.14E-13	1.73E-10	2.48E-12
Benzo(a)anthracene	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Benzo(b)fluoranthene	1.50E+00	4.86E-06	6.95E-08	1.23E-10	1.40E-11	2.99E-09	4.28E-11
Benzo(k)fluoranthene	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Benzoic acid	2.00E-01	6.47E-07	9.26E-09	1.64E-11	1.87E-12	3.99E-10	5.70E-12
Benzo(a)pyrene	9.90E-01	3.21E-06	4.58E-08	8.11E-11	9.27E-12	1.97E-09	2.82E-11
Butylbenzylphthalate	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Chrysene	1.20E+00	3.88E-06	5.56E-08	9.82E-11	1.12E-11	2.39E-09	3.42E-11
Dibenzo(a,h)anthracene	1.20E-01	3.88E-07	5.56E-09	9.82E-12	1.12E-12	2.39E-10	3.42E-12
2,4-Dimethylphenol	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
bis(2-Ethylhexyl)phthalate	3.30E+00	1.07E-05	1.53E-07	2.70E-10	3.09E-11	6.58E-09	9.41E-11
Fluoranthene	2.20E+00	7.12E-06	1.02E-07	1.80E-10	2.06E-11	4.38E-09	6.27E-11
Fluorene	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Indeno(1,2,3-cd)pyrene	9.00E-01	2.91E-06	4.17E-08	7.37E-11	8.42E-12	1.79E-09	2.57E-11
2-Methylnaphthalene	1.20E-01	3.88E-07	5.56E-09	9.82E-12	1.12E-12	2.39E-10	3.42E-12
2-Methylphenol	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
4-Methylphenol	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Naphthalene	6.80E-02	2.20E-07	3.15E-09	5.57E-12	6.36E-13	1.35E-10	1.94E-12
Di-n-octylphthalate	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Phenanthrene	6.20E-01	2.01E-06	2.87E-08	5.08E-11	5.80E-12	1.24E-09	1.77E-11
Phenol	4.06E-01	1.31E-06	1.88E-08	3.32E-11	3.80E-12	8.09E-10	1.16E-11
Pyrene	1.30E+00	4.21E-06	6.02E-08	1.06E-10	1.22E-11	2.59E-09	3.71E-11

Table 4-51 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area D

		Constr. Wrkrs On-Site Non-Carc. Inhal. Dose (mg/kg-day)	Constr. Wrkrs On-Site Carcinogenic Inhal. Dose (mg/kg-day)	Children Playground Non-Carc. Inhal. Dose (mg/kg-day)	Children Playground Carcinogenic Inhal. Dose (mg/kg-day)	Residential N. Marion St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential N. Marion St. Carcinogenic Inhal. Dose (mg/kg-day)
Soil Conc. (mg/kg)							
INORGANICS							
Aluminum	1.54E+04	4.99E-02	7.13E-04	1.26E-06	1.44E-07	3.07E-05	4.39E-07
Antimony	4.20E+00	1.36E-05	1.94E-07	3.44E-10	3.93E-11	8.37E-09	1.20E-10
Arsenic	8.07E+01	2.61E-04	3.74E-06	6.61E-09	7.55E-10	1.61E-07	2.30E-09
Barium	2.81E+02	9.10E-04	1.30E-05	2.30E-08	2.63E-09	5.60E-07	8.01E-09
Beryllium	9.90E-01	3.21E-06	4.58E-08	8.11E-11	9.27E-12	1.97E-09	2.82E-11
Cadmium	2.90E+00	9.39E-06	1.34E-07	2.37E-10	2.71E-11	5.78E-09	8.27E-11
Calcium	2.58E+04	8.35E-02	1.19E-03	2.11E-06	2.41E-07	5.14E-05	7.35E-07
Chromium	3.12E+01	1.01E-04	1.44E-06	2.55E-09	2.92E-10	6.22E-08	8.89E-10
Cobalt	1.54E+01	4.99E-05	7.13E-07	1.26E-09	1.44E-10	3.07E-08	4.39E-10
Copper	8.99E+01	2.91E-04	4.16E-06	7.36E-09	8.41E-10	1.79E-07	2.56E-09
Iron	5.65E+04	1.83E-01	2.62E-03	4.63E-06	5.29E-07	1.13E-04	1.61E-06
Lead	4.69E+02	1.52E-03	2.17E-05	3.84E-08	4.39E-09	9.35E-07	1.34E-08
Magnesium	1.24E+04	4.01E-02	5.74E-04	1.02E-06	1.16E-07	2.47E-05	3.53E-07
Manganese	7.51E+02	2.43E-03	3.48E-05	6.15E-08	7.03E-09	1.50E-06	2.14E-08
Mercury	3.10E-01	1.00E-06	1.44E-08	2.54E-11	2.90E-12	6.18E-10	8.84E-12
Nickel	2.90E+01	9.39E-05	1.34E-06	2.37E-09	2.71E-10	5.78E-08	8.27E-10
Potassium	2.42E+03	7.83E-03	1.12E-04	1.98E-07	2.26E-08	4.82E-06	6.90E-08
Selenium	1.50E+00	4.86E-06	6.95E-08	1.23E-10	1.40E-11	2.99E-09	4.28E-11
Silver	9.30E-01	3.01E-06	4.31E-08	7.61E-11	8.70E-12	1.85E-09	2.65E-11
Sodium	2.86E+02	9.26E-04	1.32E-05	2.34E-08	2.68E-09	5.70E-07	8.15E-09
Thallium	6.20E-01	2.01E-06	2.87E-08	5.08E-11	5.80E-12	1.24E-09	1.77E-11
Vanadium	4.56E+01	1.48E-04	2.11E-06	3.73E-09	4.27E-10	9.09E-08	1.30E-09
Zinc	9.40E+02	3.04E-03	4.35E-05	7.70E-08	8.80E-09	1.87E-06	2.68E-08
Cyanide	7.50E-01	2.43E-06	3.47E-08	6.14E-11	7.02E-12	1.49E-09	2.14E-11
PESTICIDES/PCBS *							
PCB-1242	9.80E-02	3.17E-07	4.54E-09	8.02E-12	9.17E-13	1.95E-10	2.79E-12
PCB-1254	1.98E-01	6.41E-07	9.17E-09	1.62E-11	1.85E-12	3.95E-10	5.64E-12
PCB-1260	1.98E-01	6.41E-07	9.17E-09	1.62E-11	1.85E-12	3.95E-10	5.64E-12
PCB-1248	9.80E-02	3.17E-07	4.54E-09	8.02E-12	9.17E-13	1.95E-10	2.79E-12
TOTAL	1.16E+05	3.74E-01	5.35E-03	9.46E-06	1.08E-06	2.30E-04	3.29E-06

* 95% Confidence Arithmetic Mean used for Pesticides/PCBs

Table 4-51 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
VOLATILES								
Benzene	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Carbon Disulfide	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
1,1-Dichloroethane	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
1,2-Dichloroethene (total)	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Ethylbenzene	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Tetrachloroethene	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Toluene	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Trichloroethene	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
Xylene (total)	2.27E-12	3.24E-14	3.16E-13	4.52E-15	1.25E-12	1.79E-14	1.25E-12	1.79E-14
SEMI-VOLATILES								
Acenaphthene	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Acenaphthylene	1.06E-10	1.51E-12	1.48E-11	2.11E-13	5.86E-11	8.38E-13	5.86E-11	8.38E-13
Anthracene	6.57E-11	9.40E-13	9.17E-12	1.31E-13	3.64E-11	5.21E-13	3.64E-11	5.21E-13
Benzo(a)anthracene	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Benzo(b)fluoranthene	1.13E-09	1.62E-11	1.58E-10	2.26E-12	6.27E-10	8.97E-12	6.27E-10	8.97E-12
Benzo(k)fluoranthene	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Benzoic acid	1.51E-10	2.16E-12	2.11E-11	3.02E-13	8.37E-11	1.20E-12	8.37E-11	1.20E-12
Benzo(a)pyrene	7.48E-10	1.07E-11	1.04E-10	1.49E-12	4.14E-10	5.92E-12	4.14E-10	5.92E-12
Butylbenzylphthalate	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Chrysene	9.07E-10	1.30E-11	1.27E-10	1.81E-12	5.02E-10	7.18E-12	5.02E-10	7.18E-12
Dibenzo(a,h)anthracene	9.07E-11	1.30E-12	1.27E-11	1.81E-13	5.02E-11	7.18E-13	5.02E-11	7.18E-13
2,4-Dimethylphenol	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
bis(2-Ethylhexyl)phthalate	2.49E-09	3.57E-11	3.48E-10	4.98E-12	1.38E-09	1.97E-11	1.38E-09	1.97E-11
Fluoranthene	1.66E-09	2.38E-11	2.32E-10	3.32E-12	9.20E-10	1.32E-11	9.20E-10	1.32E-11
Fluorene	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Indeno(1,2,3-cd)pyrene	6.80E-10	9.73E-12	9.49E-11	1.36E-12	3.76E-10	5.38E-12	3.76E-10	5.38E-12
2-Methylnaphthalene	9.07E-11	1.30E-12	1.27E-11	1.81E-13	5.02E-11	7.18E-13	5.02E-11	7.18E-13
2-Methylphenol	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
4-Methylphenol	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Naphthalene	5.14E-11	7.35E-13	7.17E-12	1.03E-13	2.84E-11	4.07E-13	2.84E-11	4.07E-13
Di-n-octylphthalate	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Phenanthrene	4.69E-10	6.70E-12	6.54E-11	9.35E-13	2.59E-10	3.71E-12	2.59E-10	3.71E-12
Phenol	3.07E-10	4.39E-12	4.28E-11	6.12E-13	1.70E-10	2.43E-12	1.70E-10	2.43E-12
Pyrene	9.82E-10	1.41E-11	1.37E-10	1.96E-12	5.44E-10	7.78E-12	5.44E-10	7.78E-12

Table 4-51 (cont'd)

Inhalation Exposure Doses
Due to Fugitive Dust Releases
From Construction On-Site
Surficial Soil - Area D

	Commercial Robinson St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Robinson St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial River Road Non-Carc. Inhal. Dose (mg/kg-day)	Commercial River Road Carcinogenic Inhal. Dose (mg/kg-day)	Residential Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Residential Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)	Commercial Sommer St. Non-Carc. Inhal. Dose (mg/kg-day)	Commercial Sommer St. Carcinogenic Inhal. Dose (mg/kg-day)
INORGANICS								
Aluminum	1.16E-05	1.66E-07	1.62E-06	2.32E-08	6.44E-06	9.21E-08	6.44E-06	9.21E-08
Antimony	3.17E-09	4.54E-11	4.43E-10	6.33E-12	1.76E-09	2.51E-11	1.76E-09	2.51E-11
Arsenic	6.10E-08	8.72E-10	8.51E-09	1.22E-10	3.38E-08	4.83E-10	3.38E-08	4.83E-10
Barium	2.12E-07	3.04E-09	2.96E-08	4.24E-10	1.18E-07	1.68E-09	1.18E-07	1.68E-09
Beryllium	7.48E-10	1.07E-11	1.04E-10	1.49E-12	4.14E-10	5.92E-12	4.14E-10	5.92E-12
Cadmium	2.19E-09	3.13E-11	3.06E-10	4.37E-12	1.21E-09	1.74E-11	1.21E-09	1.74E-11
Calcium	1.95E-05	2.79E-07	2.72E-06	3.89E-08	1.08E-05	1.54E-07	1.08E-05	1.54E-07
Chromium	2.36E-08	3.37E-10	3.29E-09	4.71E-11	1.31E-08	1.87E-10	1.31E-08	1.87E-10
Cobalt	1.16E-08	1.66E-10	1.62E-09	2.32E-11	6.44E-09	9.21E-11	6.44E-09	9.21E-11
Copper	6.79E-08	9.72E-10	9.48E-09	1.36E-10	3.76E-08	5.38E-10	3.76E-08	5.38E-10
Iron	4.27E-05	6.11E-07	5.96E-06	8.52E-08	2.36E-05	3.38E-07	2.36E-05	3.38E-07
Lead	3.54E-07	5.07E-09	4.95E-08	7.07E-10	1.96E-07	2.81E-09	1.96E-07	2.81E-09
Magnesium	9.37E-06	1.34E-07	1.31E-06	1.87E-08	5.19E-06	7.42E-08	5.19E-06	7.42E-08
Manganese	5.68E-07	8.12E-09	7.92E-08	1.13E-09	3.14E-07	4.49E-09	3.14E-07	4.49E-09
Mercury	2.34E-10	3.35E-12	3.27E-11	4.68E-13	1.30E-10	1.85E-12	1.30E-10	1.85E-12
Nickel	2.19E-08	3.13E-10	3.06E-09	4.37E-11	1.21E-08	1.74E-10	1.21E-08	1.74E-10
Potassium	1.83E-06	2.62E-08	2.55E-07	3.65E-09	1.01E-06	1.45E-08	1.01E-06	1.45E-08
Selenium	1.13E-09	1.62E-11	1.58E-10	2.26E-12	6.27E-10	8.97E-12	6.27E-10	8.97E-12
Silver	7.03E-10	1.01E-11	9.81E-11	1.40E-12	3.89E-10	5.56E-12	3.89E-10	5.56E-12
Sodium	2.16E-07	3.09E-09	3.02E-08	4.31E-10	1.20E-07	1.71E-09	1.20E-07	1.71E-09
Thallium	4.69E-10	6.70E-12	6.54E-11	9.35E-13	2.59E-10	3.71E-12	2.59E-10	3.71E-12
Vanadium	3.45E-08	4.93E-10	4.81E-09	6.88E-11	1.91E-08	2.73E-10	1.91E-08	2.73E-10
Zinc	7.10E-07	1.02E-08	9.91E-08	1.42E-09	3.93E-07	5.62E-09	3.93E-07	5.62E-09
Cyanide	5.67E-10	8.11E-12	7.91E-11	1.13E-12	3.14E-10	4.49E-12	3.14E-10	4.49E-12
PESTICIDES/PCBS *								
PCB-1242	7.41E-11	1.06E-12	1.03E-11	1.48E-13	4.10E-11	5.86E-13	4.10E-11	5.86E-13
PCB-1254	1.50E-10	2.14E-12	2.09E-11	2.99E-13	8.28E-11	1.18E-12	8.28E-11	1.18E-12
PCB-1260	1.50E-10	2.14E-12	2.09E-11	2.99E-13	8.28E-11	1.18E-12	8.28E-11	1.18E-12
PCB-1248	7.41E-11	1.06E-12	1.03E-11	1.48E-13	4.10E-11	5.86E-13	4.10E-11	5.86E-13
TOTAL	8.73E-05	1.25E-06	1.22E-05	1.74E-07	4.83E-05	6.91E-07	4.83E-05	6.91E-07

Table 4-52 presents the total inhalation doses calculated for populations exposed to fugitive dusts from construction activities at the Booth Oil Site. The doses presented in Table 4-52 range from 1.86E-04 mg/kg-day for children at the playground to 3.19 mg/kg-day for unprotected construction workers on-site. These doses are approximately three to four orders of magnitude greater than those calculated for construction traffic on-site (see Table 4-47), and four to five orders of magnitude greater than the total doses calculated for recreational and parking traffic on-site.

The total inhalation doses for each population are calculated as the sum of the source-specific inhalation doses. Table 4-53 presents the total inhalation exposure doses calculated for the Booth Oil Site. Review of the table indicates that the highest total inhalation exposure doses are calculated for unprotected construction workers on-site. Comparison of the total inhalation doses calculated for children with the total ingestion doses presented in Table 4-30 indicates that the total ingestion doses are two orders of magnitude greater than the inhalation doses. Accordingly, ingestion exposure is expected to contribute more significantly than inhalation exposure to the total risks posed to children.

4.5 Dermal Exposure

Table 4-52
Total Inhalation Exposure Doses Due to
Fugitive Dust Releases From
Construction Activities On-site

Receptor	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	1.10E-02	1.75E-02	1.19E-02	5.35E-03	4.58E-02
Non-Carcinogenic Dose	7.66E-01	1.22E+00	8.32E-01	3.74E-01	3.19E+00
Children at the Playground					
Carcinogenic Dose	8.18E-06	1.05E-05	1.52E-06	1.08E-06	2.13E-05
Non-Carcinogenic Dose	7.15E-05	9.16E-05	1.33E-05	9.46E-06	1.86E-04
Residents at No. Marion Street					
Carcinogenic Dose	2.37E-06	4.57E-06	3.23E-06	3.29E-06	1.35E-05
Non-Carcinogenic Dose	1.66E-04	3.19E-04	2.26E-04	2.30E-04	9.41E-04
Commercial Pop. at Robinson St.					
Carcinogenic Dose	1.36E-06	4.88E-06	4.37E-06	1.25E-06	1.19E-05
Non-Carcinogenic Dose	9.52E-05	3.41E-04	3.05E-04	8.73E-05	8.29E-04
Commercial Pop. at River Road					
Carcinogenic Dose	2.41E-06	1.30E-06	3.17E-07	1.74E-07	4.20E-06
Non-Carcinogenic Dose	1.68E-04	9.07E-05	2.22E-05	1.22E-05	2.93E-04
Residents at Sommer Street					
Carcinogenic Dose	1.01E-06	2.49E-06	8.89E-07	6.91E-07	5.08E-06
Non-Carcinogenic Dose	7.09E-05	1.74E-04	6.22E-05	4.83E-05	3.55E-04
Commercial Pop. at Sommer St.					
Carcinogenic Dose	1.01E-06	2.49E-06	8.89E-07	6.91E-07	5.08E-06
Non-Carcinogenic Dose	7.09E-05	1.74E-04	6.22E-05	4.83E-05	3.55E-04

Table 4-53
Total Inhalation Exposure Doses
Booth Oil Site

Receptor	Volatilization (mg/kg-day)	Recreation and Parking Traffic (mg/kg-day)	Construction Traffic (mg/kg-day)	Construction (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	1.47E-12	N/A	2.13E-05	4.58E-02	4.58E-02
Non-Carcinogenic Dose	1.03E-10	N/A	1.49E-03	3.19E+00	3.19E+00
Children On-Site					
Carcinogenic Dose	6.30E-12	3.00E-06	N/A	N/A	3.00E-06
Non-Carcinogenic Dose	5.51E-11	2.62E-05	N/A	N/A	2.62E-05
Children at the Playground					
Carcinogenic Dose	8.71E-16	2.95E-10	9.93E-09	2.13E-05	2.13E-05
Non-Carcinogenic Dose	7.62E-15	2.58E-09	8.68E-08	1.86E-04	1.86E-04
Residents at No. Marion Street					
Carcinogenic Dose	2.54E-14	1.21E-08	6.28E-09	1.35E-05	1.35E-05
Non-Carcinogenic Dose	7.01E-14	2.82E-08	4.38E-07	9.41E-04	9.41E-04
Commercial Pop. at Robinson St.					
Carcinogenic Dose	1.30E-14	5.76E-09	5.53E-09	1.19E-05	1.19E-05
Non-Carcinogenic Dose	2.27E-14	1.01E-08	3.86E-07	8.29E-04	8.29E-04
Commercial Pop. at River Road					
Carcinogenic Dose	7.86E-15	1.68E-09	1.95E-09	4.20E-06	4.20E-06
Non-Carcinogenic Dose	1.37E-14	2.95E-09	1.37E-07	2.93E-04	2.93E-04
Residents at Sommer Street					
Carcinogenic Dose	1.34E-14	5.91E-09	2.37E-09	5.08E-06	5.09E-06
Non-Carcinogenic Dose	3.15E-14	1.39E-08	1.66E-07	3.55E-04	3.55E-04
Commercial Pop. at Sommer St.					
Carcinogenic Dose	6.39E-15	2.80E-09	2.37E-09	5.08E-06	5.09E-06
Non-Carcinogenic Dose	1.12E-14	4.92E-09	1.66E-07	3.55E-04	3.55E-04

Dermal exposure doses are calculated individually for exposures of children and unprotected construction workers to surficial soil at the Booth Oil Site. In addition, dermal doses are calculated for children exposed to surficial soil in the playground, and for unprotected construction workers exposed to subsurface soil.

Dermal exposure doses for each population and medium are calculated by the formula (EPA, 1989c):

$$DEX_i = \frac{C_i \times a \times SA \times DA \times AF \times f \times ED}{BW \times T}$$

where:

- DEX_i = dermal exposure dose (mg/kg-day)
- C_i = mean concentration of contaminant i (mg/kg)
- a = conversion factor (1 kg/1.0E+06 mg)
- SA = skin surface area available for contact (cm²)
- DA = dust adherence factor (mg/cm²)
- AF = absorption factor (dimensionless)
- f = frequency of exposure (days/year)
- ED = exposure duration (years)
- BW = average body weight (kg)
- T = averaging time (days)

BOS2REPa/bos-t2
February 26, 1991

The dermal bioavailability of a chemical on soil depends upon its chemical and physical properties, as well as the characteristics of the soil. Kostecki (1989) estimates that dermal bioavailability may vary from 0.05% to 50%. Feldmann and Maibach (1970) examined the dermal absorption of 21 organic compounds administered in solution to the forearms of human subjects. The results of the study indicated that dermal absorption 24-hours after administration ranged from 0.02% to 48%. Based upon this data, Hawley (1985) assumed, for the purpose of risk assessment of chemical mixtures, 11% of the total dose per 24 hours to be the maximum absorption rate of substances applied to the skin in solution.

Hawley (1985) also discussed the "matrix effect" for absorption of chemical contaminants in soil. Dermal absorption is commonly measured by the application of a pure compound in a solvent, as in Feldmann and Maibach (1970). However, the tendency of chemicals to adsorb to soils will have profound effects on dermal absorption rates. Therefore, to adjust for soil absorption, Hawley estimated that 85% of the total dose is lost to the soil. Based upon the findings of Hawley (1985), an absorption factor of 0.165 (i.e., 0.11 multiplied by 0.85) is used herein to assess dermal exposures to chemicals in soil.

BOS2REPa/bos-t2
February 26, 1991

In addition to the above, the following assumptions are used in the calculation of dermal exposure doses:

- The skin surface area (SA) available for contact consists of the hands, face and arms. This area equates to $4.15\text{E}+03 \text{ cm}^2$ for children and $6.18\text{E}+03 \text{ cm}^2$ for construction workers (EPA, 1989b).
- The dust adherence factor (DA) is 1.45 mg/cm^2 (EPA, 1989c).
- The frequency of exposure (f) for children is 74 days/year.
- The frequency of exposure (f) for unprotected construction workers is 250 days/year.
- The exposure duration (ED) for children is 8 years.
- The exposure duration for unprotected construction workers is 1 year.
- The average body weight for children ages 10 through 18 years old is 51.3 kg (EPA, 1989b).

BOS2REPa/bos-t2
February 26, 1991

- The average body weight for construction workers is 70 kg (EPA, 1989b).

As discussed in Sections 4.3 and 4.4, separate doses are calculated for carcinogenic and noncarcinogenic effects, through the use of different averaging times (T). The noncarcinogenic averaging time is equal to the exposure duration (ED) multiplied by 365 days/year. The carcinogenic averaging time is equal to the 70-year standard lifetime multiplied by 365 days/year. The averaging times for children are 2920 days for noncarcinogenic effects and 25,550 days for carcinogenic effects. The averaging times for unprotected construction workers 365 days for noncarcinogenic effects and 25,550 days for carcinogenic effects.

Tables 4-54 through 4-57 present the dermal exposure doses calculated for exposure of children and unprotected construction workers to surficial soil at the Booth Oil Site. The dermal exposure doses calculated for surficial soil in Area A are presented in Table 4-54. The average dermal doses for children exposed to surficial soil in Area A are 8.37E-02 mg/kg-day for noncarcinogenic effects and 9.57E-03 mg/kg-day for carcinogenic effects. The average dermal doses for unprotected construction workers exposed to surficial soil in Area A are 3.09E-01 mg/kg-day

BOS2REPa/bos-t2
February 26, 1991

Table 4-54
Calculated Dermal Exposure Doses
Area A Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES					
Benzene	4.13E-01	1.62E-07	1.85E-08	5.99E-07	8.55E-09
Carbon Disulfide	1.07E-01	4.21E-08	4.80E-09	1.55E-07	2.21E-09
1,1-Dichloroethane	9.30E-01	3.65E-07	4.18E-08	1.35E-06	1.93E-08
1,2-Dichloroethene (total)	1.90E-01	7.47E-08	8.53E-09	2.76E-07	3.93E-09
Ethylbenzene	5.84E-01	2.30E-07	2.62E-08	8.47E-07	1.21E-08
Tetrachloroethene	1.66E-01	6.52E-08	7.45E-09	2.41E-07	3.44E-09
Toluene	4.13E-01	1.62E-07	1.85E-08	5.99E-07	8.55E-09
Trichloroethene	4.13E-01	1.62E-07	1.85E-08	5.99E-07	8.55E-09
Xylene (total)	1.19E+01	4.69E-06	5.36E-07	1.73E-05	2.47E-07
SEMI-VOLATILES					
Acenaphthene	1.88E+00	7.37E-07	8.42E-08	2.72E-06	3.88E-08
Acenaphthylene	1.70E+00	6.69E-07	7.65E-08	2.47E-06	3.53E-08
Anthracene	1.72E+00	6.74E-07	7.70E-08	2.49E-06	3.55E-08
Benzo(a)anthracene	1.58E+00	6.21E-07	7.09E-08	2.29E-06	3.27E-08
Benzo(b)fluoranthene	1.62E+00	6.36E-07	7.27E-08	2.35E-06	3.35E-08
Benzo(k)fluoranthene	1.72E+00	6.75E-07	7.71E-08	2.49E-06	3.56E-08
Benzoic acid	8.33E+00	3.27E-06	3.74E-07	1.21E-05	1.72E-07
Benzo(a)pyrene	1.60E+00	6.28E-07	7.18E-08	2.32E-06	3.31E-08
Butylbenzylphthalate	8.21E-01	3.23E-07	3.69E-08	1.19E-06	1.70E-08
Chrysene	1.38E+00	5.40E-07	6.17E-08	1.99E-06	2.85E-08
Dibenzo(a,h)anthracene	1.72E+00	6.75E-07	7.71E-08	2.49E-06	3.56E-08
2,4-Dimethylphenol	1.75E+00	6.86E-07	7.84E-08	2.53E-06	3.61E-08
bis(2-Ethylhexyl)phthalate	3.03E+00	1.19E-06	1.36E-07	4.39E-06	6.27E-08
Fluoranthene	2.73E+00	1.07E-06	1.23E-07	3.96E-06	5.66E-08
Fluorene	1.75E+00	6.87E-07	7.85E-08	2.54E-06	3.62E-08
Indeno(1,2,3-cd)pyrene	1.71E+00	6.72E-07	7.68E-08	2.48E-06	3.54E-08
2-Methylnaphthalene	6.77E+00	2.66E-06	3.04E-07	9.82E-06	1.40E-07
2-Methylphenol	1.72E+00	6.75E-07	7.71E-08	2.49E-06	3.56E-08
4-Methylphenol	1.71E+00	6.73E-07	7.69E-08	2.48E-06	3.55E-08
Naphthalene	1.56E+00	6.13E-07	7.00E-08	2.26E-06	3.23E-08
Di-n-octylphthalate	1.76E+00	6.93E-07	7.92E-08	2.56E-06	3.65E-08
Phenanthrene	3.43E+00	1.35E-06	1.54E-07	4.97E-06	7.10E-08
Phenol	1.72E+00	6.75E-07	7.71E-08	2.49E-06	3.56E-08
Pyrene	2.17E+00	8.54E-07	9.76E-08	3.15E-06	4.50E-08

Table 4-54 (cont'd)
Calculated Dermal Exposure Doses
Area A Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS					
Aluminum	1.12E+04	4.39E-03	5.01E-04	1.62E-02	2.31E-04
Antimony	6.79E+00	2.67E-06	3.05E-07	9.85E-06	1.41E-07
Arsenic	2.69E+01	1.06E-05	1.21E-06	3.91E-05	5.58E-07
Barium	2.02E+02	7.92E-05	9.05E-06	2.92E-04	4.17E-06
Beryllium	1.46E+00	5.73E-07	6.55E-08	2.11E-06	3.02E-08
Cadmium	1.66E+00	6.52E-07	7.44E-08	2.40E-06	3.43E-08
Calcium	1.11E+05	4.37E-02	4.99E-03	1.61E-01	2.30E-03
Chromium	2.35E+01	9.22E-06	1.05E-06	3.40E-05	4.86E-07
Cobalt	6.96E+00	2.73E-06	3.12E-07	1.01E-05	1.44E-07
Copper	8.44E+01	3.32E-05	3.79E-06	1.22E-04	1.75E-06
Iron	2.86E+04	1.12E-02	1.28E-03	4.14E-02	5.91E-04
Lead	8.98E+02	3.53E-04	4.03E-05	1.30E-03	1.86E-05
Magnesium	5.71E+04	2.24E-02	2.56E-03	8.28E-02	1.18E-03
Manganese	9.60E+02	3.77E-04	4.31E-05	1.39E-03	1.99E-05
Mercury	2.87E-01	1.13E-07	1.29E-08	4.16E-07	5.94E-09
Nickel	1.97E+01	7.73E-06	8.83E-07	2.85E-05	4.07E-07
Potassium	1.82E+03	7.15E-04	8.17E-05	2.64E-03	3.76E-05
Selenium	1.60E+00	6.27E-07	7.17E-08	2.31E-06	3.30E-08
Silver	9.27E-01	3.64E-07	4.16E-08	1.34E-06	1.92E-08
Sodium	4.79E+02	1.88E-04	2.15E-05	6.94E-04	9.91E-06
Thallium	5.24E-01	2.06E-07	2.35E-08	7.60E-07	1.08E-08
Vanadium	2.31E+01	9.07E-06	1.04E-06	3.35E-05	4.78E-07
Zinc	3.55E+02	1.40E-04	1.60E-05	5.15E-04	7.36E-06
Cyanide	8.95E+00	3.52E-06	4.02E-07	1.30E-05	1.85E-07
PESTICIDES/PCBs					
PCB-1242	5.17E-01	2.03E-07	2.32E-08	7.50E-07	1.07E-08
PCB-1254	1.45E+01	5.69E-06	6.50E-07	2.10E-05	3.00E-07
PCB-1260	1.12E+01	4.40E-06	5.03E-07	1.62E-05	2.32E-07
PCB-1248	1.68E+01	6.58E-06	7.52E-07	2.43E-05	3.47E-07
TOTAL	2.13E+05	8.37E-02	9.57E-03	3.09E-01	4.41E-03

for noncarcinogenic effects and $4.41\text{E-}03$ mg/kg-day for carcinogenic effects.

The dermal exposure doses calculated for children and unprotected construction workers exposed to surficial soil in Area B are presented in Table 4-55. The dermal doses listed in Table 4-55 range from $1.48\text{E-}01$ mg/kg-day for children to $7.78\text{E-}03$ for unprotected construction workers. These doses are the same order of magnitude as those calculated for dermal exposures to surficial soil in Area A.

Table 4-56 presents the dermal exposure doses calculated for exposures of children and unprotected construction workers to surficial soil in Area C. The dermal doses calculated for children exposed to surficial soil in Area C are $5.52\text{E-}02$ mg/kg-day for noncarcinogenic effects and $6.30\text{E-}03$ mg/kg-day for carcinogenic effects. The dermal doses calculated for unprotected construction workers exposed to surficial soil in Area C are $2.04\text{E-}01$ mg/kg-day and $2.91\text{E-}03$ mg/kg-day for noncarcinogenic and carcinogenic effects, respectively.

The dermal exposure doses calculated for exposures of children and unprotected construction workers to surficial soil in Area D are presented in Table 4-57. The doses presented in Table 4-57 for

BOS2REPa/bos-t2
February 26, 1991

Table 4-55
Calculated Dermal Exposure Doses
Area B Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES					
Benzene	4.41E-01	1.73E-07	1.98E-08	6.39E-07	9.13E-09
Carbon Disulfide	3.88E-01	1.52E-07	1.74E-08	5.63E-07	8.03E-09
1,1-Dichloroethane	3.88E-01	1.52E-07	1.74E-08	5.63E-07	8.03E-09
1,2-Dichloroethene (total)	5.95E-01	2.34E-07	2.67E-08	8.63E-07	1.23E-08
Ethylbenzene	3.88E-01	1.52E-07	1.74E-08	5.63E-07	8.03E-09
Tetrachloroethene	1.55E+00	6.09E-07	6.96E-08	2.25E-06	3.21E-08
Toluene	3.88E-01	1.52E-07	1.74E-08	5.63E-07	8.03E-09
Trichloroethene	2.74E+00	1.08E-06	1.23E-07	3.98E-06	5.68E-08
Xylene (total)	3.88E-01	1.52E-07	1.74E-08	5.63E-07	8.03E-09
SEMI-VOLATILES					
Acenaphthene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Acenaphthylene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Anthracene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Benzo(a)anthracene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Benzo(b)fluoranthene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Benzo(k)fluoranthene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Benzoic acid	8.12E+01	3.19E-05	3.64E-06	1.18E-04	1.68E-06
Benzo(a)pyrene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Butylbenzylphthalate	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Chrysene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Dibenzo(a,h)anthracene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
2,4-Dimethylphenol	7.76E+01	3.05E-05	3.48E-06	1.12E-04	1.61E-06
bis(2-Ethylhexyl)phthalate	4.49E+01	1.77E-05	2.02E-06	6.52E-05	9.30E-07
Fluoranthene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Fluorene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
Indeno(1,2,3-cd)pyrene	1.67E+01	6.58E-06	7.52E-07	2.43E-05	3.46E-07
2-Methylnaphthalene	4.15E+00	1.63E-06	1.86E-07	6.01E-06	8.58E-08
2-Methylphenol	5.69E+01	2.24E-05	2.55E-06	8.25E-05	1.18E-06
4-Methylphenol	4.27E+02	1.68E-04	1.92E-05	6.19E-04	8.84E-06
Naphthalene	1.69E+01	6.66E-06	7.61E-07	2.46E-05	3.51E-07
Di-n-octylphthalate	1.65E+01	6.47E-06	7.39E-07	2.39E-05	3.41E-07
Phenanthrene	2.48E+00	9.76E-07	1.12E-07	3.60E-06	5.14E-08
Phenol	2.50E+02	9.83E-05	1.12E-05	3.63E-04	5.18E-06
Pyrene	1.64E+01	6.46E-06	7.38E-07	2.38E-05	3.40E-07

Table 4-55 (cont'd)
Calculated Dermal Exposure Doses
Area B Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS					
Aluminum	3.40E+04	1.34E-02	1.53E-03	4.93E-02	7.03E-04
Antimony	1.85E+02	7.29E-05	8.32E-06	2.69E-04	3.84E-06
Arsenic	1.39E+01	5.46E-06	6.23E-07	2.01E-05	2.87E-07
Barium	3.04E+03	1.19E-03	1.36E-04	4.40E-03	6.28E-05
Beryllium	6.30E+00	2.47E-06	2.83E-07	9.13E-06	1.30E-07
Cadmium	9.33E+00	3.67E-06	4.19E-07	1.35E-05	1.93E-07
Calcium	2.09E+05	8.21E-02	9.38E-03	3.03E-01	4.32E-03
Chromium	1.74E+02	6.82E-05	7.80E-06	2.52E-04	3.59E-06
Cobalt	1.33E+01	5.23E-06	5.97E-07	1.93E-05	2.75E-07
Copper	6.35E+02	2.49E-04	2.85E-05	9.21E-04	1.31E-05
Iron	5.14E+04	2.02E-02	2.31E-03	7.45E-02	1.06E-03
Lead	2.45E+03	9.64E-04	1.10E-04	3.56E-03	5.08E-05
Magnesium	6.55E+04	2.57E-02	2.94E-03	9.49E-02	1.36E-03
Manganese	2.84E+03	1.12E-03	1.28E-04	4.12E-03	5.88E-05
Mercury	1.72E-01	6.76E-08	7.72E-09	2.49E-07	3.56E-09
Nickel	4.59E+01	1.80E-05	2.06E-06	6.66E-05	9.50E-07
Potassium	2.55E+03	1.00E-03	1.15E-04	3.70E-03	5.29E-05
Selenium	2.18E+00	8.56E-07	9.78E-08	3.16E-06	4.51E-08
Silver	9.37E-01	3.68E-07	4.21E-08	1.36E-06	1.94E-08
Sodium	1.58E+03	6.20E-04	7.08E-05	2.29E-03	3.26E-05
Thallium	7.01E-01	2.75E-07	3.15E-08	1.02E-06	1.45E-08
Vanadium	2.89E+01	1.13E-05	1.30E-06	4.18E-05	5.97E-07
Zinc	1.36E+03	5.35E-04	6.12E-05	1.98E-03	2.82E-05
Cyanide	6.20E+00	2.43E-06	2.78E-07	8.98E-06	1.28E-07
PESTICIDES/PCBs					
PCB-1242	1.66E+01	6.51E-06	7.44E-07	2.40E-05	3.43E-07
PCB-1254	3.83E+01	1.51E-05	1.72E-06	5.56E-05	7.93E-07
PCB-1260	3.66E+01	1.44E-05	1.64E-06	5.31E-05	7.58E-07
PCB-1248	3.44E+01	1.35E-05	1.55E-06	4.99E-05	7.13E-07
TOTAL	3.76E+05	1.48E-01	1.69E-02	5.45E-01	7.78E-03

Table 4-56
Calculated Dermal Exposure Doses
Area C Surficial Soil

	Soil Conc. (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES					
Benzene	4.00E-03	1.57E-09	1.80E-10	5.80E-09	8.28E-11
Carbon Disulfide	5.00E-03	1.97E-09	2.25E-10	7.25E-09	1.04E-10
1,1-Dichloroethane	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
1,2-Dichloroethene (total)	6.50E-02	2.55E-08	2.92E-09	9.43E-08	1.35E-09
Ethylbenzene	6.00E-03	2.36E-09	2.69E-10	8.70E-09	1.24E-10
Tetrachloroethene	7.00E-03	2.75E-09	3.14E-10	1.02E-08	1.45E-10
Toluene	1.40E-02	5.50E-09	6.29E-10	2.03E-08	2.90E-10
Trichloroethene	1.90E-02	7.47E-09	8.53E-10	2.76E-08	3.93E-10
Xylene (total)	3.60E-02	1.41E-08	1.62E-09	5.22E-08	7.45E-10
SEMI-VOLATILES					
Acenaphthene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Acenaphthylene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Anthracene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Benzo(a)anthracene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Benzo(b)fluoranthene	1.80E+00	7.07E-07	8.08E-08	2.61E-06	3.73E-08
Benzo(k)fluoranthene	8.10E-01	3.18E-07	3.64E-08	1.17E-06	1.68E-08
Benzoic acid	6.82E+00	2.68E-06	3.06E-07	9.88E-06	1.41E-07
Benzo(a)pyrene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Butylbenzylphthalate	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Chrysene	1.10E+00	4.32E-07	4.94E-08	1.60E-06	2.28E-08
Dibenzo(a,h)anthracene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
2,4-Dimethylphenol	7.50E-01	2.95E-07	3.37E-08	1.09E-06	1.55E-08
bis(2-Ethylhexyl)phthalate	8.20E+00	3.22E-06	3.68E-07	1.19E-05	1.70E-07
Fluoranthene	1.50E+00	5.90E-07	6.74E-08	2.18E-06	3.11E-08
Fluorene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Indeno(1,2,3-cd)pyrene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
2-Methylnaphthalene	1.10E+00	4.32E-07	4.94E-08	1.60E-06	2.28E-08
2-Methylphenol	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
4-Methylphenol	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Naphthalene	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Di-n-octylphthalate	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Phenanthrene	1.70E+00	6.68E-07	7.63E-08	2.47E-06	3.52E-08
Phenol	1.41E+00	5.53E-07	6.31E-08	2.04E-06	2.91E-08
Pyrene	1.90E+00	7.47E-07	8.53E-08	2.76E-06	3.93E-08

Table 4-56 (cont'd)
 Calculated Dermal Exposure Doses
 Area C Surficial Soil

	Soil Conc. (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS					
Aluminum	1.33E+04	5.23E-03	5.97E-04	1.93E-02	2.75E-04
Antimony	4.80E+00	1.89E-06	2.16E-07	6.96E-06	9.94E-08
Arsenic	2.12E+01	8.33E-06	9.52E-07	3.07E-05	4.39E-07
Barium	2.37E+02	9.31E-05	1.06E-05	3.44E-04	4.91E-06
Beryllium	9.70E-01	3.81E-07	4.36E-08	1.41E-06	2.01E-08
Cadmium	2.40E+00	9.43E-07	1.08E-07	3.48E-06	4.97E-08
Calcium	7.33E+04	2.88E-02	3.29E-03	1.06E-01	1.52E-03
Chromium	2.97E+01	1.17E-05	1.33E-06	4.31E-05	6.15E-07
Cobalt	8.10E+00	3.18E-06	3.64E-07	1.17E-05	1.68E-07
Copper	7.39E+01	2.90E-05	3.32E-06	1.07E-04	1.53E-06
Iron	2.38E+04	9.35E-03	1.07E-03	3.45E-02	4.93E-04
Lead	7.44E+02	2.92E-04	3.34E-05	1.08E-03	1.54E-05
Magnesium	2.53E+04	9.94E-03	1.14E-03	3.67E-02	5.24E-04
Manganese	7.45E+02	2.93E-04	3.35E-05	1.08E-03	1.54E-05
Mercury	2.30E-01	9.04E-08	1.03E-08	3.34E-07	4.76E-09
Nickel	2.24E+01	8.80E-06	1.01E-06	3.25E-05	4.64E-07
Potassium	1.99E+03	7.82E-04	8.94E-05	2.89E-03	4.12E-05
Selenium	6.70E-01	2.63E-07	3.01E-08	9.72E-07	1.39E-08
Silver	8.30E-01	3.26E-07	3.73E-08	1.20E-06	1.72E-08
Sodium	3.01E+02	1.18E-04	1.35E-05	4.36E-04	6.23E-06
Thallium	4.20E-01	1.65E-07	1.89E-08	6.09E-07	8.69E-09
Vanadium	2.17E+01	8.53E-06	9.74E-07	3.15E-05	4.49E-07
Zinc	3.43E+02	1.35E-04	1.54E-05	4.97E-04	7.10E-06
Cyanide	5.40E-01	2.12E-07	2.42E-08	7.83E-07	1.12E-08
PESTICIDES/PCBS *					
PCB-1242	1.45E+00	5.71E-07	6.53E-08	2.11E-06	3.01E-08
PCB-1254	5.57E+01	2.19E-05	2.50E-06	8.08E-05	1.15E-06
PCB-1260	6.23E+00	2.45E-06	2.80E-07	9.03E-06	1.29E-07
PCB-1248	3.32E+01	1.31E-05	1.49E-06	4.82E-05	6.88E-07
TOTAL	1.40E+05	5.52E-02	6.30E-03	2.04E-01	2.91E-03

* 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

Table 4-57
Calculated Dermal Exposure Doses
Area D Surficial Soil

	Soil Conc. (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES					
Benzene	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Carbon Disulfide	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
1,1-Dichloroethane	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
1,2-Dichloroethene (total)	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Ethylbenzene	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Tetrachloroethene	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Toluene	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Trichloroethene	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
Xylene (total)	3.00E-03	1.18E-09	1.35E-10	4.35E-09	6.21E-11
SEMI-VOLATILES					
Acenaphthene	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Acenaphthylene	1.40E-01	5.50E-08	6.29E-09	2.03E-07	2.90E-09
Anthracene	8.70E-02	3.42E-08	3.91E-09	1.26E-07	1.80E-09
Benzo(a)anthracene	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Benzo(b)fluoranthene	1.50E+00	5.90E-07	6.74E-08	2.18E-06	3.11E-08
Benzo(k)fluoranthene	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Benzoic acid	2.00E-01	7.86E-08	8.98E-09	2.90E-07	4.14E-09
Benzo(a)pyrene	9.90E-01	3.89E-07	4.45E-08	1.44E-06	2.05E-08
Butylbenzylphthalate	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Chrysene	1.20E+00	4.72E-07	5.39E-08	1.74E-06	2.48E-08
Dibenzo(a,h)anthracene	1.20E-01	4.72E-08	5.39E-09	1.74E-07	2.48E-09
2,4-Dimethylphenol	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
bis(2-Ethylhexyl)phthalate	3.30E+00	1.30E-06	1.48E-07	4.79E-06	6.83E-08
Fluoranthene	2.20E+00	8.65E-07	9.88E-08	3.19E-06	4.55E-08
Fluorene	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Indeno(1,2,3-cd)pyrene	9.00E-01	3.54E-07	4.04E-08	1.31E-06	1.86E-08
2-Methylnaphthalene	1.20E-01	4.72E-08	5.39E-09	1.74E-07	2.48E-09
2-Methylphenol	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
4-Methylphenol	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Naphthalene	6.80E-02	2.67E-08	3.05E-09	9.86E-08	1.41E-09
Di-n-octylphthalate	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Phenanthrene	6.20E-01	2.44E-07	2.78E-08	8.99E-07	1.28E-08
Phenol	4.06E-01	1.60E-07	1.82E-08	5.89E-07	8.40E-09
Pyrene	1.30E+00	5.11E-07	5.84E-08	1.89E-06	2.69E-08

Table 4-57 (cont'd)
Calculated Dermal Exposure Doses
Area D Surficial Soil

	Soil Conc. (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS					
Aluminum	1.54E+04	6.05E-03	6.91E-04	2.23E-02	3.19E-04
Antimony	4.20E+00	1.65E-06	1.89E-07	6.09E-06	8.69E-08
Arsenic	8.07E+01	3.17E-05	3.62E-06	1.17E-04	1.67E-06
Barium	2.81E+02	1.10E-04	1.26E-05	4.07E-04	5.82E-06
Beryllium	9.90E-01	3.89E-07	4.45E-08	1.44E-06	2.05E-08
Cadmium	2.90E+00	1.14E-06	1.30E-07	4.21E-06	6.00E-08
Calcium	2.58E+04	1.01E-02	1.16E-03	3.74E-02	5.34E-04
Chromium	3.12E+01	1.23E-05	1.40E-06	4.52E-05	6.46E-07
Cobalt	1.54E+01	6.05E-06	6.91E-07	2.23E-05	3.19E-07
Copper	8.99E+01	3.53E-05	4.04E-06	1.30E-04	1.86E-06
Iron	5.65E+04	2.22E-02	2.54E-03	8.19E-02	1.17E-03
Lead	4.69E+02	1.84E-04	2.11E-05	6.80E-04	9.71E-06
Magnesium	1.24E+04	4.87E-03	5.57E-04	1.80E-02	2.57E-04
Manganese	7.51E+02	2.95E-04	3.37E-05	1.09E-03	1.55E-05
Mercury	3.10E-01	1.22E-07	1.39E-08	4.50E-07	6.42E-09
Nickel	2.90E+01	1.14E-05	1.30E-06	4.21E-05	6.00E-07
Potassium	2.42E+03	9.51E-04	1.09E-04	3.51E-03	5.01E-05
Selenium	1.50E+00	5.90E-07	6.74E-08	2.18E-06	3.11E-08
Silver	9.30E-01	3.65E-07	4.18E-08	1.35E-06	1.93E-08
Sodium	2.86E+02	1.12E-04	1.28E-05	4.15E-04	5.92E-06
Thallium	6.20E-01	2.44E-07	2.78E-08	8.99E-07	1.28E-08
Vanadium	4.56E+01	1.79E-05	2.05E-06	6.61E-05	9.44E-07
Zinc	9.40E+02	3.69E-04	4.22E-05	1.36E-03	1.95E-05
Cyanide	7.50E-01	2.95E-07	3.37E-08	1.09E-06	1.55E-08
PESTICIDES/PCBS *					
PCB-1242	9.80E-02	3.85E-08	4.40E-09	1.42E-07	2.03E-09
PCB-1254	1.98E-01	7.78E-08	8.89E-09	2.87E-07	4.10E-09
PCB-1260	1.98E-01	7.78E-08	8.89E-09	2.87E-07	4.10E-09
PCB-1248	9.80E-02	3.85E-08	4.40E-09	1.42E-07	2.03E-09
TOTAL	1.16E+05	4.54E-02	5.19E-03	1.68E-01	2.39E-03

* 95% Confidence Arithmetic Mean Used For Pesticides/PCBs

exposures of children are $4.54\text{E-}02$ mg/kg-day for noncarcinogenic effects and $5.19\text{E-}03$ mg/kg-day for carcinogenic effects. The dermal doses calculated for exposure of unprotected construction workers to surficial soil in Area D are $1.68\text{E-}01$ mg/kg-day and $2.30\text{E-}03$ mg/kg-day for noncarcinogenic and carcinogenic effects, respectively.

The total dermal exposure doses for surficial soil are calculated as the sum of the dermal doses calculated for each area of the site. Table 4-58 presents the total dermal doses calculated for exposures of children and unprotected construction workers to surficial soil at the Booth Oil Site. Review of the table indicates that the dermal doses calculated for unprotected construction workers are greater than those calculated for children.

For the purpose of comparison, dermal doses for children and unprotected construction workers are also calculated for exposures to surficial soil in the playground. These doses are presented in Table 4-59. Comparison of Tables 4-58 and 4-59 indicates that the dermal doses calculated for on-site exposures of each population are one order of magnitude greater than those calculated for exposures at the playground.

Tdssd/BOS9

Table 4-58
Total Dermal Exposure Doses
Surficial Soil

Receptor	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	4.41E-03	7.78E-03	2.91E-03	2.39E-03	1.75E-02
Non-Carcinogenic Dose	3.09E-01	5.45E-01	2.04E-01	1.68E-01	1.23E+00
Children On-Site					
Carcinogenic Dose	9.57E-03	1.69E-02	6.30E-03	5.19E-03	3.80E-02
Non-Carcinogenic Dose	8.37E-02	1.48E-11	5.52E-02	4.54E-02	1.84E-01

Table 4-59
Calculated Dermal Exposure Doses
Playground Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES					
Benzene	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Carbon Disulfide	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
1,1-Dichloroethane	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
1,2-Dichloroethene (total)	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Ethylbenzene	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Tetrachloroethene	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Toluene	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Trichloroethene	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
Xylene (total)	4.69E-03	1.84E-09	2.11E-10	6.80E-09	9.71E-11
SEMI-VOLATILES					
Acenaphthene	4.76E-01	1.87E-07	2.14E-08	6.90E-07	9.85E-09
Acenaphthylene	4.67E-01	1.84E-07	2.10E-08	6.77E-07	9.67E-09
Anthracene	4.69E-01	1.84E-07	2.11E-08	6.80E-07	9.71E-09
Benzo(a)anthracene	7.09E-01	2.79E-07	3.18E-08	1.03E-06	1.47E-08
Benzo(b)fluoranthene	8.25E-01	3.24E-07	3.70E-08	1.20E-06	1.71E-08
Benzo(k)fluoranthene	8.22E-01	3.23E-07	3.69E-08	1.19E-06	1.70E-08
Benzoic acid	1.31E-01	5.15E-08	5.88E-09	1.90E-07	2.71E-09
Benzo(a)pyrene	7.35E-01	2.89E-07	3.30E-08	1.07E-06	1.52E-08
Butylbenzylphthalate	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
Chrysene	1.08E+00	4.25E-07	4.86E-08	1.57E-06	2.24E-08
Dibenzo(a,h)anthracene	4.61E-01	1.81E-07	2.07E-08	6.68E-07	9.54E-09
2,4-Dimethylphenol	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
bis(2-Ethylhexyl)phthalate	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
Fluoranthene	2.28E+00	8.96E-07	1.02E-07	3.31E-06	4.72E-08
Fluorene	4.52E-01	1.78E-07	2.03E-08	6.55E-07	9.36E-09
Indeno(1,2,3-cd)pyrene	6.95E-01	2.73E-07	3.12E-08	1.01E-06	1.44E-08
2-Methylnaphthalene	2.09E-01	8.21E-08	9.38E-09	3.03E-07	4.33E-09
2-Methylphenol	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
4-Methylphenol	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
Naphthalene	1.09E-01	4.28E-08	4.89E-09	1.58E-07	2.26E-09
Di-n-octylphthalate	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
Phenanthrene	2.32E+00	9.10E-07	1.04E-07	3.36E-06	4.79E-08
Phenol	4.12E-01	1.62E-07	1.85E-08	5.97E-07	8.53E-09
Pyrene	1.61E+00	6.31E-07	7.21E-08	2.33E-06	3.32E-08

Table 4-59 (cont'd)
Calculated Dermal Exposure Doses
Playground Surficial Soil

	Upper 95% Confidence Arith Mean (mg/kg)	Children Non-Carc. Dermal Dose (mg/kg-day)	Children Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Non-Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS					
Aluminum	1.71E+04	6.72E-03	7.68E-04	2.48E-02	3.54E-04
Antimony	4.34E+00	1.71E-06	1.95E-07	6.29E-06	8.98E-08
Arsenic	1.81E+01	7.12E-06	8.13E-07	2.63E-05	3.75E-07
Barium	1.37E+02	5.37E-05	6.14E-06	1.98E-04	2.83E-06
Beryllium	1.15E+00	4.50E-07	5.15E-08	1.66E-06	2.37E-08
Cadmium	9.80E-01	3.85E-07	4.40E-08	1.42E-06	2.03E-08
Calcium	1.46E+04	5.72E-03	6.54E-04	2.11E-02	3.02E-04
Chromium	2.67E+01	1.05E-05	1.20E-06	3.87E-05	5.53E-07
Cobalt	1.02E+01	3.99E-06	4.56E-07	1.47E-05	2.10E-07
Copper	7.46E+01	2.93E-05	3.35E-06	1.08E-04	1.54E-06
Iron	3.55E+04	1.40E-02	1.60E-03	5.15E-02	7.36E-04
Lead	1.39E+02	5.45E-05	6.23E-06	2.01E-04	2.87E-06
Magnesium	8.51E+03	3.34E-03	3.82E-04	1.23E-02	1.76E-04
Manganese	7.69E+02	3.02E-04	3.45E-05	1.11E-03	1.59E-05
Mercury	1.20E-01	4.72E-08	5.39E-09	1.74E-07	2.48E-09
Nickel	2.85E+01	1.12E-05	1.28E-06	4.13E-05	5.90E-07
Potassium	2.54E+03	1.000E-03	1.14E-04	3.69E-03	5.27E-05
Selenium	1.58E+00	6.20E-07	7.08E-08	2.29E-06	3.26E-08
Silver	9.70E-01	3.81E-07	4.36E-08	1.41E-06	2.01E-08
Sodium	2.81E+02	1.10E-04	1.26E-05	4.07E-04	5.81E-06
Thallium	5.50E-01	2.16E-07	2.47E-08	7.98E-07	1.14E-08
Vanadium	3.91E+01	1.53E-05	1.75E-06	5.66E-05	8.08E-07
Zinc	2.91E+02	1.15E-04	1.31E-05	4.22E-04	6.03E-06
Cyanide	6.50E-01	2.55E-07	2.92E-08	9.43E-07	1.35E-08
PESTICIDES/PCBs					
PCB-1242	1.54E-01	6.05E-08	6.91E-09	2.23E-07	3.19E-09
PCB-1254	3.17E-01	1.25E-07	1.42E-08	4.59E-07	6.56E-09
PCB-1260	3.17E-01	1.25E-07	1.42E-08	4.59E-07	6.56E-09
PCB-1248	1.54E-01	6.05E-08	6.91E-09	2.23E-07	3.19E-09
TOTAL	8.01E+04	3.15E-02	3.60E-03	1.16E-01	1.66E-03

Dermal exposure doses are also calculated for exposure of unprotected construction workers to subsurface soil at the Booth Oil Site. Tables 4-60 through 4-63 present the dermal exposure doses calculated for exposures of unprotected construction workers to subsurface soil in Areas A through D of the site. Table 4-60 lists the dermal exposure doses calculated for exposure of unprotected construction workers to subsurface soil in Area A of the Booth Oil Site. These doses are $2.28\text{E-}01$ mg/kg-day for noncarcinogenic effects and $3.26\text{E-}03$ mg/kg-day for carcinogenic effects.

Comparison of Tables 4-60 and 4-54 indicates that the dermal doses calculated for exposures of unprotected construction workers to surficial and subsurface soil in Area A are within the same order of magnitude. This is attributed to the similar total mean contaminant concentrations in the surficial and subsurface soil of Area A.

Table 4-61 presents the dermal doses calculated for exposure of unprotected construction workers to subsurface soil in Area B. The dermal doses presented in Table 4-61 are $3.36\text{E-}01$ mg/kg-day for noncarcinogenic effects and $4.80\text{E-}01$ mg/kg-day for carcinogenic effects. These doses are within the same order of magnitude as those calculated for exposure of unprotected construction workers

BOS2REPa/bos-t2
February 26, 1991

Table 4-60
Calculated Dermal Exposure Doses
Area A - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES			
Benzene	4.66E-01	6.76E-07	9.65E-09
Carbon Disulfide	4.66E-01	6.76E-07	9.65E-09
1,1-Dichloroethane	4.65E-01	6.74E-07	9.63E-09
1,1-Dichloroethene	4.66E-01	6.76E-07	9.65E-09
1,2-Dichloroethene (total)	6.32E-01	9.16E-07	1.31E-08
Ethylbenzene	3.80E+00	5.51E-06	7.87E-08
Tetrachloroethene	4.65E-01	6.74E-07	9.63E-09
Toluene	4.66E-01	6.76E-07	9.65E-09
Trichloroethene	3.65E-01	5.29E-07	7.56E-09
1,1,1-Trichloroethane	4.65E-01	6.74E-07	9.63E-09
Xylene (total)	2.45E+01	3.55E-05	5.07E-07
SEMIVOLATILES			
Acenaphthene	7.11E-01	1.03E-06	1.47E-08
Anthracene	6.78E-01	9.83E-07	1.40E-08
Benzo(a)anthracene	1.36E+00	1.97E-06	2.82E-08
Benzo(b)fluoranthene	2.54E+00	3.69E-06	5.26E-08
Benzo(k)fluoranthene	1.59E+00	2.30E-06	3.28E-08
Butylbenzylphthalate	7.11E-01	1.03E-06	1.47E-08
Chrysene	2.16E+00	3.14E-06	4.48E-08
1,2-Dichlorobenzene	7.11E-01	1.03E-06	1.47E-08
1,4-Dichlorobenzene	7.11E-01	1.03E-06	1.47E-08
Fluoranthene	3.32E+00	4.81E-06	6.87E-08
Fluorene	3.66E+00	5.31E-06	7.58E-08
2-Methylnaphthalene	3.31E+01	4.81E-05	6.86E-07
4-Methylphenol	1.66E+00	2.40E-06	3.43E-08
Naphthalene	7.40E+00	1.07E-05	1.53E-07
N-Nitrosodiphenylamine	7.11E-01	1.03E-06	1.47E-08
Di-n-octylphthalate	6.76E-01	9.80E-07	1.40E-08
Phenanthrene	1.17E+01	1.69E-05	2.42E-07
Pyrene	4.89E+00	7.09E-06	1.01E-07
1,2,4-Trichlorobenzene	7.11E-01	1.03E-06	1.47E-08

Table 4-60 (cont'd)
 Calculated Dermal Exposure Doses
 Area A - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS			
Aluminum	1.40E+04	2.03E-02	2.89E-04
Antimony	3.78E+00	5.48E-06	7.82E-08
Arsenic	3.83E+01	5.55E-05	7.93E-07
Barium	1.29E+02	1.87E-04	2.66E-06
Beryllium	9.50E-01	1.38E-06	1.97E-08
Cadmium	1.39E+00	2.01E-06	2.88E-08
Calcium	6.28E+04	9.11E-02	1.30E-03
Chromium	4.31E+01	6.24E-05	8.91E-07
Cobalt	1.12E+01	1.62E-05	2.31E-07
Copper	1.07E+02	1.55E-04	2.21E-06
Iron	4.96E+04	7.19E-02	1.03E-03
Lead	2.68E+02	3.89E-04	5.55E-06
Magnesium	2.68E+04	3.89E-02	5.55E-04
Manganese	6.65E+02	9.65E-04	1.38E-05
Mercury	1.70E-01	2.47E-07	3.52E-09
Nickel	2.52E+01	3.65E-05	5.21E-07
Potassium	1.99E+03	2.88E-03	4.11E-05
Selenium	1.68E+00	2.43E-06	3.47E-08
Silver	8.32E-01	1.21E-06	1.72E-08
Sodium	4.76E+02	6.90E-04	9.85E-06
Thallium	6.49E-01	9.41E-07	1.34E-08
Vanadium	2.49E+01	3.61E-05	5.16E-07
Zinc	2.47E+02	3.58E-04	5.11E-06
Cyanide	3.38E+00	4.90E-06	6.99E-08
PESTICIDES/PCBS			
Aldrin	2.60E-02	3.77E-08	5.38E-10
PCB - 1242	1.97E+01	2.86E-05	4.08E-07
PCB - 1254	4.89E-01	7.09E-07	1.01E-08
PCB - 1260	3.92E+00	5.68E-06	8.11E-08
PCB - 1248	4.77E+00	6.91E-06	9.87E-08
4,4'-DDD	5.30E-02	7.69E-08	1.10E-09
TOTAL	1.57E+05	2.28E-01	3.26E-03

Table 4-61
Calculated Dermal Exposure Doses
Area B Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Remed. Workers Non Carc. Dermal Dose (mg/kg-day)	Remed. Workers Carc. Dermal Dose (mg/kg-day)
VOLATILES			
Benzene	4.14E-01	6.00E-07	8.57E-09
Carbon Disulfide	4.12E-01	5.97E-07	8.53E-09
1,1-Dichloroethane	4.13E-01	5.99E-07	8.55E-09
1,1-Dichloroethene	4.12E-01	5.97E-07	8.53E-09
1,2-Dichloroethene (total)	7.64E+00	1.11E-05	1.58E-07
Ethylbenzene	6.35E+00	9.21E-06	1.32E-07
Tetrachloroethene	1.58E+00	2.29E-06	3.27E-08
Toluene	7.05E+00	1.02E-05	1.46E-07
Trichloroethene	4.12E-01	5.97E-07	8.53E-09
1,1,1-Trichloroethane	1.09E+00	1.58E-06	2.25E-08
Xylene (total)	3.51E+01	5.09E-05	7.26E-07
SEMIVOLATILES			
Acenaphthene	6.83E-01	9.90E-07	1.41E-08
Anthracene	6.83E-01	9.90E-07	1.41E-08
Benzo(a)anthracene	6.83E-01	9.90E-07	1.41E-08
Benzo(b)fluoranthene	6.83E-01	9.90E-07	1.41E-08
Benzo(k)fluoranthene	6.83E-01	9.90E-07	1.41E-08
Butylbenzylphthalate	6.83E-01	9.90E-07	1.41E-08
Chrysene	6.83E-01	9.90E-07	1.41E-08
1,2-Dichlorobenzene	6.83E-01	9.90E-07	1.41E-08
1,4-Dichlorobenzene	6.83E-01	9.90E-07	1.41E-08
Fluoranthene	6.83E-01	9.90E-07	1.41E-08
Fluorene	1.13E+00	1.64E-06	2.33E-08
2-Methylnaphthalene	1.72E+01	2.49E-05	3.56E-07
4-Methylphenol	6.83E-01	9.90E-07	1.41E-08
Naphthalene	1.03E+01	1.50E-05	2.14E-07
N-Nitrosodiphenylamine (1)	1.62E+00	2.35E-06	3.35E-08
Di-n-octylphthalate	4.59E-01	6.66E-07	9.50E-09
Phenanthrene	2.02E+00	2.93E-06	4.19E-08
Pyrene	6.38E-01	9.25E-07	1.32E-08
1,2,4-Trichlorobenzene	1.00E+00	1.45E-06	2.08E-08

Table 4-61 (cont'd)
Calculated Dermal Exposure Doses
Area B Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Remed. Workers Non Carc. Dermal Dose (mg/kg-day)	Remed. Workers Carc. Dermal Dose (mg/kg-day)
INORGANICS			
Aluminum	1.98E+04	2.87E-02	4.10E-04
Antimony	4.51E+00	6.54E-06	9.34E-08
Arsenic	2.93E+00	4.25E-06	6.07E-08
Barium	1.32E+02	1.91E-04	2.73E-06
Beryllium	1.77E+00	2.56E-06	3.66E-08
Cadmium	7.13E-01	1.03E-06	1.48E-08
Calcium	1.24E+05	1.80E-01	2.57E-03
Chromium	2.52E+01	3.65E-05	5.21E-07
Cobalt	1.28E+01	1.85E-05	2.65E-07
Copper	2.93E+01	4.24E-05	6.06E-07
Iron	2.87E+04	4.16E-02	5.93E-04
Lead	1.22E+02	1.76E-04	2.52E-06
Magnesium	5.18E+04	7.51E-02	1.07E-03
Manganese	1.18E+03	1.71E-03	2.44E-05
Mercury	1.25E-01	1.81E-07	2.59E-09
Nickel	2.55E+01	3.70E-05	5.29E-07
Potassium	4.85E+03	7.03E-03	1.00E-04
Selenium	4.15E-01	6.02E-07	8.59E-09
Silver	9.20E-01	1.33E-06	1.90E-08
Sodium	6.88E+02	9.98E-04	1.42E-05
Thallium	2.07E-01	3.00E-07	4.28E-09
Vanadium	3.36E+01	4.87E-05	6.95E-07
Zinc	7.61E+01	1.10E-04	1.58E-06
Cyanide	2.08E+00	3.02E-06	4.31E-08
PESTICIDES/PCBS			
Aldrin	1.00E-02	1.45E-08	2.07E-10
PCB - 1242	5.31E+00	7.70E-06	1.10E-07
PCB - 1254	1.20E+00	1.74E-06	2.49E-08
PCB - 1260	1.45E+00	2.10E-06	3.00E-08
PCB - 1248	2.10E+00	3.05E-06	4.35E-08
4,4'-DDD	2.20E-02	3.19E-08	4.55E-10
TOTAL	2.32E+05	3.36E-01	4.80E-03

to surficial soil in Area B (see Table 4-55). Further review of the tables indicates that this is attributed to the similar total mean contaminant concentrations detected in the surficial and subsurface soil of Area B.

The dermal doses calculated for exposure of unprotected construction workers to subsurface soil in Area C are presented in Table 4-62. These doses are $2.71\text{E-}01$ mg/kg-day and $3.86\text{E-}03$ mg/kg-day for noncarcinogenic and carcinogenic effects, respectively. Comparison of Tables 4-62 and 4-56 indicates that the dermal doses calculated for unprotected construction workers exposed to subsurface and surficial soil in Area C are within the same order of magnitude. As in Areas A and B, this is attributed to the similar total mean contaminant concentrations in the surficial and subsurface soils of Area C.

Table 4-63 presents the dermal exposure doses calculated for exposure of unprotected construction workers to subsurface soil in Area D of the Booth Oil Site. The doses presented in Table 4-63 are $3.29\text{E-}01$ mg/kg-day and $4.70\text{E-}03$ mg/kg-day for noncarcinogenic and carcinogenic effects, respectively. Comparison of these doses with those calculated for exposure of unprotected construction workers to surficial soil in Area D (see Table 4-57) indicates that they are within the same order of magnitude. As in each of the

BOS2REPa/bos-t2
February 26, 1991

Table 4-62
Calculated Dermal Exposure Doses
Area C - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES			
Benzene	3.26E-01	4.73E-07	6.75E-09
Carbon Disulfide	3.25E-01	4.71E-07	6.73E-09
1,1-Dichloroethane	3.26E-01	4.73E-07	6.75E-09
1,1-Dichloroethene	3.26E-01	4.73E-07	6.75E-09
1,2-Dichloroethene (total)	5.50E-01	7.98E-07	1.14E-08
Ethylbenzene	1.75E-01	2.54E-07	3.62E-09
Tetrachloroethene	3.41E-01	4.94E-07	7.06E-09
Toluene	2.61E-01	3.78E-07	5.40E-09
Trichloroethene	3.30E-01	4.79E-07	6.83E-09
1,1,1-Trichloroethane	3.26E-01	4.73E-07	6.75E-09
Xylene (total)	1.05E+00	1.52E-06	2.16E-08
SEMIVOLATILES			
Acenaphthene	1.55E+00	2.24E-06	3.20E-08
Anthracene	1.55E+00	2.24E-06	3.20E-08
Benzo(a)anthracene	1.55E+00	2.24E-06	3.20E-08
Benzo(b)fluoranthene	1.55E+00	2.24E-06	3.20E-08
Benzo(k)fluoranthene	1.55E+00	2.24E-06	3.20E-08
Butylbenzylphthalate	1.55E+00	2.24E-06	3.20E-08
Chrysene	1.34E+00	1.94E-06	2.77E-08
1,2-Dichlorobenzene	4.16E-01	6.03E-07	8.61E-09
1,4-Dichlorobenzene	3.17E-01	4.60E-07	6.56E-09
Fluoranthene	5.17E-01	7.50E-07	1.07E-08
Fluorene	1.54E+00	2.24E-06	3.20E-08
2-Methylnaphthalene	3.56E+00	5.16E-06	7.37E-08
4-Methylphenol	5.93E-01	8.60E-07	1.23E-08
Naphthalene	1.74E+00	2.52E-06	3.60E-08
N-Nitrosodiphenylamine (1)	1.55E+00	2.24E-06	3.20E-08
Di-n-octylphthalate	1.54E+00	2.23E-06	3.19E-08
Phenanthrene	3.05E+00	4.43E-06	6.32E-08
Pyrene	1.53E+00	2.22E-06	3.16E-08
1,2,4-Trichlorobenzene	1.55E+00	2.24E-06	3.20E-08

Table 4-62 (cont'd)
 Calculated Dermal Exposure Doses
 Area C - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS			
Aluminum	2.34E+04	3.39E-02	4.84E-04
Antimony	9.62E+00	1.39E-05	1.99E-07
Arsenic	1.56E+01	2.27E-05	3.23E-07
Barium	5.53E+02	8.02E-04	1.14E-05
Beryllium	1.46E+00	2.12E-06	3.02E-08
Cadmium	2.18E+00	3.16E-06	4.51E-08
Calcium	8.31E+04	1.21E-01	1.72E-03
Chromium	7.80E+01	1.13E-04	1.61E-06
Cobalt	1.55E+01	2.25E-05	3.21E-07
Copper	1.24E+02	1.79E-04	2.56E-06
Iron	3.40E+04	4.93E-02	7.03E-04
Lead	1.19E+03	1.72E-03	2.46E-05
Magnesium	3.67E+04	5.32E-02	7.59E-04
Manganese	7.81E+02	1.13E-03	1.62E-05
Mercury	1.44E-01	2.09E-07	2.98E-09
Nickel	3.26E+01	4.72E-05	6.74E-07
Potassium	5.41E+03	7.85E-03	1.12E-04
Selenium	1.39E+00	2.01E-06	2.87E-08
Silver	8.62E-01	1.25E-06	1.78E-08
Sodium	7.69E+02	1.12E-03	1.59E-05
Thallium	4.74E-01	6.87E-07	9.81E-09
Vanadium	4.38E+01	6.35E-05	9.07E-07
Zinc	3.74E+02	5.42E-04	7.74E-06
Cyanide	7.15E-01	1.04E-06	1.48E-08
PESTICIDES/PCBS			
Aldrin	7.90E-02	1.15E-07	1.64E-09
PCB - 1242	7.09E-01	1.03E-06	1.47E-08
PCB - 1254	1.56E+01	2.26E-05	3.23E-07
PCB - 1260	9.46E+00	1.37E-05	1.96E-07
PCB - 1248	2.10E+01	3.05E-05	4.36E-07
4,4'-DDD	1.64E-01	2.38E-07	3.39E-09
TOTAL	1.87E+05	2.71E-01	3.86E-03

Table 4-63
Calculated Dermal Exposure Doses
Area D - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
VOLATILES			
Benzene	3.58E+00	5.19E-06	7.41E-08
Carbon Disulfide	4.74E+00	6.87E-06	9.80E-08
1,1-Dichloroethane	1.79E+01	2.59E-05	3.70E-07
1,1-Dichloroethene	4.74E+00	6.87E-06	9.80E-08
1,2-Dichloroethene (total)	1.91E+02	2.77E-04	3.95E-06
Ethylbenzene	8.95E+01	1.30E-04	1.85E-06
Tetrachloroethene	2.62E+02	3.81E-04	5.43E-06
Toluene	3.58E+02	5.19E-04	7.41E-06
Trichloroethene	2.03E+02	2.94E-04	4.20E-06
1,1,1-Trichloroethane	2.62E+01	3.81E-05	5.43E-07
Xylene (total)	4.65E+02	6.75E-04	9.63E-06
SEMIVOLATILES			
Acenaphthene	1.90E+01	2.76E-05	3.94E-07
Anthracene	4.12E+00	5.97E-06	8.52E-08
Benzo(a)anthracene	4.10E+00	5.94E-06	8.48E-08
Benzo(b)fluoranthene	4.09E+00	5.93E-06	8.46E-08
Benzo(k)fluoranthene	4.09E+00	5.93E-06	8.46E-08
Butylbenzylphthalate	1.17E+01	1.70E-05	2.43E-07
Chrysene	8.05E+00	1.17E-05	1.67E-07
1,2-Dichlorobenzene	7.69E+00	1.12E-05	1.59E-07
1,4-Dichlorobenzene	9.98E-01	1.45E-06	2.07E-08
Fluoranthene	7.06E+00	1.02E-05	1.46E-07
Fluorene	4.09E+00	5.93E-06	8.46E-08
2-Methylnaphthalene	1.67E+02	2.42E-04	3.45E-06
4-Methylphenol	7.16E+02	1.04E-03	1.48E-05
Naphthalene	9.06E+01	1.31E-04	1.88E-06
N-Nitrosodiphenylamine (1)	3.86E+00	5.60E-06	7.99E-08
Di-n-octylphthalate	4.09E+00	5.93E-06	8.46E-08
Phenanthrene	6.40E+01	9.28E-05	1.33E-06
Pyrene	6.53E+01	9.47E-05	1.35E-06
1,2,4-Trichlorobenzene	4.09E+00	5.93E-06	8.46E-08

Table 4-63 (cont'd)
 Calculated Dermal Exposure Doses
 Area D - Subsurface Soil

	Upper 95% Confidence Arith. Mean (mg/kg)	Constr. Wrker Non Carc. Dermal Dose (mg/kg-day)	Constr. Wrker Carc. Dermal Dose (mg/kg-day)
INORGANICS			
Aluminum	1.23E+03	1.78E-03	2.55E-05
Antimony	1.18E+01	1.72E-05	2.45E-07
Arsenic	3.21E+01	4.66E-05	6.65E-07
Barium	3.76E+03	5.45E-03	7.78E-05
Beryllium	5.17E-01	7.50E-07	1.07E-08
Cadmium	2.29E+01	3.32E-05	4.74E-07
Calcium	9.07E+04	1.32E-01	1.88E-03
Chromium	2.36E+02	3.42E-04	4.89E-06
Cobalt	1.19E+01	1.72E-05	2.46E-07
Copper	1.38E+03	2.00E-03	2.85E-05
Iron	3.33E+04	4.82E-02	6.88E-04
Lead	3.30E+04	4.79E-02	6.84E-04
Magnesium	5.04E+04	7.31E-02	1.04E-03
Manganese	5.99E+02	8.68E-04	1.24E-05
Mercury	2.01E+00	2.91E-06	4.15E-08
Nickel	2.14E+02	3.11E-04	4.44E-06
Potassium	3.82E+03	5.54E-03	7.91E-05
Selenium	4.62E-01	6.70E-07	9.56E-09
Silver	2.23E+00	3.24E-06	4.62E-08
Sodium	1.76E+03	2.55E-03	3.64E-05
Thallium	4.16E-01	6.03E-07	8.61E-09
Vanadium	2.18E+01	3.16E-05	4.52E-07
Zinc	3.61E+03	5.23E-03	7.46E-05
Cyanide	1.05E+01	1.52E-05	2.17E-07
PESTICIDES/PCBS			
Aldrin	3.36E-01	4.87E-07	6.96E-09
PCB - 1242	1.08E+01	1.57E-05	2.24E-07
PCB - 1254	2.16E+01	3.13E-05	4.47E-07
PCB - 1260	7.37E+00	1.07E-05	1.53E-07
PCB - 1248	4.58E+01	6.64E-05	9.48E-07
4,4'-DDD	6.72E-01	9.74E-07	1.39E-08
TOTAL	2.27E+05	3.29E-01	4.70E-03

preceding areas of the site, this is due to the similar total mean contaminant concentrations in the surficial and subsurface soils of Area D.

The total dermal doses for exposure of unprotected construction workers to subsurface soil is calculated as the sum of the area-specific doses. Table 4-64 presents the total dermal doses for exposure of unprotected construction workers to subsurface soil at the Booth Oil Site. These doses are $1.66\text{E-}02$ mg/kg-day and 1.16 mg/kg-day for carcinogenic and noncarcinogenic effects, respectively. Comparison of these doses with those calculated for exposure of unprotected construction workers to surficial soil (see Table 4-58) indicates that they are within the same order of magnitude.

Table 4-65 presents the total dermal exposure doses calculated for children and unprotected construction workers exposed to both surficial and subsurface soil at the Booth Oil Site. Review of the table indicates that the dermal doses calculated for unprotected construction workers (i.e., 2.39 mg/kg-day for noncarcinogenic effects and $3.41\text{E-}02$ mg/kg-day for carcinogenic effects) are one order of magnitude greater than those calculated for children (i.e., $1.84\text{E-}01$ mg/kg-day for noncarcinogenic effects and $3.80\text{E-}02$ mg/kg-day for carcinogenic effects).

Tdsubd/BOS9

Table 4-64
Total Dermal Exposure Doses
Subsurface Soil

Receptor	Area A (mg/kg-day)	Area B (mg/kg-day)	Area C (mg/kg-day)	Area D (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site					
Carcinogenic Dose	3.26E-03	4.80E-03	3.86E-03	4.70E-03	1.66E-02
Non-Carcinogenic Dose	2.28E-01	3.36E-01	2.71E-01	3.29E-01	1.16E+00

Tdd/BOS9

Table 4-65
Total Dermal Exposure Doses
Booth Oil Site

Receptor	Surficial Soil (mg/kg-day)	Subsurface Soil (mg/kg-day)	TOTAL (mg/kg-day)
Construction Worker On-Site			
Carcinogenic Dose	1.75E-02	1.66E-02	3.41E-02
Non-Carcinogenic Dose	1.23E+00	1.16E+00	2.39E+00
Children On-Site			
Carcinogenic Dose	3.80E-02	N/A	3.80E-02
Non-Carcinogenic Dose	1.84E-01	N/A	1.84E-01

Comparison of the total dermal doses presented in Table 4-65 with the total inhalation doses presented in Table 4-53 indicates that dermal doses calculated for dermal and inhalation exposures of unprotected construction workers are within the same order of magnitude. However, the dermal doses calculated for exposures children are four orders of magnitude greater than the inhalation doses calculated for this population. Similarly, the total dermal doses calculated for children are one order of magnitude greater than the ingestion doses calculated for pica children (see Table 4-30) and two orders of magnitude greater than the ingestion doses calculated for non-pica children.

It is generally expected that actual doses due to dermal exposure of children to contaminants in soil would be orders of magnitude lower than those for ingestion of the same contaminated soil. The disparity between this expectation and the dermal doses presented herein may be attributed to the simplified approach used by Hawley (1985), as adopted herein, to estimate dermal exposure doses. This simplified approach assumes a single absorption factor for all contaminants, when, in fact, some contaminants may be unavailable for dermal uptake due to adsorption to the soil. It is expected, therefore, that the method used herein to evaluate dermal exposure will overestimate actual dermal doses. However, the available literature offers little data to assess each contaminant

BOS2REPa/bos-t2
February 26, 1991

on an individual basis, resulting in little recourse but to rely upon the data and methods presented by Hawley (1985). Accordingly, the dermal doses and risks presented herein should be interpreted with caution.

BOS2REPa/bos-t2
February 26, 1991