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Harding Lawson Associates

**NAVY RESPONSES TO SUPPLEMENTAL REGULATORY AGENCY COMMENTS
ON THE DRAFT OPERABLE UNIT II
PUBLIC HEALTH AND ENVIRONMENTAL EVALUATION REPORT
NAVAL STATION TREASURE ISLAND
HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA**

**NAVY RESPONSES TO SUPPLEMENTAL REGULATORY AGENCY COMMENTS
ON THE DRAFT OPERABLE UNIT II
PUBLIC HEALTH AND ENVIRONMENTAL EVALUATION REPORT**

The following are the Navy's responses to the second round of comments from regulatory agencies on the *Draft Operable Unit (OU) II Public Health and Environmental Evaluation (PHEE) Report, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California*, dated August 12, 1992. Sections I and II contain comments from the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC), Region 2 Site Mitigation Branch Human and Ecological Risk Section (HERS), dated October 13 and December 12, 1992, respectively, and the Navy's responses to each. The October 13, 1992, comments were not submitted to the Navy in time to be addressed in the *Navy Responses to Regulatory Agency Comments, Draft OU II PHEE Report* dated November 10, 1992. Section III contains comments from the U.S. Environmental Protection Agency (EPA), dated December 16, 1992, and the Navy's responses; these comments were prepared by Bechtel Environmental, Inc., under contract to EPA. All comments are reproduced exactly as in the original documents.

Literature citations are referenced in the OU II PHEE report unless otherwise noted. The acronym list presented in the draft report is included here for the convenience of the reader.

**I. DTSC REGION 2 SITE MITIGATION HERS COMMENTS -
October 13, 1992**

A. General Comments

Comment: I [James M. Polisini] have reviewed, in more detail than was previously possible given the short time-frame, the document titled Draft Operable Unit II Public Health and Environmental Evaluation, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California, dated August 12, 1992, particularly the selection of chemicals of concern (COCs). These comments are offered in addition to those supplied on the PHEE in a memorandum dated September 9, 1992.

Response: This comment is acknowledged.

B. Specific Comments

Comment 1: The selection of chemicals of concern (COCs) from the potential list of chemicals detected at the Installation Remediation (IR) sites appears to have a serious flaw. I have reviewed the selection of COCs for surface soils at IR-8 and the selection of COCs for groundwater at IR-6/IR-10. Total health-based levels for carcinogens (tHBL_c) and total health-based levels for non-carcinogens (tHBL_n) are developed (Tables 7-3 through 7-7) as one of the screening criteria for determining whether a chemical which is detected is carried forward in the risk assessment as a COC.

These total health-based levels are essentially the preliminary remediation goals (PRGs) in Volume I, Part B of Risk Assessment Guidance for Superfund Sites (RAGS) (EPA, 1991). Chemicals for which the average or maximum concentration detected is not greater than certain ARARS or the appropriate $tHBL_c$ or $tHBL_n$ are not carried forward as COCs in the risk assessment (Tables 7-8 through 7-17). The flaw in this method is that it does not consider additivity. The $tHBL_c$ values are based on a risk of 10^{-6} . A chemical could contribute a risk of 9.99×10^{-7} and not be carried forward in the risk assessment. Similarly, the $tHBL_n$ is based on a hazard quotient of 1.0. A chemical concentration compared to the appropriate reference dose could have a hazard quotient of 0.99 and not be carried forward in the risk assessment. Numerous chemicals which had detection frequencies of 20 or 50 percent were not carried forward in the risk assessment which I checked: surface soils for IR-8 and groundwater for the combined IR-6/IR-10. This selection process for chemicals of concern could seriously underestimate the risk posed by contaminants at HPA.

Response: Please refer to Attachment A for a detailed response to this comment. Attachment A was prepared in response to the agencies' overall concerns regarding the use of tHBLs as a screening tool for identification of COCs and the possible underestimation of human health risks at OU II sites. In response to agency comments, chemicals excluded as COCs were reevaluated based on revised and conservative tHBLs targeting a cancer risk of 1×10^{-8} and a hazard index (HI) of 0.01. The concerns regarding screening of chemicals with 20 to 50 percent frequencies of detection are also discussed as part of the analysis presented in Attachment A.

C. Conclusions

Comment: I realize that the date for the return on comments on the OU2 PHEE has passed and DTSC may not be able to have this comment addressed. Human and Ecological Risk Section (HERS) will not consider this process appropriate in any future human health risk assessments.

Response: This comment is acknowledged.

II. DTSC REGION 2 SITE MITIGATION HERS COMMENTS - December 12, 1992

A. General Comments

Comment: The response to DTSC/HERS comments (Section II, pages 3 through 12) is acceptable with the exception of response 8 and response 25.

There is no response to the additional HERS comment questioning the validity of the selection process for chemicals of concern (Memorandum to Bonnie Arthur dated October 12, 1992). HERS comments in this memorandum appear to agree with the EPA comment 1 (page 13). A copy of that memorandum is attached.

Response: Please refer to Attachment A for a detailed response to this comment. The Navy did not receive the October 13, 1992 comments until receipt of these December 12, 1992 comments, as stated previously.

B. Specific Comments

Comment 1: Response Number 8: We understand that the 3 percent dermal absorption factor (AF) for volatile organic compounds (VOCs) did not affect the risk characterization because no VOCs were included in the chemicals of concern (COCs) as presented in the response. However, the basis for selecting a default of 3 percent AF for VOCs seems in error. The EPA dermal guidance dated 1991 specifically states that is a review draft only and not for citation. The 3 percent AF for VOCs was apparently developed from the listing of default AFs based on ranges of Henry's Law Constants on page 6-24 of this 1991 review draft. The Interim Report on Dermal Exposure Assessment, dated 1992 (EPA/600/8-91/011B), contains no default AFs for VOCs. HERS recommends 10 percent as a default AF for VOCs in the absence of chemical specific factors. The AF used should be changed so that the factors used in the PHEE for OU2 are consistent with factors that will be used in the future for PHEEs of other operable units where VOCs are present.

Response: The January 1992 *Interim Report on Dermal Exposure Assessment* cited in this comment supports using 3 percent as a dermal AF for VOCs, as shown on page 6-42, which is similar to page 6-24 of the 1991 draft. As stated on page 6-40 of the Interim Report, based on studies by McKone, any substances with a dimensionless Henry's Law Constant (K_h) ≥ 0.1 can be assumed to have a dermal AF of 3 percent. K_h can be calculated using the following equation:

$$K_h = \frac{H}{(R \times T)}$$

where:

H = Henry's Law Constant (atm-m³/mol)
 R = Real Gas Constant (8.205 x 10⁻⁵ $\frac{\text{m}^3 \cdot \text{atm}}{\text{mol} \cdot ^\circ\text{K}}$)
 T = Ambient temperature (298° Kelvin)

Based on values for H presented in Appendix C of the OU II PHEE report, the VOCs detected at OU II sites, including benzene, trichloroethene, and vinyl chloride, result in K_h values of greater than 0.1. Therefore, an AF of 3 percent was assumed for VOCs. The use of the AF of 3 percent was considered appropriate because VOCs detected at OU II sites are not present as a separate phase, an AF of 10 percent was considered to be conservative. The dermal AF of 3 percent was only used in estimating tHBLs, and not in risk characterization.

Comment 2: Response Number 25: The exclusion of chromium VI, a carcinogen, from the list of chemicals of concern appears to be an example of the problems outlined with the selection of COCs using total health-based levels (tHBLs) addressed in the October 12, 1992 HERS memorandum. Where detected, chromium VI should be carried through the risk assessment independent of chromium III. This comment appears in agreement with EPA comment 46 (page 28).

Response: In the OU II PHEE report, chromium VI and chromium III were independently evaluated in the COC analysis and where applicable, both were separately quantified in risk characterization. Specifically, chromium VI was evaluated based on site analytical data available for chromium VI (see Tables 4-4 through 4-14 presented in the OU II PHEE report). Chromium VI was identified as a COC in groundwater at Sites IR-9 and Sites IR-6/10 and hypothetical health risks were quantified using the analytical data reported for chromium VI. All chromium VI measured in groundwater samples was assumed to be present in a dissolved phase. In the case of soil, the data for total chromium indicate chromium III is the primary species present in soil. Chromium VI was not identified as a COC in soil because chromium VI analytical results, when compared to chromium VI tHBLs targeting a cancer risk of 1×10^{-6} and a hazard index (HI) of 1.0, showed no exceedance of these health-risk based levels in soil.

In response to agency concerns regarding exclusion of chromium VI as a COC (in soil), an additional analysis as presented in Attachment A was done using a revised tHBL targeting a lower cancer risk of 1×10^{-8} and HI of 0.01. Using these revised tHBLs, chromium VI would be included as a COC in surface and subsurface soil at Sites IR-8, IR-9, and IR-6. As shown in Attachment A (Tables 1b through 4b), additional risk characterization was performed on chromium VI at these three sites; carcinogenic health risks associated with possible exposures to chromium VI at these OU II sites range from 9×10^{-10} to 8×10^{-8} , levels far below EPA target criteria. The HI is also far below EPA's target criteria of 1.0. Any cumulative health risks from multipathway exposures based on inclusion of chromium VI as a COC would not change the results presented in the OU II PHEE report.

Chromium VI was not detected in surface soil at Site IR-10; however, it was detected and would be a COC in subsurface soil based on the methods used in this analysis. A separate evaluation of chromium VI as a COC in subsurface soil at Site IR-10 was not performed as part of this analysis. Chromium VI was detected once at 0.2 mg/kg at MW13A2 at 5.75 feet below ground surface. Exposures via the ingestion of fruits and vegetables exposure pathway at this depth are not expected, even though the OU II PHEE report conservatively quantified the ingestion of fruits and vegetables pathway using the greater of the concentration in surface and subsurface soil. Exposures via this pathway would not be expected to exceed a cancer risk of 1×10^{-8} to 1×10^{-6} , which would not materially change the results of the OU II PHEE report.

Please refer to Attachment A for further documentation to support this response.

C. Conclusions

Comment: All responses to comments are adequate with the exception of the two listed above and the concerns regarding the selection of chemicals of concern contained in the attached October 12, 1992 HERS memorandum.

Response: Please refer to Attachment A for a detailed response to this comment.

III. EPA COMMENTS - December 16, 1992

A. General Comments

Comment: As you requested, the Bechtel Project Team, including ICF, has reviewed the Navy's Responses to Agency Comments on the Draft Operable Unit II Public Health and Environmental Evaluation. The Navy has provided thoughtful and technically sound responses to most of our comments.

Two issues, however, remain unresolved. The first of these is the use of total health-based levels to eliminate potential chemicals of concern (COC) from consideration. The second, is exclusion of chromium VI as a COC in soil. A more detailed statement of these unresolved issues is attached.

Response: Please refer to Attachment A for a detailed response to this comment.

B. Specific Comments

Comment 1: The use of total-health based levels to select chemicals of concern is not approved by EPA, Region IX.

Response: The list of COCs in the OU II PHEE report derived by using tHBLs as the main screening tool was considered representative for risk characterization of COCs and for evaluating possible baseline health risks at OU II sites. As stated in the OU II PHEE report, the use of tHBLs, in this case, provided an up-to-date, health-based, and conservative, soil or groundwater action level to screen chemicals based on analytical concentration data available for OU II sites. tHBLs were estimated based on a target cancer risk of 1×10^{-6} and intake assumptions consistent with EPA methods developed for estimating health risk-based screening values such as EPA RCRA action levels (ALs) and preliminary remediation goals (PRGs); these EPA screening values as well as tHBLs can be used to evaluate the need for further action at a site (EPA, 1990d, 1991f, as referenced in the OU II PHEE report). For RCRA values, a less conservative target cancer risk of 1×10^{-5} is used to evaluate Class C carcinogens (EPA, 1990d).

As is the case with any health risk-based screening value, the tHBL concept can be used as a method to judge whether a chemical should be a COC, whether possible baseline health risks are expected at a site, and whether further action is required. The latter two applications can be demonstrated by reviewing the sum total baseline cancer risk estimates associated with multipathway exposures (presented in Tables 9-1 through 9-5 of the OU II PHEE report for the original list of COCs). As shown in Attachment A and the discussion below, the results presented in Tables 9-1 through 9-5 would not materially change by adding risks associated with chemicals not originally included as COCs.

At OU II sites, approximately 20 to 50 chemicals were screened out during the COC selection process. If 50 chemicals were conservatively assumed to be carcinogenic and assumed to each contribute a risk of 9.99×10^{-7} to the sum total health risks predicted for that IR, a cancer risk of 1×10^{-5} ($50 \times 9.99 \times 10^{-7}$) would be added to 3×10^{-4} or 2×10^{-3} (the range of results for reasonable maximum exposures [RME] to a resident child receptor; see Tables 9-1 through 9-5), resulting in a risk of 3×10^{-4} or 2×10^{-3} . Thus the estimated sum total health risks presented in Table 9-1 through 9-5 would not materially change.

As shown in Attachment A, some chemicals detected at OU II sites and not considered as COCs for risk characterization, although frequently detected in some cases, were not detected at concentrations that would result in as much as a 9.99×10^{-7} cancer risk, and therefore would not result in a significant additive contribution to total risk. In addition, fewer than 50 chemicals were screened out at most sites, and not all chemicals screened out are considered carcinogens.

Attachment A was prepared to further demonstrate the minimal effect on risk estimates of using tHBLs based on a target cancer risk of 1×10^{-8} and an HI of 0.01 for OU II sites.

Comment 2: It is EPA, Region IX policy that all Class A carcinogens be carried through a full risk assessment for all media which exhibit a route of potential exposure. Chromium VI is considered a Class A carcinogen via inhalation and therefore cannot be excluded from consideration as a chemical of concern.

Response: Please refer to the response to DTSC/HERS Comment B2 in Section II and Attachment A for the detailed analysis prepared in response to agency concerns regarding possible underestimation of health risks from exclusion of chromium VI as a COC at OU II sites.

Besides chromium VI, other Class A carcinogens detected at OU II sites were benzene and vinyl chloride. These VOCs would not be identified as additional COCs in soil at any OU II sites or in groundwater at Site IR-9 based on a tHBL_c targeting a conservative cancer risk of 1×10^{-8} (see revised Table 7-18 in Attachment A and original Table 7-18, respectively).

Based on this analysis, the concentrations of Class A carcinogens detected at OU II sites are not expected to present health risks from soil contact exposure pathways such as ingestion and dermal contact with soil and inhalation of dust. The groundwater concentrations detected at Site IR-9 are not expected to present health risks from exposure pathways such as ingestion and inhalation during domestic use of groundwater. The detected concentrations of VOCs in soil and groundwater are also not expected to result in significant vapor emissions as documented in the OU II PHEE report. For these reasons, some Class A carcinogens were not identified as a COC in certain media. Class A carcinogens were identified as COCs in groundwater at Site IR-6/10 and the health risks were fully quantified as presented in the OU II PHEE report.

**ATTACHMENT A
IDENTIFICATION OF ADDITIONAL CHEMICALS
USING REVISED HEALTH-BASED LEVELS
OU II PHEE REPORT
HUNTERS POINT ANNEX**

LIST OF TABLES

Revised OU II PHEE Report Tables

- Table 7-18 List of Chemicals of Concern and Additional Chemicals at OU II Sites - Residential Scenario
- Table 7-19 Toxicity Values for Risk Characterization of Chemicals of Concern and Additional Chemicals
- Table 8-2 Summary of Exposure Point Concentrations of COCs and Additional Chemicals for Average and Reasonable Maximum Exposures at Site IR-8
- Table 8-3 Summary of Exposure Point Concentrations of COCs and Additional Chemicals for Average and Reasonable Maximum Exposures at Site IR-9
- Table 8-4 Summary of Exposure Point Concentrations of COCs and Additional Chemicals for Average and Reasonable Maximum Exposures at Site IR-6
- Table 8-5 Summary of Exposure Point Concentrations of COCs and Additional Chemicals for Average and Reasonable Maximum Exposures at Site IR-10

Additional Tables

- Table 1a Summary of Estimated Risks from Multipathway Exposures, Site IR-8, Additional Chemicals
- Table 1b Calculation Worksheet for Table 1a
- Table 2a Summary of Estimated Risks from Multipathway Exposures, Site IR-9, Additional Chemicals
- Table 2b Calculation Worksheet for Table 2b
- Table 3a Summary of Estimated Risks from Multipathway Exposures, Site IR-6, Additional Chemicals
- Table 3b Calculation Worksheet for Table 3b
- Table 4a Summary of Estimated Risks from Multipathway Exposures, Site IR-10, Additional Chemicals
- Table 4b Calculation Worksheet for Table 4b

**ATTACHMENT A
IDENTIFICATION OF ADDITIONAL CHEMICALS
USING REVISED HEALTH-BASED LEVELS
OU II PHEE REPORT
HUNTERS POINT ANNEX**

1.0 PURPOSE

This analysis was prepared in response to EPA and Cal/EPA concerns regarding the use of total health-based levels (tHBLs) as screening tools for identifying chemicals of concern (COCs) for the OU II sites at HPA as documented in the August 12, 1992, *Draft Operable Unit (OU) II Public Health and Environmental Evaluation (PHEE) Report, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California.*

The purpose of this analysis was to evaluate the adequacy of COCs selected in the OU II PHEE and whether the COC selection process and resulting list and summary and conclusions presented in the OU II PHEE report would need to be revised. In this assessment, chemicals detected at OU II sites were evaluated for possible inclusion as COCs using alternative selection criteria to those used in the OU II PHEE; risk calculations then were performed on these additional chemicals. The tasks performed, results, conclusions, and any uncertainties associated with the analysis are described below.

2.0 TASKS PERFORMED IN EVALUATING COCs AT OU II SITES

In response to agency concerns regarding the use of tHBLs to identify COCs at the OU II sites, this analysis used a modified approach to estimate tHBLs. The modified approach consisted of reducing tHBLs by two orders of magnitude to account for possible additive exposures from multiple chemicals.

The following steps, which parallel the process used in the OU II PHEE analysis, were performed to reevaluate the list of COCs presented in the OU II PHEE report:

- The total health-based levels for carcinogens (tHBL_c) used to evaluate soil and groundwater concentrations were changed to target a cancer risk of 1×10^{-8} rather than 1×10^{-6} and the total health-based levels for noncarcinogens (tHBL_n) were changed to target an HI of 0.01 rather than 1.0 thus reducing tHBL_c and tHBL_n values by two orders of magnitude compared to the values presented in the OU II PHEE report (Tables 7-3 and 7-6 for soil and groundwater, respectively)
- Similar to the methods presented in the OU II PHEE report, maximum and arithmetic mean concentrations of all detected chemicals in surface soil, subsurface soil, and groundwater were screened against the most conservative screening values and exposure scenario, the tHBL_c and tHBL_n values based on a hypothetical resident child and adult receptor.
- As discussed in the OU II PHEE report, chemicals were identified as COCs without regard to the chemical's frequency of detection (FOD) or comparison to interim ambient levels. This is a conservative assumption since EPA guidance states that chemicals with an FOD less than 5 percent can be excluded as COCs (EPA, 1989a). By not using these other screens, a greater number of chemicals were selected for evaluation in the OU II PHEE report, and subsequently in this analysis.
- A revised Table 7-18 was produced using the revised tHBLs. As shown in the revised table, the shaded areas denote the additional chemicals that could be considered COCs for the particular media at the specified site, based on the revised screening criteria.

The remaining tasks were performed to evaluate the additional potential carcinogens. As shown in the revised Table 7-18, the results of screening detected chemical concentrations against the revised tHBL_c resulted in the addition of many of the same chemicals screened against the revised tHBL_n. Screening against the revised tHBL_n resulted in the addition of some additional noncarcinogenic PAHs, metals and VOCs. Additional risk characterization for noncarcinogens was not performed herein for the reasons presented in Section 4.0. The following steps were performed on carcinogenic chemicals:

- A revised Table 7-19 was prepared showing the toxicity values of the additional carcinogenic chemicals listed in the revised Table 7-18 and not evaluated in the OU II PHEE report. The toxicity values are based on current EPA sources (EPA, 1992a,b).
- Revised Tables 8-2 through 8-4 summarize (with shading) exposure point concentrations used to quantitatively assess the additional carcinogenic chemicals. As presented in the OU II PHEE report, exposure point concentrations are presented for surface soil, subsurface soil, and indoor and outdoor air particulates. Additional modeling of exposure point concentrations in fruits and vegetables was not performed for this analysis. Instead, the risk characterization results for ingestion of fruits and ingestion of vegetables were each assumed to be equivalent to risks from the ingestion of soil exposure pathway. Risk characterization results presented in the OU II PHEE report (Tables 9-1 through 9-4) showed risks from the ingestion of soil pathway to be consistently higher than the risks from the ingestion of fruits and vegetable exposure pathways. Therefore, this approach results in a conservative approximation of the risk associated with the latter pathway.
- The additional risk characterization of the additional carcinogenic chemicals was based on exposures to adult commercial office workers, and child and adult resident receptors as evaluated in the OU II PHEE report. Construction workers were not reevaluated in this analysis.
- Tables 1a through 4a summarize the additional risk characterization results of the additional carcinogenic chemicals in a manner similar to Tables 9-1 through 9-4 of the OU II PHEE report. Backup calculation worksheets are provided in Tables 1b through 4b in a manner similar to the Appendix F tables in the PHEE report.
- The sum total HIs and cancer risks associated with the additional carcinogenic chemicals (Tables 1a through 4a) were compared to the HIs and cancer risks associated with the original COCs (Tables 9-1 through 9-4 of the OU II PHEE report).
- The risks associated with the additional chemicals are summarized in Sections 3.3 and 4.0. The uncertainties in this analysis are summarized in Section 5.0.

3.0 RESULTS BASED ON USE OF REVISED tHBL_c VALUES FOR CARCINOGENS

3.1 Revised COCs

As shown in the revised Table 7-18, additional possible carcinogenic chemicals were added to the list. Although these chemicals are referred to as "additional"

chemicals herein, please note that some of these chemicals were included as COCs at one or more sites in the OU II PHEE report. Several new carcinogenic chemicals were identified for assessment in soil at Site IR-8, Site IR-9, Site IR-6, and Site IR-10. The revised tHBL_c did not result in the addition of any carcinogenic chemicals to the list for groundwater at Sites IR-9 or IR-6/10; therefore additional risk characterization for groundwater exposure pathways at Sites IR-9 or IR-6/10 was not performed.

3.2 Revised Exposure Point Concentrations

As shown in the revised Tables 8-2 through 8-4, the exposure point concentrations (all exposure pathways except ingestion of fruits and vegetables by residents and the exposure scenario for construction workers) for the additional carcinogenic chemicals are presented using methods consistent with those presented in the OU II PHEE report.

3.3 Revised Risk Characterization for Carcinogens

As shown in Tables 1a through 4a, using the exposure point concentrations presented in revised Tables 8-2 through 8-4 for the OU II sites and the methods for risk characterization presented in the OU II PHEE report, the baseline sum total health risk estimates from the additional chemicals were calculated for a hypothetical commercial office worker and hypothetical adult and child resident receptor. As shown, the hypothetical sum total cancer risk estimates from the additional chemicals range from 3×10^{-8} to 2×10^{-6} for Site IR-8, from 6×10^{-9} to 8×10^{-7} for Site IR-9, from 3×10^{-8} to 6×10^{-7} for Site IR-6, and from 2×10^{-10} to 6×10^{-8} for Site IR-10. Calculations for any carcinogens with a noncarcinogenic component resulted in an HI well below 1.0. The results for these additional chemicals are below EPA target risk

criteria of 10^{-4} to 10^{-6} for cancer risks at all IRs except for a slight exceedance at Site IR-8. Results show no exceedances of an HI of 1.0. Summing these values with those presented in the OU II PHEE report based on the original COC list (Table 7-18) does not materially change the results of the OU II PHEE report. Therefore, no revisions were required to Tables 9-1 to 9-4 or to the summary and conclusions presented in the OU II PHEE report.

4.0 RESULTS BASED ON USE OF REVISED tHBL_n FOR NONCARCINOGENS

As shown in the revised Table 7-18, as a result of screening concentrations detected at OU II sites against a revised tHBL_n targeting an HI of 0.01, some noncarcinogenic PAHs, metals and other VOCs would be considered for evaluation. Additional risk characterization on noncarcinogens was not considered necessary at this time for reasons presented below.

With the addition of the new metals, the HIs presented in the OU II PHEE report (Tables 9-1 through 9-5) could change slightly. Because all metals detected at OU II sites, except chromium VI and lead, are considered nonpoint-source-related and are being deferred for future studies, they can be reassessed in future parcel RI studies. Chromium VI and lead have been discussed in the OU II Feasibility Study (FS) and Summary Alternative Selection Report (ASR).

The additional noncarcinogenic PAHs are also considered nonpoint-source-related and would be reassessed in future studies at HPA. The majority of the other organic chemicals identified in groundwater for Site IR-6/10 (revised Table 7-18) were infrequently detected or may be considered laboratory contaminants (e.g, carbon disulfide) or field contaminants (toluene) as documented in the OU II PHEE report.

They are not expected to contribute to the HIs already presented for Site IR-6/10 (Table 9-5).

Based on this analysis, even if the sum total HI is higher based on the addition of nonpoint-source related chemicals such as frequently detected metals and PAHs, the conclusions of the OU II PHEE report and any subsequent OU II studies such as the OU II FS and Summary ASR, are not expected to change.

5.0 CONCLUSIONS

As shown above, the risk characterization results of the OU II PHEE report would not be affected by risk characterization results using additional chemicals identified based on screening soil and groundwater concentrations against conservative health-risk-based concentrations targeting a cancer risk of 1×10^{-8} and a HI of 0.01.

6.0 UNCERTAINTIES

The uncertainties in performing this analysis are similar to those presented in the OU II PHEE report. Targeting a cancer risk of 1×10^{-8} and a HI of 0.01 in estimating tHBLs for evaluating site-related chemicals at OU II sites is considered conservative.

Revised Table 7-18. List of Chemicals of Concern and Additional Chemicals at OU II Sites
 Residential Scenario
 OU II PHEE Report
 Hunters Point Annex

Chemicals	IR-8			IR-9			IR-6		IR-10		IR-6/10
	ss	sbs	gw	ss	sbs	gw	ss	sbs	ss	sbs	gw
VOCs											
Benzene											x
Carbon disulfide			N/A								x(1.2)
Chloroform			N/A			x(15.6)					
1,1-Dichloroethane			N/A								x(1.0)
1,2-Dichloroethane			N/A								x
Ethylbenzene			N/A								x(8.0)
Methyl ethyl ketone			N/A								x(3.2)
Tetrachloroethene			N/A					x			x
Toluene			N/A								x(11.0)
Trichloroethene			N/A						x	x	x
Vinyl chloride			N/A								x
Xylenes			N/A								x(8.0)
SOCs											
Aldrin			N/A				x				
Alpha chlordane		x	N/A								
Aroclor 1260	x	x	N/A				x	x			
4,4'-DDD	x	x	N/A				x				
4,4'-DDE	x	x	N/A								
4,4'-DDT	x	x	N/A								
1,2-Dichlorobenzene			N/A								x(2.6)
1,4-Dichlorobenzene			N/A								x(0.9)
2,4-Dimethylphenol			N/A				x(7.7)				x(3.6)
Endosulfan I			N/A			x(2.0)					
Gamma chlordane		x	N/A								
n-Nitrosodiphenylamine			N/A					x			
Pentachlorophenol			N/A							x	x
1,2,4-Trichlorobenzene		x(2.9)	N/A								x(2.0)
cPAHs											
Benzo(a)anthracene	x	x	N/A	x	x		x	x	x	x	
Benzo(a)pyrene	x	x	N/A	x	x	x	x	x	x	x	
Benzo(b)fluoranthene	x	x	N/A	x	x	x	x	x	x	x	
Benzo(k)fluoranthene	x	x	N/A	x		x	x		x	x	
Chrysene	x	x	N/A	x	x		x	x	x	x	
Dibenzo(a,h)anthracene			N/A				x		x		
Indeno(1,2,3-cd)pyrene	x	x	N/A			x	x	x	x		
nPAHs											
Acenaphthene			N/A			x(2.2)					x
Acenaphthylene			N/A			x(2.2)					
Anthracene			N/A								x
Benzo(g,h,i)perylene			N/A				x(8.9)				
Fluoranthene			N/A								x
Fluorene			N/A					x(20.3)			x
2-Methylnaphthalene			N/A				x(19.0)	x(34.4)		x(7.8)	x
Naphthalene			N/A				x(13.9)	x(18.8)			x
Phenanthrene		x	N/A				x(36.7)	x(35.9)		x(11.8)	x
Pyrene			N/A								x

Revised Table 7-18. List of Chemicals of Concern and Additional Chemicals at OU II Sites
Residential Scenario
OU II PHEE Report
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Chemicals	IR-8			IR-9			IR-6		IR-10		IR-6/10
	ss	sbs	gw	ss	sbs	gw	ss	sbs	ss	sbs	gw
Inorganics/Metals											
Ammonia			N/A								x(97.2)
Antimony	x	x	N/A	x	(x)	[x]	(x)	x			[x]
Arsenic	[x]	[x]	N/A	(x)	[x]	[x]	x	[x]	[x]	x	(x)
Barium	x(100.0)	x(100.0)	N/A	x(100.0)	x(100.0)	x(100.0)	x(100.0)	x(100.0)	x(100.0)	x	x(100.0)
Beryllium	[x]	[x]	N/A	[x]	[x]	x	[x]	[x]	(x)	x	[x]
Cadmium	[x]	[x]	N/A	[x]	[x]	x	[x]	[x]			x(3.0)
Chromium (as Chromium III)	[x]	[x]	N/A	[x]	[x]	x	(x)	[x]	[x]	[x]	x(12.4)
Chromium VI	x	x	N/A	x	x	x	x	x		x	x
Copper	x	x	N/A	x	x	x	x	x	x	x	x
Cyanide			N/A			x(6.7)					
Lead			N/A	x	x		x		x		
Manganese	[x]	[x]	N/A	[x]	[x]	[x]	(x)	[x]	[x]	x	(x)
Mercury	x(56.0)	x(36.9)	N/A	x(57.6)	x(45.1)	x(4.4)	x(38.4)	x(16.4)	x(78.9)	x(70.6)	
Molybdenum		x	N/A			x					(x)
Nickel	[x]	[x]	N/A	[x]	(x)	x	(x)	[x]	[x]	[x]	[x]
Nitrate as N			N/A			x					x(36.4)
Selenium			N/A			x(8.9)	x(1.3)				x(6.0)
Silver			N/A			x(4.4)				x(3.0)	x(5.7)
Thallium			N/A	x(15.2)	x(2.8)		x(11.4)	x(3.1)	x(5.3)	x(4.4)	
Vanadium	x(100.0)	x(100.0)	N/A	x(100.0)	x(100.0)	x(71.9)	x(100.0)	x(100.0)	x(100.0)	x(100.0)	x(54.9)
Zinc	x(100.0)	x(100.0)	N/A		x(100.0)	x(47.2)		x(100.0)	x(100.0)	x(100.0)	x(46.1)

ss = Surface soil; sbs = Subsurface soil; gw = Groundwater
 N/A = Not applicable; groundwater not considered potable.
 [x] = Maximum site concentration and in some cases 95 percent upper confidence limit of arithmetic mean less than interim ambient level for media of concern.
 (x) = 95 percent upper confidence limit of arithmetic mean but not maximum concentration less than interim ambient level for media of concern.
 x(1.2) = 1.2 is the frequency of detection for noncarcinogenic chemicals added based on tHBLn screen and for which additional risk characterization was not performed (see Attachment A).
 Shaded chemicals are those chemicals added based on revised tHBLs (tHBLc and tHBLn).
 Shaded x's show media at individual sites where a chemical has been added.

Revised Table 7-19. Toxicity Values for Risk Characterization /a/
of Chemicals of Concern and Additional Chemicals
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Chemical	CAS Number	Inhalation Route			SF (mg/kg/day) ⁻¹	WOE	Source
		cRID (mg/kg/day)	sRID (mg/kg/day)	Source			
Acenaphthene	83329	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
Acenaphthylene	208968	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
Aldrin	309002	NA	NA	EPA, 1992b	1.70E+01	B2	EPA, 1992b
Alpha chlordane	5103719	NA	NA	EPA, 1992b	1.30E+00	B2	EPA, 1992b
Ammonia	7664417	2.90E-02	2.90E-02	EPA, 1992a	NA	NA	EPA, 1992b
Anthracene	120127	NA	NA	EPA, 1992b	DI	D	EPA, 1992b
Antimony	7440360	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
Aroclor 1260	11096825	NA	NA	EPA, 1992b	7.70E+00	B2	Cal-EPA, 1992a
Arsenic	7440382	NA	NA	EPA, 1992a,b	1.51E+01	A	EPA, 1992b
Barium	7440393	1.43E-04	1.43E-03	EPA, 1992a	NA	NA	EPA, 1992b
Benzene	71432	NA	NA	EPA, 1992b	2.90E-02	A	EPA, 1992a,b
Benzo(a)anthracene	56553	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
Benzo(a)pyrene	50328	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
Benzo(b)fluoranthene	205992	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
Benzo(k)fluoranthene	207089	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
Benzo(g,h,i)perylene	191242	NA	NA	EPA, 1992b	DI	D	EPA, 1992a
Beryllium	7440417	NA	NA	EPA, 1992b	8.40E+00	B2	EPA, 1992a,b
Cadmium	7440439	NA	NA	EPA, 1992b	NA	B1	EPA, 1992b
Carbon disulfide	75150	2.86E-03	2.86E-03	EPA, 1992a	NA	D	EPA, 1992b
Chloroform	67663	NA	NA	EPA, 1992b	8.10E-02	B2	EPA, 1992a,b
Chromium (as Chromium III)	7440473	NA	NA	EPA, 1992a,b	NA	NA	EPA, 1992b
Chromium VI	18540299	NA	NA	EPA, 1992a,b	4.20E+01	A	EPA, 1992b
Chrysene	218019	NA	NA	EPA, 1992a	6.10E+00	B2	EPA, 1992a
Copper	7440508	NA	NA	EPA, 1992a	DI	D	EPA, 1992b
Cyanide	57125	ND	ND	EPA, 1992a	NA	D	EPA, 1992b
4,4'-DDD	72548	NA	NA	EPA, 1992b	NA	B2	EPA, 1992b
4,4'-DDE	72559	NA	NA	EPA, 1992b	NA	B2	EPA, 1992b
4,4'-DDT	50293	NA	NA	EPA, 1992a	3.40E-01	B2	EPA, 1992a,b
Dibenzo(a,h)anthracene	53703	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
1,2-Dichlorobenzene	95501	4.00E-02	4.00E-01	EPA, 1992a	NA	D	EPA, 1992b
1,4-Dichlorobenzene	106467	2.00E-01	2.00E-01	EPA, 1992a	ND	C	EPA, 1992a
1,1-Dichloroethane	75343	1.00E+01	1.00E-01	EPA, 1992a	NA	C	EPA, 1992b
1,2-Dichloroethene	156592	NA	NA	EPA, 1992a	NA	D	EPA, 1992b
2,4-Dimethylphenol	105679	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
Endosulfan I	959988	ND	ND	EPA, 1992a	NA	NA	EPA, 1992b
Ethylbenzene	100414	2.86E-01	2.86E-01	EPA, 1992a,b	NA	D	EPA, 1992b
Fluoranthene	206440	NA	NA	EPA, 1992b	DI	D	EPA, 1992b
Fluorene	86737	NA	NA	EPA, 1992b	DI	D	EPA, 1992b
Gamma chlordane	5103742	NA	NA	EPA, 1992b	1.30E+00	B2	EPA, 1992b
Indeno(1,2,3-cd)pyrene	193395	NA	NA	EPA, 1992b	6.10E+00	B2	EPA, 1992a
Lead	7439921	NA	NA	EPA, 1992b	NA	B2	EPA, 1992b
Manganese	7439965	1.10E-04	1.10E-04	EPA, 1992a,b	DI	D	EPA, 1992b
Mercury	7439976	8.57E-05	8.57E-05	EPA, 1992a	DI	D	EPA, 1992b
Methyl ethyl ketone	78933	2.90E-02	2.90E-01	EPA, 1992b	NA	D	EPA, 1992b
2-Methylnaphthalene	91576	NA	NA	EPA, 1992a	DI	D	EPA, 1992b
Molybdenum	7439987	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
Naphthalene	91203	NA	NA	EPA, 1992a	DI	D	EPA, 1992b
Nickel	7440020	NA	NA	EPA, 1992b	8.40E-01	A	EPA, 1992a
Nitrate	25900	NA	NA	EPA, 1992b	NA	NA	EPA, 1992b
n-Nitrosodiphenylamine	86306	NA	NA	EPA, 1992b	NA	B2	EPA, 1992a,b
Pentachlorophenol	87865	NA	NA	EPA, 1992b	1.80E-02	B2	Cal-EPA, 1992a
Phenanthrene	85018	NA	NA	EPA, 1992a	DI	D	EPA, 1992b

Revised Table 7-19. Toxicity Values for Risk Characterization /a/
of Chemicals of Concern and Additional Chemicals
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Chemical	CAS Number	Inhalation Route			SF		
		cRfD (mg/kg/day)	sRfD (mg/kg/day)	Source	(mg/kg/day) ⁻¹	WOE	Source
Pyrene	129000	NA	NA	EPA, 1992b	DI	D	EPA, 1992b
Selenium	7782492	NA	NA	EPA, 1992a,b	DI	D	EPA, 1992b
Silver	7440224	NA	NA	EPA, 1992a,b	NA	D	EPA, 1992b
Tetrachloroethene	127184	NA	NA	EPA, 1992b	5.10E-02	NA	Cal-EPA, 1992a
Thallium	7440280	NA	NA	EPA, 1992a	NA	NA	EPA, 1992b
Toluene	108883	1.14E-01	5.71E-01	EPA, 1992a,b	DI	D	EPA, 1992b
1,2,4-Trichlorobenzene	120821	3.00E-02	3.00E-03	EPA, 1992a	DI	D	EPA, 1992b
Trichloroethene	79016	NA	NA	EPA, 1992b	1.00E-02	B2	Cal-EPA, 1992a
Vanadium	7440622	NA	NA	EPA, 1992b	NA	NA	EPA, 1992a
Vinyl chloride	75014	NA	NA	EPA, 1992b	2.95E-01	A	EPA, 1992a
Xylenes	1330207	NA	NA	EPA, 1992a	NA	D	EPA, 1992b
Zinc	7440666	NA	NA	EPA, 1992a	DI	D	EPA, 1992b

Revised Table 7-19. Toxicity Values for Risk Characterization /a/
of Chemicals of Concern and Additional Chemicals
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Chemical	CAS Number	Oral Route			SF		
		cRfD (mg/kg/day)	sRfD (mg/kg/day)	Source	(mg/kg/day) ⁻¹	WOE	Source
Acenaphthene	83329	6.00E-02	6.00E-01	EPA, 1992a,b	NA	NA	EPA, 1992b
Acenaphthylene	208968	4.00E-02	4.00E-02	EPA, 1992a,b	DI	D	EPA, 1992b
Aldrin	309002	3.00E-05	3.00E-05	EPA, 1992a,b	1.70E+01	B2	EPA, 1992b
Alpha chlordane	5103719	6.00E-05	6.00E-05	EPA, 1992a,b	1.30E+00	B2	EPA, 1992b
Ammonia	7664417	9.71E-01	9.71E-01	EPA, 1992a	NA	NA	EPA, 1992b
Anthracene	120127	3.00E-01	3.00E+00	EPA, 1992a,b	DI	D	EPA, 1992b
Antimony	7440360	4.00E-04	4.00E-04	EPA, 1992a,b	NA	NA	EPA, 1992b
Aroclor 1260	11096825	NA	NA	EPA, 1992b	7.70E+00	B2	EPA, 1992b
Arsenic	7440382	3.00E-04	3.00E-04	EPA, 1988c	1.75E+00	A	EPA, 1988c
Barium	7440393	7.00E-02	7.00E-02	EPA, 1992a,b	NA	NA	EPA, 1992b
Benzene	71432	NA	NA	EPA, 1992b	2.90E-02	A	EPA, 1992a,b
Benzo(a)anthracene	56553	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Benzo(a)pyrene	50328	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Benzo(b)fluoranthene	205992	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Benzo(k)fluoranthene	207089	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Benzo(g,h,i)perylene	191242	4.00E-02	4.00E-02	EPA, 1992a	DI	D	EPA, 1992b
Beryllium	7440417	5.00E-03	5.00E-03	EPA, 1992a,b	4.30E+00	B2	EPA, 1992b
Cadmium	7440439	5.00E-04	NA	EPA, 1992b	6.30E+00	B1	EPA, 1992b
Carbon disulfide	75150	1.00E-01	1.00E-01	EPA, 1992a,b	NA	D	EPA, 1992b
Chloroform	67663	1.00E-02	1.00E-02	EPA, 1992a,b	6.10E-03	B2	EPA, 1992b
Chromium (as Chromium III)	7440473	1.00E+00	1.00E+00	EPA, 1992a,b	NA	NA	EPA, 1992b
Chromium VI	18540299	5.00E-03	2.00E-02	EPA, 1992a,b	4.20E-01	A	Cal-EPA, 1992a
Chrysene	218019	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Copper	7440508	3.70E-02	3.70E-02	EPA, 1992a	DI	D	EPA, 1992b
Cyanide	57125	2.00E-02	2.00E-02	EPA, 1992a	NA	D	EPA, 1992b
4,4'-DDD	72548	NA	NA	EPA, 1992b	2.40E-01	B2	EPA, 1992b
4,4'-DDE	72559	NA	NA	EPA, 1992b	3.40E-01	B2	EPA, 1992b
4,4'-DDT	50293	5.00E-04	5.00E-04	EPA, 1992a,b	3.40E-01	B2	EPA, 1992a,b
Dibenzo(a,h)anthracene	53703	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
1,2-Dichlorobenzene	95501	9.00E-02	9.00E-01	EPA, 1992a,b	NA	D	EPA, 1992b
1,4-Dichlorobenzene	106467	ND	ND	EPA, 1992a	2.40E-02	C	EPA, 1992a
1,1-Dichloroethane	75343	NA	C		1.00E+01	1.00E-	EPA, 1992a
1,2-Dichloroethene	156592	1.00E-02	1.00E-01	EPA, 1992a	NA	D	EPA, 1992b
2,4-Dimethylphenol	105679	2.00E-02	2.00E-01	EPA, 1992a,b	NA	NA	EPA, 1992b
Endosulfan I	959988	NA	2.00E-04	EPA, 1992a,b	NA	NA	EPA, 1992b
Ethylbenzene	100414	1.00E-01	1.00E+00	EPA, 1992a,b	NA	D	EPA, 1992b
Fluoranthene	206440	4.00E-02	4.00E-01	EPA, 1992a,b	DI	D	EPA, 1992b
Fluorene	86737	4.00E-02	4.00E-01	EPA, 1992a,b	DI	D	EPA, 1992b
Gamma chlordane	5103742	6.00E-05	6.00E-05	EPA, 1992a,b	1.30E+00	B2	EPA, 1992b
Indeno(1,2,3-cd)pyrene	193395	NA	NA	EPA, 1992b	5.79E+00	B2	EPA, 1992a,b
Lead	7439921	NA	NA	EPA, 1992b	NA	B2	EPA, 1992b
Manganese	7439965	1.00E-01	1.00E-01	EPA, 1992b	DI	D	EPA, 1992b
Mercury	7439976	3.00E-04	3.00E-04	EPA, 1992a	DI	D	EPA, 1992b
Methyl ethyl ketone	78933	5.00E-02	5.00E-01	EPA, 1992a	NA	D	EPA, 1992b
2-Methylnaphthalene	91576	4.00E-02	4.00E-02	EPA, 1992a	DI	D	EPA, 1992b
Molybdenum	7439987	5.00E-03	5.00E-03	EPA, 1992a	NA	NA	EPA, 1992b
Naphthalene	91203	4.00E-02	4.00E-02	EPA, 1992a	DI	D	EPA, 1992b
Nickel	7440020	2.00E-02	2.00E-02	EPA, 1992a,b	8.40E-01	NA	Cal-EPA, 1992a
Nitrate	25900	1.60E+00	1.60E+00	EPA, 1992b	NA	NA	EPA, 1992b
n-Nitrosodiphenylamine	86306	NA	NA	EPA, 1992b	4.90E-03	B2	EPA, 1992a,b
Pentachlorophenol	87865	3.00E-02	3.00E-02	EPA, 1992a,b	1.20E-01	B2	EPA, 1992b
Phenanthrene	85018	4.00E-02	4.00E-02	EPA, 1992a	DI	D	EPA, 1992b

Revised Table 7-19. Toxicity Values for Risk Characterization /a/
of Chemicals of Concern and Additional Chemicals
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Chemical	CAS Number	Oral Route			SF		
		cRfD (mg/kg/day)	sRfD (mg/kg/day)	Source	(mg/kg/day) ⁻¹	WOE	Source
Pyrene	129000	3.00E-02	3.00E-01	EPA, 1992a,b	DI	D	EPA, 1992b
Selenium	7782492	5.00E-03	5.00E-03	EPA, 1992a,b	DI	D	EPA, 1992b
Silver	7440224	5.00E-03	5.00E-03	EPA, 1992a,b	NA	D	EPA, 1992b
Tetrachloroethene	127184	1.00E-02	1.00E-01	EPA, 1992a,b	5.10E-02	NA	Cal-EPA, 1992a
Thallium	7440280	7.00E-05	7.00E-04	EPA, 1992a	NA	NA	EPA, 1992b
Toluene	108883	2.00E-01	2.00E+00	EPA, 1992a,b	DI	D	EPA, 1992b
1,2,4-Trichlorobenzene	120821	1.00E-02	1.00E-02	EPA, 1992a	DI	D	EPA, 1992b
Trichloroethene	79016	NA	NA	EPA, 1992b	1.50E-02	B2	Cal-EPA, 1992a
Vanadium	7440622	7.00E-03	7.00E-03	EPA, 1992a	NA	NA	EPA, 1992a
Vinyl chloride	75014	NA	NA	EPA, 1992b	1.90E+00	A	EPA, 1992a
Xylenes	1330207	4.00E+00	2.00E+00	EPA, 1992a,b	NA	D	EPA, 1992b
Zinc	7440666	3.00E-01	3.00E-01	EPA, 1992a	DI	D	EPA, 1992b

6.00E-02 = 6.00 x 10⁻².

Oral toxicity values used to evaluate dermal exposures.

CAS Number = Chemical abstract services number.

cRfD = Chronic reference dose.

sRfD = Subchronic reference dose.

SF = Slope factor.

mg/kg/day = milligrams per kilogram per day.

NA = Agency-established toxicity value not available.

DI = Data inadequate for agency to establish toxicity value.

WOE = Weight of evidence.

WOE definitions as follows:

A = Human carcinogen.

B2 = Probable human carcinogen.

D = Not classified as to its carcinogenicity.

The RfDs for additional noncarcinogens were not updated for the purposes of this analysis.

/a/ Legend describing contents of this table was not revised;

see OU II PHEE report Tables 6-1 and 7-19.

**Revised Table 8-2. Summary of Exposure Point Concentrations of COCs and Additional Chemicals
for Average and Reasonable Maximum Exposures at Site IR-8
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Chemicals of Concern /a/	Air (Respirable Particulates)				Surface Soil		Subsurface Soil	
	Residents/Office Workers				All Receptors		All Receptors	
	Outdoor Air /b/		Indoor Air /b/		Average (mg/kg)	RME (mg/kg)	Average (mg/kg)	RME (mg/kg)
	Average (mg/m ³)	RME (mg/m ³)	Average (mg/m ³)	RME (mg/m ³)				
SOCs								
Alpha chlordane	---	---	---	---	---	---	1.03E-01	4.40E-03
Aroclor 1260	2.74E-08	1.19E-07	2.06E-08	8.95E-08	3.92E-01	1.71E+00	2.23E-01	2.02E+00
4,4'-DDD	2.86E-09	1.40E-09	2.15E-09	1.05E-09	4.09E-02	2.00E-02	2.55E-02	3.79E-01
4,4'-DDE	2.79E-09	6.09E-10	2.10E-09	4.57E-10	3.99E-02	8.70E-03	2.28E-02	3.06E-01
4,4'-DDT	3.41E-09	1.04E-08	2.56E-09	7.81E-09	4.87E-02	1.49E-01	1.73E-02	9.36E-02
Gamma chlordane	---	---	---	---	---	---	1.03E-01	4.30E-03
cPAHs								
Benzo(a)anthracene	1.60E-08	3.85E-08	1.20E-08	2.89E-08	2.28E-01	5.51E-01	1.93E-01	1.40E-01
Benzo(a)pyrene	1.62E-08	4.38E-08	1.22E-08	3.29E-08	2.32E-01	6.26E-01	1.96E-01	8.30E-02
Benzo(b)fluoranthene	1.90E-08	6.13E-08	1.42E-08	4.60E-08	2.71E-01	8.76E-01	1.95E-01	1.30E-01
Benzo(k)fluoranthene	1.51E-08	1.75E-08	1.13E-08	1.31E-08	2.15E-01	2.50E-01	1.96E-01	8.90E-02
Chrysene	1.58E-08	4.10E-08	1.18E-08	3.08E-08	2.25E-01	5.86E-01	1.83E-01	3.70E-01
Indeno(1,2,3-cd)pyrene	1.44E-08	1.26E-08	1.08E-08	9.45E-09	2.06E-01	1.80E-01	1.97E-01	4.60E-02
Metals								
Arsenic	2.57E-07	5.77E-07	1.93E-07	4.33E-07	3.67E+00	8.24E+00	3.25E+00	7.99E+00
Beryllium	2.94E-08	5.18E-08	2.20E-08	3.88E-08	4.20E-01	7.40E-01	3.90E-01	7.00E-01
Cadmium	3.08E-08	5.39E-08	2.31E-08	4.04E-08	4.40E-01	7.70E-01	6.50E-01	1.62E+00
Chromium (as Chromium III)	1.34E-05	3.80E-05	1.01E-05	2.85E-05	1.92E+02	5.43E+02	2.59E+02	7.78E+02
Chromium VI	5.18E-09	2.24E-08	3.89E-09	1.68E-08	7.40E-02	3.20E-01	4.45E-02	2.10E+00
Manganese	6.47E-05	1.08E-04	4.85E-05	8.07E-05	9.24E+02	1.54E+03	8.86E+02	1.64E+03
Nickel	2.34E-05	7.84E-05	1.76E-05	5.88E-05	3.35E+02	1.12E+03	3.91E+02	1.30E+03

2.87E-07 = 2.87 x 10⁻⁷

mg/m³ = milligrams per cubic meter.

mg/kg = milligrams per kilogram.

Average = estimated using arithmetic mean concentration.

RME = estimated using lesser of maximum and 95% upper confidence limit concentration.

SOCs = semivolatile organic compounds.

cPAHs = carcinogenic polycyclic aromatic hydrocarbons.

Dashes (--) denote chemical not of concern for receptor and pathway of concern.

/a/ See Revised Table 7-18.

/b/ Outdoor air concentrations for resident/office workers based on surface soil concentrations x 1E-06 kg/mg x RP of 0.07 mg/m³ (Hawley, 1985).

Indoor air concentrations based on 75% of outdoor air concentrations (Hawley, 1985).

Note: In some cases the arithmetic mean concentration exceeds the maximum detected concentration due to elevated detection limits;

see Section 4.8 of the OU II PHEE report.

Shaded areas represent the revisions based on the additional carcinogenic chemicals added to the revised Table 7-18.

Revised Table 8-3. Summary of Exposure Point Concentrations of COCs and Additional Chemicals
for Average and Reasonable Maximum Exposures at Site IR-9
OU II PHEE Report
Hunters Point Annex

Chemicals of Concern /a/	Air (Respirable Particulates)				Surface Soil		Subsurface Soil		Groundwater	
	Residents/Office Workers				All Receptors		All Receptors		Residents/ Office Workers	
	Outdoor Air /b/		Indoor Air /b/		Average (mg/kg)	RME (mg/kg)	Average (mg/kg)	RME (mg/kg)	Average (mg/l)	RME (mg/l)
	Average (mg/m ³)	RME (mg/m ³)	Average (mg/m ³)	RME (mg/m ³)						
SOCs										
cPAHs										
Benzo(a)anthracene	1.59E-08	7.70E-09	1.19E-08	5.77E-09	2.27E-01	1.10E-01	2.04E-01	3.60E-02	ND	ND
Benzo(a)pyrene	1.66E-08	2.10E-08	1.24E-08	1.57E-08	2.36E-01	3.00E-01	2.04E-01	7.20E-02	9.50E-04	3.10E-04
Benzo(b)fluoranthene	1.57E-08	3.15E-09	1.18E-08	2.36E-09	2.24E-01	4.50E-02	2.00E-01	5.00E-02	9.20E-04	2.00E-04
Benzo(k)fluoranthene	1.60E-08	3.43E-09	1.20E-08	2.57E-09	2.29E-01	4.90E-02	ND	ND	9.10E-04	8.00E-05
Chrysene	1.63E-08	3.43E-08	1.22E-08	2.57E-08	2.33E-01	4.90E-01	1.92E-01	1.60E-01	ND	ND
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	9.90E-04	3.00E-04
Metals										
Antimony	--	--	--	--	--	--	5.42E+00	1.62E+01	1.21E-02	2.17E-02
Arsenic	2.87E-07	7.97E-07	2.15E-07	5.98E-07	4.10E+00	1.14E+01	2.54E+00	6.22E+00	3.19E-03	7.81E-03
Beryllium	3.64E-08	7.98E-08	2.73E-08	5.98E-08	5.20E-01	1.14E+00	3.90E-01	7.80E-01	--	--
Cadmium	4.97E-08	1.36E-07	3.73E-08	1.02E-07	7.10E-01	1.94E+00	6.60E-01	1.48E+00	--	--
Chromium (as Chromium III)	1.40E-05	3.84E-05	1.05E-05	2.88E-05	2.00E+02	5.49E+02	5.52E+02	1.53E+03	--	--
Chromium VI	3.55E-09	1.35E-08	2.66E-09	1.01E-08	5.07E-02	1.93E-01	7.81E-02	3.99E-01	5.61E-02	2.72E-01
Lead	4.36E-06	2.83E-05	3.27E-06	2.12E-05	6.23E+01	4.04E+02	1.09E+01	6.29E+01	--	--
Manganese	8.23E-05	1.76E-04	6.17E-05	1.32E-04	1.18E+03	2.52E+03	9.32E+02	2.02E+03	1.11E+00	3.56E+00
Nickel	2.52E-05	8.66E-05	1.89E-05	6.50E-05	3.61E+02	1.24E+03	1.12E+03	3.21E+03	5.31E-02	1.50E-01
Inorganics										
Nitrate	--	--	--	--	--	--	--	--	2.32E+00	2.11E+01

3.65E-07 = 3.65 x 10⁻⁷

mg/m³ = milligrams per cubic meters.

mg/kg = milligrams per kilogram.

mg/l = milligrams per liter.

Average = estimated using arithmetic mean concentration.

RME = estimated using lesser of maximum and 95% upper confidence limit concentration.

SOCs = semivolatile organic compounds.

cPAHs = carcinogenic polycyclic aromatic hydrocarbons.

Dashes (--) denote chemical not of concern for receptor and pathway of concern.

/a/ See Revised Table 7-18.

/b/ Outdoor air concentrations for resident/office workers based on surface soil concentrations x 1E-06 kg/mg x RP of 0.07 mg/m³ (Hawley, 1985).

Indoor air concentrations based on 75% of outdoor air concentrations (Hawley, 1985).

Note: In some cases the arithmetic mean concentration exceeds the maximum detected concentration due to elevated detection limits;

see Section 4.8 of the OU II PHEE report.

Shaded areas represent the revisions based on the additional carcinogenic chemicals added to the revised Table 7-18.

Revised Table 8-4. Summary of Exposure Point Concentrations of COCs and Additional Chemicals
for Average and Reasonable Maximum Exposures at Site IR-6
OU II PHEE Report
Hunters Point Annex

Chemicals of Concern /a/	Air (Respirable Particulates)				Surface Soil		Subsurface Soil	
	Residents/Office Workers				All Receptors		All Receptors	
	Outdoor Air /b/		Indoor Air /b/		Average (mg/kg)	RME (mg/kg)	Average (mg/kg)	RME (mg/kg)
	Average (mg/m ³)	RME (mg/m ³)	Average (mg/m ³)	RME (mg/m ³)				
VOCs								
Tetrachloroethene	--	--	--	--	--	--	4.67E-02	5.56E-01
SOCs								
Aldrin	5.63E-09	9.10E-09	4.22E-09	6.82E-09	8.04E-02	1.30E-01	--	--
Aroclor 1260	2.33E-07	2.80E-06	1.75E-07	2.10E-06	3.33E+00	4.01E+01	4.42E-01	1.95E+00
4,4'-DDD	1.33E-08	1.33E-09	9.97E-09	9.97E-10	1.90E-01	1.90E-02	--	--
n-Nitrosodiphenylamine	--	--	--	--	--	--	5.45E+00	8.00E-01
cPAHs								
Benzo(a)anthracene	1.62E-07	5.81E-08	1.21E-07	4.36E-08	2.31E+00	8.30E-01	5.49E+00	4.40E-01
Benzo(a)pyrene	1.63E-07	9.10E-08	1.22E-07	6.82E-08	2.32E+00	1.30E+00	5.49E+00	1.20E-01
Benzo(b)fluoranthene	1.65E-07	1.75E-07	1.24E-07	1.31E-07	2.35E+00	2.50E+00	5.48E+00	1.50E-01
Benzo(k)fluoranthene	1.65E-07	1.75E-07	1.24E-07	1.31E-07	2.36E+00	2.50E+00	ND	ND
Chrysene	1.62E-07	1.33E-07	1.22E-07	9.97E-08	2.32E+00	1.90E+00	5.48E+00	3.00E-01
Dibenzo(a,h)anthracene	1.62E-07	5.88E-09	1.21E-07	4.41E-09	2.31E+00	8.40E-02	ND	ND
Indeno(1,2,3-cd)pyrene	1.62E-07	3.99E-08	1.21E-07	2.99E-08	2.31E+00	5.70E-01	5.49E+00	7.70E-02
Metals								
Antimony	3.33E-07	8.00E-07	2.50E-07	6.00E-07	4.76E+00	1.14E+01	--	--
Arsenic	2.70E-07	1.23E-06	2.03E-07	9.25E-07	3.86E+00	1.76E+01	2.23E+00	4.18E+00
Beryllium	2.59E-08	5.25E-08	1.94E-08	3.94E-08	3.70E-01	7.50E-01	4.80E-01	8.10E-01
Cadmium	4.13E-08	1.02E-07	3.10E-08	7.66E-08	5.90E-01	1.46E+00	4.70E-01	7.80E-01
Chromium (as Chromium III)	2.07E-05	5.90E-05	1.55E-05	4.42E-05	2.96E+02	8.43E+02	3.90E+02	1.11E+03
Chromium VI	9.87E-09	7.70E-09	7.41E-09	5.77E-09	1.41E-01	1.10E-01	3.52E-02	9.73E-02
Lead	1.83E-05	9.88E-05	1.37E-05	7.41E-05	2.62E+02	1.41E+03	--	--
Manganese	5.74E-05	1.51E-04	4.31E-05	1.13E-04	8.20E+02	2.16E+03	7.37E+02	1.67E+03
Nickel	4.20E-05	1.28E-04	3.15E-05	9.57E-05	6.00E+02	1.82E+03	7.11E+02	2.05E+03

3.76E-06 = 3.76 x 10⁻⁶

mg/m³ = milligrams per cubic meter.

mg/kg = milligrams per kilogram.

mg/l = milligrams per liter.

Average = estimated using arithmetic mean concentration.

RME = estimated using lesser of maximum and 95% upper confidence limit concentration.

/a/ See Revised Table 7-18.

/b/ Outdoor air concentrations for resident/office workers based on surface soil concentrations x 1E-06 kg/mg x RP of 0.07 mg/m³ (Hawley, 1985).

Indoor air concentrations based on 75% of outdoor air concentrations (Hawley, 1985).

Note: In some cases the arithmetic mean concentration exceeds the maximum detected concentration due to elevated detection limits;

see Section 4.8 of the OU II PHEE report.

VOCs = volatile organic compounds.

SOCs = semivolatile organic compounds.

cPAHs = carcinogenic polycyclic aromatic hydrocarbons.

Dashes (--) denote chemical not of concern for receptor and pathway of concern.

Shaded areas represent the revisions based on the additional carcinogenic chemicals added to the revised Table 7-18.

Revised Table 8-5. Summary of Exposure Point Concentrations of COCs and Additional Chemicals
for Average and Reasonable Maximum Exposures at Site IR-10
OU II PHEE Report
Hunters Point Annex

Chemicals of Concern /a/	Air (Respirable Particulates)				Surface Soil		Subsurface Soil		IR-6/10 Groundwater	
	Residents/Office Workers				All Receptors		All Receptors		Residents/ Office Workers	
	Outdoor Air /b/		Indoor Air /b/		Average (mg/kg)	RME (mg/kg)	Average (mg/kg)	RME (mg/kg)	Average (mg/l)	RME (mg/l)
	Average (mg/m ³)	RME (mg/m ³)	Average (mg/m ³)	RME (mg/m ³)						
VOCs										
Benzene	--	--	--	--	--	--	--	--	4.61E-03	2.40E-02
1,2-Dichloroethene	--	--	--	--	--	--	--	--	8.54E-03	4.88E-02
Tetrachloroethene	--	--	--	--	--	--	--	--	2.17E-03	3.00E-03
Trichloroethene	5.16E-09	3.94E-08	3.87E-09	2.95E-08	7.37E-02	5.82E-01	7.28E-02	6.78E-01	3.67E-03	1.43E-02
Vinyl chloride	--	--	--	--	--	--	--	--	6.07E-03	1.86E-02
SOCs										
Pentachlorophenol	--	--	--	--	--	--	1.17E+00	4.20E-02	--	3.00E-03
cPAHs										
Benzo(a)anthracene	1.34E-08	2.04E-08	1.01E-08	1.53E-08	1.92E-01	2.91E-01	2.38E-01	5.10E-02	--	--
Benzo(a)pyrene	1.24E-08	1.79E-08	9.30E-09	1.34E-08	1.77E-01	2.55E-01	2.41E-01	4.60E-02	--	--
Benzo(b)fluoranthene	1.36E-08	2.67E-08	1.02E-08	2.00E-08	1.94E-01	3.81E-01	2.39E-01	6.70E-02	--	--
Benzo(k)fluoranthene	1.35E-08	2.11E-08	1.01E-08	1.58E-08	1.93E-01	3.01E-01	2.41E-01	3.80E-02	--	--
Chrysene	1.23E-08	2.12E-08	9.25E-09	1.59E-08	1.76E-01	3.02E-01	2.30E-01	5.70E-01	--	--
Dibenzo(a,h)anthracene	1.22E-08	5.25E-09	9.17E-09	3.94E-09	1.75E-01	7.50E-02	ND	ND	--	--
Indeno(1,2,3-cd)pyrene	1.27E-08	1.40E-08	9.55E-09	1.05E-08	1.82E-01	2.00E-01	ND	ND	--	--
nPAHs										
Acenaphthene	--	--	--	--	--	--	--	--	1.61E-02	9.54E-02
Anthracene	--	--	--	--	--	--	--	--	5.42E-03	9.42E-03
Fluoranthene	--	--	--	--	--	--	--	--	5.74E-03	1.34E-02
Fluorene	--	--	--	--	--	--	--	--	1.16E-02	6.73E-02
2-Methylnaphthalene	--	--	--	--	--	--	--	--	1.17E-02	8.08E-02
Naphthalene	--	--	--	--	--	--	--	--	6.61E-02	6.18E-01
Phenanthrene	--	--	--	--	--	--	--	--	1.09E-02	6.22E-02
Pyrene	--	--	--	--	--	--	--	--	5.17E-03	8.41E-03

**Revised Table 8-5. Summary of Exposure Point Concentrations of COCs and Additional Chemicals
for Average and Reasonable Maximum Exposures at Site IR-10
OU II PHEE Report
Hunters Point Annex**

Chemicals of Concern /a/	Air (Respirable Particulates)				Surface Soil		Subsurface Soil		IR-6/10 Groundwater	
	Residents/Office Workers				All Receptors		All Receptors		Residents/ Office Workers	
	Outdoor Air /b/		Indoor Air /b/		Average (mg/kg)	RME (mg/kg)	Average (mg/kg)	RME (mg/kg)	Average (mg/l)	RME (mg/l)
	Average (mg/m ³)	RME (mg/m ³)	Average (mg/m ³)	RME (mg/m ³)						
Metals										
Antimony	--	--	--	--	--	--	--	--	1.34E-02	3.20E-02
Arsenic	2.84E-07	5.86E-07	2.13E-07	4.39E-07	4.05E+00	8.37E+00	5.06E+00	2.04E+01	3.41E-03	9.29E-03
Barium	--	--	--	--	--	--	1.43E+02	4.74E+02	--	--
Beryllium	3.01E-08	9.80E-08	2.26E-08	7.35E-08	4.30E-01	1.40E+00	4.30E-01	1.42E+00	4.10E-04	1.07E-03
Chromium (as Chromium III)	1.47E-05	4.12E-05	1.10E-05	3.09E-05	2.10E+02	5.88E+02	3.97E+02	8.09E+02	--	--
Chromium VI	--	--	--	--	--	--	2.56E-01	2.00E-01	2.73E-02	1.69E-01
Lead	4.20E-06	2.86E-05	3.15E-06	2.14E-05	6.00E+01	4.08E+02	--	--	--	--
Manganese	6.97E-05	1.80E-04	5.23E-05	1.35E-04	9.96E+02	2.57E+03	1.52E+03	1.12E+04	1.47E+00	5.08E+00
Molybdenum	--	--	--	--	--	--	--	--	9.24E-03	3.63E-02
Nickel	2.98E-05	9.18E-05	2.23E-05	6.89E-05	4.26E+02	1.31E+03	9.90E+02	2.02E+03	2.18E-02	6.20E-02

4.61E-03 = 4.61 x 10⁻³

mg/m³ = milligrams per cubic meters.

mg/kg = milligrams per kilograms.

mg/l = milligrams per liter.

Groundwater exposure point concentrations are representative of groundwater at both Sites IR-6 and IR-10.

Average = estimated using arithmetic mean concentration.

RME = estimated using lesser of maximum and 95% upper confidence limit concentration.

SOCs = semivolatile organic compounds.

cPAHs = carcinogenic polycyclic aromatic hydrocarbons.

nPAHs = noncarcinogenic polycyclic aromatic hydrocarbons.

Dashes (--) denote chemical not of concern for receptor and pathway of concern.

/a/ See Revised Table 7-18.

/b/ Outdoor air concentrations for resident/office workers based on surface soil concentrations x 1E-06 kg/mg x RP of 0.07 mg/m³ (Hawley, 1985).

Indoor air concentrations based on 75% of outdoor air concentrations (Hawley, 1985).

Note: In some cases the arithmetic mean concentration exceeds the maximum detected concentration due to elevated detection limits;

see Section 4.8 of the OU II PHEE report.

Shaded areas represent the revisions based on the additional carcinogenic chemicals added to the revised Table 7-18.

**Table 1a. Summary of Estimated Risks from Multipathway Exposures,
Site IR-8, Additional Chemicals /a/
OU II PHEE Report
Hunters Point Annex**

Receptor Populations Exposure Pathways	Hazard Index		Potential Upper Bound Excess Cancer Risk	
	Average	RME	Average	RME
Future Hypothetical Onsite				
<u>Adult Office Workers</u>				
Inhalation of dust in indoor air	--	--	1E-09	1E-08
Inhalation of dust in outdoor air	--	--	3E-09	5E-08
Ingestion of soil	5E-04	9E-04	4E-09	3E-08
Dermal contact with soil	5E-04	3E-03	2E-08	2E-07
Multipathway Exposures	1E-03	4E-03	3E-08	3E-07
Future Hypothetical Onsite				
<u>Child/Adult Residents</u>				
Inhalation of dust in indoor air	--	--	2E-08	2E-07
Inhalation of dust in outdoor air	--	--	9E-09	8E-08
Ingestion of soil	1E-02	3E-02	9E-08	3E-07
Ingestion of fruits	(1E-02)	(3E-02)	(9E-08)	(3E-07)
Ingestion of vegetables	(1E-02)	(3E-02)	(9E-08)	(3E-07)
Dermal contact with soil	3E-03	2E-02	9E-08	7E-07
Multipathway Exposures	5E-02	1E-01	4E-07	2E-06
Future Hypothetical Onsite				
<u>Adult Residents</u>				
Inhalation of dust in indoor air	--	--	6E-09	8E-08
Inhalation of dust in outdoor air	--	--	4E-10	1E-08
Ingestion of soil	1E-03	3E-03	1E-08	1E-07
Ingestion of fruits	(1E-03)	(3E-03)	(1E-08)	(1E-07)
Ingestion of vegetables	(1E-03)	(3E-03)	(1E-08)	(1E-07)
Dermal contact with soil	7E-04	5E-03	3E-08	3E-07
Multipathway Exposures	5E-03	1E-02	7E-08	8E-07

5E-04 = 5 x 10⁻⁴

Dashes (--) = pathway not calculable because organic chemicals of concern do not have toxicity values.

All figures rounded to one significant figure for presentation purposes. Backup to table attached; revised Appendix F tables of OU II PHEE report used to produce these tables.

(2E-02) = For the purposes of this analysis, HIs and cancer risks assumed to be equal to ingestion of soil exposure pathway (i.e., additional modeling was not performed). Any additional chemicals based on this analysis which were only detected in subsurface soil (i.e., alpha and gamma chlordane) were not included in this analysis.

/a/ Backup calculations showing the results for each additional chemical are provided in subsequent pages to this table (Table 1b). These results relate to the results presented in Table 9-1 of OU II PHEE report for the original COCs.

Table 1b. Calculation Worksheet to Table 1a.

AVERAGE SCENARIO	Hazard Quotient			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Cadmium	--	--	4E-04	2E-04
Chromium VI	--	--	7E-06	3E-06
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	5E-05	3E-04
TOTAL HAZARD INDEX	--	--	5E-04	5E-04

RME SCENARIO	Hazard Quotient			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Cadmium	--	--	8E-04	9E-04
Chromium VI	--	--	3E-05	4E-05
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	1E-04	2E-03
TOTAL HAZARD INDEX	--	--	9E-04	3E-03

AVERAGE SCENARIO	Cancer Risk			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Cadmium	5E-10	1E-09	--	--
Chromium VI	5E-10	2E-09	2E-09	9E-10
4,4'-DDD	--	--	6E-10	4E-09
4,4'-DDE	--	--	9E-10	6E-09
4,4'-DDT	3E-12	8E-12	1E-09	7E-09
TOTAL RISK	1E-09	3E-09	4E-09	2E-08

RME SCENARIO	Cancer Risk			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Cadmium	3E-09	1E-08	--	--
Chromium VI	9E-09	4E-08	2E-08	3E-08
4,4'-DDD	--	--	8E-10	1E-08
4,4'-DDE	--	--	5E-10	9E-09
4,4'-DDT	3E-11	1E-10	9E-09	2E-07
TOTAL RISK	1E-08	5E-08	3E-08	2E-07

Table 1b. Calculation Worksheet to Table 1a.

Hazard Quotient				
AVERAGE SCENARIO	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
<u>Child/Adult Residents</u>				
Cadmium	--	--	1E-02	1E-03
Chromium VI	--	--	2E-04	2E-05
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	1E-03	2E-03
TOTAL HAZARD INDEX	--	--	1E-02	3E-03

Hazard Quotient				
RME SCENARIO	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
<u>Child/Adult Residents</u>				
Cadmium	--	--	2E-02	5E-03
Chromium VI	--	--	9E-04	2E-04
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	4E-03	1E-02
TOTAL HAZARD INDEX	--	--	3E-02	2E-02

Cancer Risk				
AVERAGE SCENARIO	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
<u>Child/Adult Residents</u>				
Cadmium	1E-08	4E-09	--	--
Chromium VI	1E-08	5E-09	4E-08	5E-09
4,4'-DDD	--	--	1E-08	2E-08
4,4'-DDE	--	--	2E-08	3E-08
4,4'-DDT	8E-11	2E-11	2E-08	4E-08
TOTAL RISK	2E-08	9E-09	9E-08	9E-08

Cancer Risk				
RME SCENARIO	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
<u>Child/Adult Residents</u>				
Cadmium	5E-08	2E-08	--	--
Chromium VI	1E-07	6E-08	2E-07	1E-07
4,4'-DDD	--	--	9E-09	5E-08
4,4'-DDE	--	--	5E-09	3E-08
4,4'-DDT	6E-10	2E-10	9E-08	6E-07
TOTAL RISK	2E-07	8E-08	3E-07	7E-07

Table 1b. Calculation Worksheet to Table 1a.

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	1E-03	3E-04
Chromium VI	--	--	2E-05	5E-06
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	1E-04	5E-04
TOTAL HAZARD INDEX	--	--	1E-03	7E-04

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	2E-03	1E-03
Chromium VI	--	--	9E-05	5E-05
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	--	--	4E-04	3E-03
TOTAL HAZARD INDEX	--	--	3E-03	5E-03

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	3E-09	2E-10	--	--
Chromium VI	3E-09	2E-10	5E-09	1E-09
4,4'-DDD	--	--	2E-09	6E-09
4,4'-DDE	--	--	2E-09	8E-09
4,4'-DDT	2E-11	1E-12	3E-09	1E-08
TOTAL RISK	6E-09	4E-10	1E-08	3E-08

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	2E-08	3E-09	--	--
Chromium VI	6E-08	7E-09	8E-08	4E-08
4,4'-DDD	--	--	3E-09	2E-08
4,4'-DDE	--	--	2E-09	1E-08
4,4'-DDT	2E-10	3E-11	3E-08	3E-07
TOTAL RISK	8E-08	1E-08	1E-07	3E-07

**Table 2a. Summary of Estimated Risks from Multipathway Exposures,
Site IR-9, Additional Chemicals /a/
OU II PHEE Report
Hunters Point Annex**

Harding Lawson Associates

Receptor Populations Exposure Pathways	Hazard Index		Potential Upper Bound Excess Cancer Risk	
	Average	RME	Average	RME
Future Hypothetical Onsite				
Adult Office Workers				
Inhalation of dust in indoor air	--	--	1E-09	1E-08
Inhalation of dust in outdoor air	--	--	3E-09	6E-08
Ingestion of soil	7E-04	2E-03	1E-09	1E-08
Dermal contact with soil	3E-04	2E-03	6E-10	2E-08
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	1E-03	4E-03	6E-09	1E-07
Future Hypothetical Onsite				
Child/Adult Residents				
Inhalation of dust in indoor air	--	--	3E-08	2E-07
Inhalation of dust in outdoor air	--	--	1E-08	9E-08
Ingestion of soil	2E-02	6E-02	3E-08	1E-07
Ingestion of fruits	(2E-02)	(6E-02)	(3E-08)	(1E-07)
Ingestion of vegetables	(2E-02)	(6E-02)	(3E-08)	(1E-07)
Dermal contact with soil	2E-03	1E-02	3E-09	6E-08
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	7E-02	2E-01	1E-07	8E-07
Future Hypothetical Onsite				
Adult Residents				
Inhalation of dust in indoor air	--	--	6E-09	9E-08
Inhalation of dust in outdoor air	--	--	5E-10	1E-08
Ingestion of soil	2E-02	5E-03	4E-09	5E-08
Ingestion of fruits	(2E-02)	(5E-03)	(4E-09)	(5E-08)
Ingestion of vegetables	(2E-02)	(5E-03)	(4E-09)	(5E-08)
Dermal contact with soil	4E-04	3E-03	9E-10	3E-08
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	6E-02	2E-02	2E-08	3E-07

7E-04 = 7 x 10⁻⁴

Dashes (--) = pathway not calculable because organic chemicals of concern do not have toxicity values.

All figures rounded to one significant figure for presentation purposes. Backup to table attached; revised Appendix F tables of OU II PHEE report used to produce these tables.

(2E-02) = For the purposes of this analysis, HIs and cancer risks assumed to be equal to ingestion of soil exposure pathway (i.e., additional modeling was not performed).

/a/ Backup calculations showing the results for each additional chemical are provided in subsequent pages to this table (Table 2b). These results relate to the results presented in Table 9-1 of OU II PHEE report for the original chemicals.

Table 2b. Calculation Worksheet to Table 2a.
Harding Lawson Associates

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Office Workers				
Cadmium	--	--	7E-04	3E-04
Chromium VI	--	--	5E-06	2E-06
TOTAL HAZARD INDEX	--	--	7E-04	3E-04

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Office Workers				
Cadmium	--	--	2E-03	2E-03
Chromium VI	--	--	2E-05	2E-05
TOTAL HAZARD INDEX	--	--	2E-03	2E-03

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Office Workers				
Cadmium	7E-10	2E-09	--	--
Chromium VI	4E-10	1E-09	1E-09	6E-10
TOTAL RISK	1E-09	3E-09	1E-09	6E-10

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Office Workers				
Cadmium	8E-09	4E-08	--	--
Chromium VI	5E-09	2E-08	1E-08	2E-08
TOTAL RISK	1E-08	6E-08	1E-08	2E-08

Table 2b. Calculation Worksheet to Table 2a.
Harding Lawson Associates

<u>AVERAGE SCENARIO</u> <u>Child/Adult Residents</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Cadmium	--	--	2E-02	2E-03
Chromium VI	--	--	1E-04	1E-05
TOTAL HAZARD INDEX	--	--	2E-02	2E-03

<u>RME SCENARIO</u> <u>Child/Adult Residents</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Cadmium	--	--	6E-02	1E-02
Chromium VI	--	--	6E-04	1E-04
TOTAL HAZARD INDEX	--	--	6E-02	1E-02

<u>AVERAGE SCENARIO</u> <u>Child/Adult Residents</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Cadmium	2E-08	7E-09	--	--
Chromium VI	1E-08	3E-09	3E-08	3E-09
TOTAL RISK	3E-08	1E-08	3E-08	3E-09

<u>RME SCENARIO</u> <u>Child/Adult Residents</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Cadmium	1E-07	5E-08	--	--
Chromium VI	9E-08	4E-08	1E-07	6E-08
TOTAL RISK	2E-07	9E-08	1E-07	6E-08

Table 2b. Calculation Worksheet to Table 2a.
Harding Lawson Associates

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	2E-02	4E-04
Chromium VI	--	--	1E-05	3E-06
<u>TOTAL HAZARD INDEX</u>	--	--	2E-02	4E-04

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	5E-03	3E-03
Chromium VI	--	--	5E-05	3E-05
<u>TOTAL HAZARD INDEX</u>	--	--	5E-03	3E-03

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	4E-09	3E-10	--	--
Chromium VI	2E-09	2E-10	4E-09	9E-10
<u>TOTAL RISK</u>	6E-09	5E-10	4E-09	9E-10

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	6E-08	7E-09	--	--
Chromium VI	4E-08	4E-09	5E-08	3E-08
<u>TOTAL RISK</u>	9E-08	1E-08	5E-08	3E-08

**Table 3a. Summary of Estimated Risks from Multipathway Exposures,
Site IR-6, Additional Chemicals /a/
OU II PHEE Report
Hunters Point Annex**

Receptor Populations Exposure Pathways	Hazard Index		Potential Upper Bound Excess Cancer Risk	
	Average	RME	Average	RME
Future Hypothetical Onsite				
<u>Adult Office Workers</u>				
Inhalation of dust in indoor air	--	--	2E-09	9E-09
Inhalation of dust in outdoor air	--	--	5E-09	4E-08
Ingestion of soil	6E-04	1E-03	7E-09	9E-09
Dermal contact with soil	3E-04	2E-03	2E-08	2E-08
Multipathway Exposures	9E-04	3E-03	3E-08	8E-08
Future Hypothetical Onsite				
<u>Child/Adult Residents</u>				
Inhalation of dust in indoor air	--	--	4E-08	2E-07
Inhalation of dust in outdoor air	--	--	1E-08	6E-08
Ingestion of soil	2E-02	4E-02	1E-07	9E-08
Ingestion of fruits	(2E-02)	(4E-02)	(1E-07)	(9E-08)
Ingestion of vegetables	(2E-02)	(4E-02)	(1E-07)	(9E-08)
Dermal contact with soil	2E-03	9E-03	1E-07	8E-08
Multipathway Exposures	6E-02	1E-01	6E-07	6E-07
Future Hypothetical Onsite				
<u>Adult Residents</u>				
Inhalation of dust in indoor air	--	--	9E-09	6E-08
Inhalation of dust in outdoor air	--	--	7E-10	7E-09
Ingestion of soil	2E-03	4E-03	2E-08	3E-08
Ingestion of fruits	(2E-03)	(4E-03)	(2E-08)	(3E-08)
Ingestion of vegetables	(2E-03)	(4E-03)	(2E-08)	(3E-08)
Dermal contact with soil	4E-04	2E-03	3E-08	4E-08
Multipathway Exposures	5E-03	1E-02	1E-07	2E-07

6E-04 = 6 x 10⁻⁴

Dashes (--) = pathway not calculable because organic chemicals of concern do not have toxicity values.

All figures rounded to one significant figure for presentation purposes. Backup to table attached; revised Appendix F tables of OU II PHEE report used to produce these tables.

(2E-02) = For the purposes of this analysis, HIs and cancer risks assumed to be equal to ingestion of soil exposure pathway (i.e., additional modeling was not performed). Any additional chemicals based on this analysis which were only detected in subsurface soil (i.e., tetrachloroethene and n-nitrosodiphenylamine) were not included in this analysis.

/a/ Backup calculations showing the results for each additional chemical are provided in subsequent pages to this table (Table 3b). These results relate to the results presented in Table 9-1 of OU II PHEE report for the original chemicals.

Table 3b. Calculation Worksheet to Table 3a.

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Office Workers</u>				
Cadmium	--	--	6E-04	3E-04
Chromium VI	--	--	1E-05	6E-06
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	6E-04	3E-04

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Office Workers</u>				
Cadmium	--	--	1E-03	2E-03
Chromium VI	--	--	1E-05	1E-05
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	1E-03	2E-03

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Office Workers</u>				
Cadmium	6E-10	2E-09	--	--
Chromium VI	1E-09	3E-09	4E-09	2E-09
4,4'-DDD	--	--	3E-09	2E-08
TOTAL RISK	2E-09	5E-09	7E-09	2E-08

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Office Workers</u>				
Cadmium	6E-09	3E-08	--	--
Chromium VI	3E-09	1E-08	8E-09	9E-09
4,4'-DDD	--	--	8E-10	1E-08
TOTAL RISK	9E-09	4E-08	9E-09	2E-08

Table 3b. Calculation Worksheet to Table 3a.

AVERAGE SCENARIO	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Child/Adult Residents</u>				
Cadmium	--	--	2E-02	2E-03
Chromium VI	--	--	4E-04	4E-05
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	2E-02	2E-03

RME SCENARIO	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Child/Adult Residents</u>				
Cadmium	--	--	4E-02	9E-03
Chromium VI	--	--	3E-04	7E-05
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	4E-02	9E-03

AVERAGE SCENARIO	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Child/Adult Residents</u>				
Cadmium	2E-08	6E-09	--	--
Chromium VI	3E-08	9E-09	8E-08	9E-09
4,4'-DDD	--	--	6E-08	1E-07
TOTAL RISK	4E-08	1E-08	1E-07	1E-07

RME SCENARIO	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Child/Adult Residents</u>				
Cadmium	1E-07	4E-08	--	--
Chromium VI	5E-08	2E-08	8E-08	3E-08
4,4'-DDD	--	--	8E-09	5E-08
TOTAL RISK	2E-07	6E-08	9E-08	8E-08

Table 3b. Calculation Worksheet to Table 3a.

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	2E-03	4E-04
Chromium VI	--	--	4E-05	9E-06
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	2E-03	4E-04

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	--	--	4E-03	2E-03
Chromium VI	--	--	3E-05	2E-05
4,4'-DDD	--	--	--	--
TOTAL HAZARD INDEX	--	--	4E-03	2E-03

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	4E-09	3E-10	--	--
Chromium VI	6E-09	4E-10	1E-08	2E-09
4,4'-DDD	--	--	8E-09	3E-08
TOTAL RISK	9E-09	7E-10	2E-08	3E-08

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
<u>Adult Residents</u>				
Cadmium	4E-08	5E-09	--	--
Chromium VI	2E-08	3E-09	3E-08	2E-08
4,4'-DDD	--	--	3E-09	2E-08
TOTAL RISK	6E-08	7E-09	3E-08	4E-08

Table 4a. Summary of Estimated Risks from Multipathway Exposures
Site IR-10, Additional Chemicals /a/
OU II PHEE Report
Hunters Point Annex

Harding Lawson Associates

Receptor Populations Exposure Pathways	Hazard Index		Potential Upper Bound Excess Cancer Risk	
	Average	RME	Average	RME
Future Hypothetical Onsite				
Adult Office Workers				
Inhalation of dust in indoor air	--	--	1E-13	4E-12
Inhalation of dust in outdoor air	--	--	4E-13	2E-11
Ingestion of soil	--	--	7E-11	1E-09
Dermal contact with soil	--	--	1E-10	5E-09
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	--	--	2E-10	7E-09
Future Hypothetical Onsite				
Child/Adult Residents				
Inhalation of dust in indoor air	--	--	3E-12	6E-11
Inhalation of dust in outdoor air	--	--	1E-12	2E-11
Ingestion of soil	--	--	1E-09	1E-08
Ingestion of fruits	(--)	(--)	(1E-09)	(1E-08)
Ingestion of vegetables	(--)	(--)	(1E-09)	(1E-08)
Dermal contact with soil	--	--	5E-10	2E-08
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	--	--	5E-09	6E-08
Future Hypothetical Onsite				
Adult Residents				
Inhalation of dust in indoor air	--	--	7E-13	3E-11
Inhalation of dust in outdoor air	--	--	6E-14	3E-12
Ingestion of soil	--	--	2E-10	5E-09
Ingestion of fruits	(--)	(--)	(2E-10)	(5E-09)
Ingestion of vegetables	(--)	(--)	(2E-10)	(5E-09)
Dermal contact with soil	--	--	1E-10	8E-09
Ingestion of groundwater	--	--	--	--
Dermal contact with groundwater during showering	--	--	--	--
Inhalation of groundwater vapors during showering	--	--	--	--
Multipathway Exposures	--	--	7E-10	2E-08

7E-04 = 7×10^{-4}

Dashes (--) = pathway not calculable because organic chemicals of concern do not have toxicity values.

All figures rounded to one significant figure for presentation purposes. Backup to table attached; revised Appendix F tables of OU II PHEE report used to produce these tables.

(1E-09) = For the purposes of this analysis, HIs and cancer risks assumed to be equal to ingestion of soil exposure pathway (i.e., additional modeling was not performed).

/a/ Backup calculations showing the results for each additional chemical are provided in subsequent pages to this table (Table 4b). These results relate to the results presented in Table 9-1 of OU II PHEE report for the original chemicals.

Table 4b. Calculation Worksheet to Table 4a.
Harding Lawson Associates

Hazard Quotient				
<u>AVERAGE SCENARIO</u>	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Trichloroethene	--	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

Hazard Quotient				
<u>RME SCENARIO</u>	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Trichloroethene	--	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

Cancer Risk				
<u>AVERAGE SCENARIO</u>	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Trichloroethene	1E-13	4E-13	7E-11	1E-10
TOTAL RISK	1E-13	4E-13	7E-11	1E-10

Cancer Risk				
<u>RME SCENARIO</u>	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
Adult Office Workers				
Trichloroethene	4E-12	2E-11	1E-09	5E-09
TOTAL RISK	4E-12	2E-11	1E-09	5E-09

Table 4b. Calculation Worksheet to Table 4a.
Harding Lawson Associates

<u>AVERAGE SCENARIO</u> Child/Adult Residents	Hazard Quotient			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
	Trichloroethene	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

<u>RME SCENARIO</u> Child/Adult Residents	Hazard Quotient			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
	Trichloroethene	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

<u>AVERAGE SCENARIO</u> Child/Adult Residents	Cancer Risk			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
	Trichloroethene	3E-12	1E-12	1E-09
TOTAL RISK	3E-12	1E-12	1E-09	5E-10

<u>RME SCENARIO</u> Child/Adult Residents	Cancer Risk			
	Inhalation of Dust Indoor Air	Inhalation of Dust Outdoor Air	Ingestion of Soil	Dermal Contact with Soil
	Trichloroethene	6E-11	2E-11	1E-08
TOTAL RISK	6E-11	2E-11	1E-08	2E-08

Table 4b. Calculation Worksheet to Table 4a.
Harding Lawson Associates

<u>AVERAGE SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Residents Trichloroethene	--	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

<u>RME SCENARIO</u>	Hazard Quotient			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Residents Trichloroethene	--	--	--	--
TOTAL HAZARD INDEX	--	--	--	--

<u>AVERAGE SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Residents Trichloroethene	7E-13	6E-14	2E-10	1E-10
TOTAL RISK	7E-13	6E-14	2E-10	1E-10

<u>RME SCENARIO</u>	Cancer Risk			
	Inhalation of Dust	Inhalation of Dust	Ingestion	Dermal Contact
	Indoor Air	Outdoor Air	of Soil	with Soil
Adult Residents Trichloroethene	3E-11	3E-12	5E-09	8E-09
TOTAL RISK	3E-11	3E-12	5E-09	8E-09