Revised Draft Final Report Human Health Risk Assessment

Shieldalloy Metallurgical Corporation Newfield, New Jersey

April 1994



REVISED DRAFT FINAL REPORT

HUMAN HEALTH RISK ASSESSMENT

Shieldalloy Metallurgical Corporation Newfield, New Jersey

April 1994

Submitted by:

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EXECUTIVE SUMMARY

A Remedial Investigation (RI) was conducted at the Shieldalloy Metallurgical Corporation (SMC) facility located in Newfield, New Jersey by TRC Environmental Consultants, Inc. (TRC) as required under Administrative Consent Order (1988) (Remedial Investigation Technical Report, 1992).

The SMC facility consists of approximately 67.5 acres. The manufacturing facilities and support areas are located on approximately 60 acres in Newfield, New Jersey, within Gloucester County. SMC also owns 7.5 acres of farmlands southwest of the main facility in Vineland, New Jersey within Cumberland County. A site location map is provided in Figure ES-1.

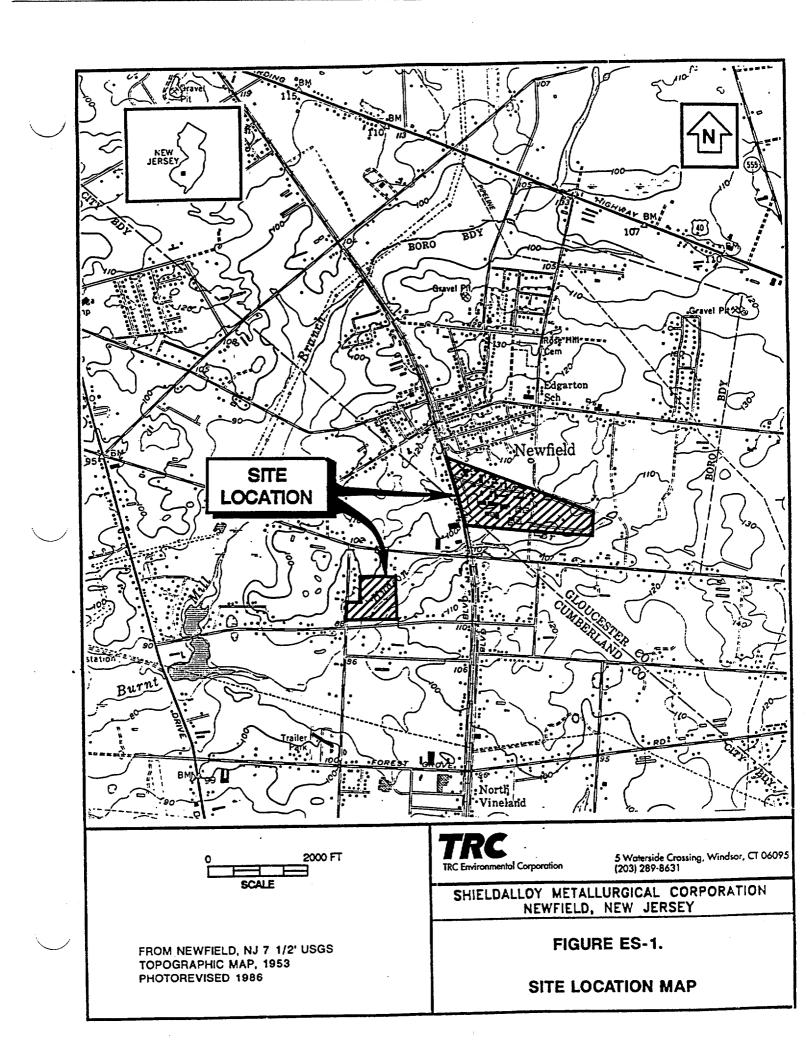
The purposes of the Remedial Investigation were to: 1) investigate the physical characteristics of the site; 2) determine the nature and extent of contamination resulting from operations at SMC; and 3) to characterize environmental impact and potential health risks. Figure ES-2 illustrates the four general areas studied in detail and presented in the RI.

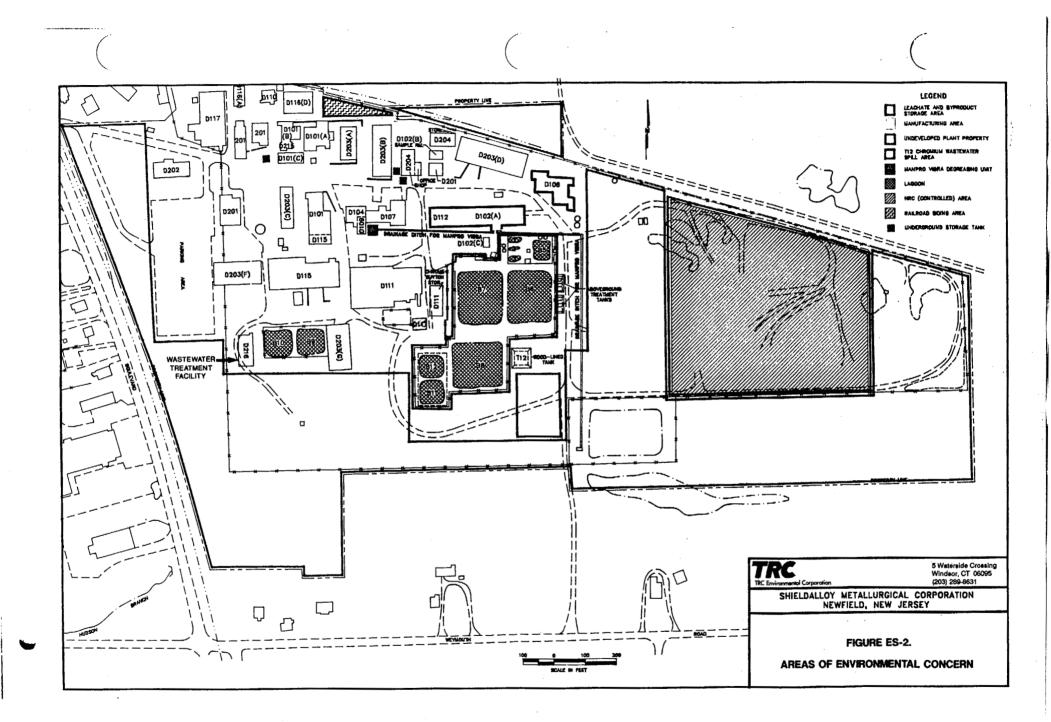
This Human Health Evaluation report presents the results of the human health risk assessment, describing the chemicals of potential concern, assessing potential exposure pathways and chemical toxicity, and characterizing risks associated with the site. The site history, physical characteristics of the site, the activities conducted during the RI, and the nature and extent of contamination at and around the site are addressed in the RI report (TRC, 1992).

This human health risk assessment does not include risks associated with radioactive contaminants at the site. However, Appendix D contains the <u>Assessment of Environmental</u> <u>Radiological Conditions at the Newfield Facility</u>.

This Executive Summary presents an overview of the purpose and methodology of risk assessment activities, followed by a description of the study and its results.

ES-1





PURPOSE AND METHODOLOGY - HUMAN HEALTH EVALUATION

The primary objectives of the Human Health Evaluation conducted at the SMC facility

include the following:

- Examine exposure pathways and contaminant concentrations in environmental media;
- Estimate the potential for adverse effects associated with the contaminants of concern under current and future land use conditions;
- Provide a risk management framework upon which decisions can be made regarding what, if anything, should be done;
- Identify site or land use conditions that present unacceptable risks; and
- Provide a basis from which recommendations for future activities at the site can be made which are protective of human health.

Methodology

The risk assessment follows guidelines established by the U.S. Environmental Protection Agency in the Interim Final Risk Assessment Guidance for Superfund, Volume I (Human Health Evaluation Manual - Part A) (1989). The general format followed in conducting the risk assessment is presented below, followed by descriptions of risk assessment findings.

Chemicals of Potential Concern - Potential contaminants of concern have been evaluated and identified for the various media identified at the site. For each medium, the analytical data were evaluated following EPA guidelines (EPA, 1989). The chemicals of concern were identified on the basis of this evaluation, and a determination was made as to which chemicals would be addressed qualitatively and/or quantitatively in the risk assessment. In some cases, data qualified with U, J or UJ qualifiers (i.e., not verified "hits") were used in the quantitative risk assessment in accordance with current guidance. However, these compounds were not significant in the risk assessment.

Exposure Assessment - The exposure assessment involved considerations of potential receptor populations and migration pathways by which contaminants could potentially be transported off-site. Specific exposure scenarios were developed to represent potential situations in which humans may be exposed to on-site contaminants.

Potential migration pathways included the following:

- Migration of surface soil contaminants directly via surface runoff, windblown dust, or tracking (tires, shoes, etc.);
- Migration of surface soil contaminants indirectly via precipitation, leaching and subsequent ground water migration, via volatilization to ambient air, or via uptake by plants or animals and subsequent human consumption;
- Migration of subsurface soil contaminants via precipitation, leaching or subsequent ground water migration; and
- Migration of ground water contaminants via ground water flow.

In accordance with NJS 40:63-52, et seq., the City of Vineland has designated an area of the city as an aquifer exclusion zone, requiring mandatory connection with Public Water Systems and sealing of domestic and supply wells. The SMC facility is not within this aquifer exclusion zone, but it is connected with the public water system. A residential area to the south of the site is also outside the aquifer exclusion zone.

Potential current human exposure scenarios developed for evaluation included the following:

- Trespassing Scenario Exposure to children through direct access to the site (e.g., trespassers);
- Commercial/Industrial Use Scenario Exposure to adult employees through current industrial use of the site; and

• Residential Use Scenario - Exposure to residents through current residential use of ground water (to the south of the SMC facility).

Potential future human exposure scenarios developed for evaluation at the site included the following:

- Construction Scenario Exposure to construction workers for a one year period assuming development of the site as an industrial/residential site and no remedial activities prior to construction; and
- Residential Use Scenario Exposure to children from 0 to 6 years of age and to adults (30 year period) through future residential use of the site.

Assumptions used in evaluating each exposure scenario were developed to be conservative yet representative of current and anticipated conditions. Uncertainties associated with these assumptions were addressed for each scenario at each site.

Toxicity Assessment - The toxic effects of each chemical of concern were evaluated, including effects associated with exposure and concentrations at which such effects may be expected to occur, when available. Chronic and subchronic non-carcinogenic effects for the oral and inhalation routes and slope factors associated with these effects were identified.

Risk Characterization - Human health risks were presented with regard to potential effects from the contaminants of concern. These effects may include potential risks of cancer or non-cancerous (systemic) effects. Cancer risk levels, the lifetime incremental probabilities of excess cancer due to exposure to the site contaminants, take into account exposure concentrations and the carcinogenic potencies of the chemicals. Cancer risks are calculated by multiplying exposure dose by the appropriate cancer slope factor for each compound and exposure route. Health effects associated with exposures to non-carcinogenic chemicals were evaluated primarily with regard to reference dose (RfD) values. The associated risk was quantitated by the Hazard Index ratio, which is the ratio of the exposure dose to the RfD. The results of the quantitative risk analysis are presented in two basic forms. For carcinogenic risks, risk estimates are presented in scientific notation, where a lifetime risk of 1E-04 represents a lifetime risk of one in ten thousand. The calculated risk is compared to the acceptable lifetime cancer risk range (1E-04 to 1E-06) for evaluating the need for remediation, as stated in 40 CFR Part 300 (EPA, 1990b). EPA (1990b) considers a cancer risk of 1E-06 as the point of departure for determining risk-based remediation goals. For non-carcinogenic risks, the Hazard Index Ratio is used. When the total Hazard Index for an exposed individual or group of individuals exceeds unity, there may be concern for potential non-cancer health effects. Thus, the cancer risk and hazard index ratios that constitute a potential concern are >1E-06 and >1E+00, respectively.

In the qualitative risk assessment, analytes for which quantitative assessments could not be conducted were evaluated to determine if their omission from the quantitative assessment would be expected to have a significant impact on the overall risk posed by the site.

The uncertainty analysis identified the major sources of uncertainty in the risk assessment as follows:

- Exposure assumptions;
- Exclusion of chemicals due to lack of quantitation or missing toxicity data;
- The use of models to estimate concentrations of chemicals in fugitive dust and the volatilization of chemicals during home use of ground water;
- Data uncertainties due to infrequent detections, limited numbers of samples, qualified data, or uncertainties in background sampling locations;
- Toxicity value derivations; and
- Potential interactions between carcinogens and between non-carcinogens which could lead to increased or diminished carcinogenic responses or toxicity.

Chemicals of Potential Concern - Field investigations at SMC included the collection of surface soil, subsurface soil, sediment, surface and ground water samples. Observed contaminants mainly consist of inorganics in soils, sediments and surface water; and VOCs and inorganics in the ground water.

Exposure Assessment - Potential migration pathways identified for this site were as previously described. For volatile organic compounds (VOCs), detections were greatest in ground water. The primary migration pathway for VOCs appears to be through ground water migration. Semi-volatile compounds, which are generally persistent in the environment, were identified primarily, although infrequently, in the surface and subsurface soils, with migration to ground water not considered a primary migration route. Pesticides and PCBs were not generally detected. Inorganics were detected at elevated levels in surface and subsurface soils and in ground water samples, indicating potential migration from the soils to the ground water, and potential for movement off-site within the ground water.

Potential current and future human exposure scenarios developed for evaluation included the common exposure scenarios listed previously.

Toxicity Assessment - The toxic effects of each chemical of concern were evaluated.

Risk Characterization - The estimated risks associated with each scenario evaluated and the exposure pathway(s) driving the calculated risk are summarized below and presented in Table ES-1.

• Trespassing Scenario (Scenario 1) - Total cancer risk exceeded the target value of 1E-06 by a factor of 2. The total hazard index ratio is below the target value of 1E+00. The major pathway associated with the cancer risk is incidental ingestion of arsenic and beryllium in surface water (pathway risk = 2E-06) by children age 9 to 18 years.

TABLE ES-1

SUMMARY OF CANCER AND NON-CANCER RISKS FOR THE HUMAN HEALTH RISK ASSESSMENT

Scenario		Receptor	Cancer Risk Estimate	Hazard Index Ratic
1	Trespassing	Children	2E-06	1E-01
2	Commercial/Industrial	Adults	8E-05	7E-01
3	Residential (Current)	Adults	4E-02 ^A 8E-03 ^B	$6E+02^{A}$ $2E+02^{B}$
4	Construction	Adults	1E-06	1E+00
5	Residential (Future)	Children Adults	9E-05 2E-04	3E+00 4E-01

^A Associated with shallow ground water ^B Associated with deep ground water

- Commercial/Industrial Use Scenario (Scenario 2) Total cancer risk (8E-05) exceeds the target value of 1E-06. The total hazard index ratio is below the target value of 1E+00. The major pathways associated with the cancer risk are dermal contact with PCBs in soil (pathway risk = 5E-05) and incidental ingestion of arsenic, beryllium, and PCBs in soil (pathway risk = 3E-05). Current facility workers constitute the population under consideration for these exposures.
- Residential Use (Current) Scenario (Scenario 3) The total cancer risk and the hazard index ratio exceeded the target values (1E-06 and 1E+00, respectively) for both shallow and deep ground water. The major contributing factor to the calculation of cancer risk is ingestion of arsenic and beryllium in both shallow and deep ground water (as a potable source) and trichloroethene in deep ground water (pathway risk = 4E-02 and 8E-03, respectively). Inhalation of airborne trichloroethene (pathway risk = 4E-04, deep ground water only) and dermal exposure to arsenic in ground water (pathway risk = 2E-05 and 1E-05, shallow and deep ground water, respectively) also contributed to the cancer risk. Similarly, ingestion of inorganics in ground water, respectively) was also the primary contribution to the total hazard index ratio.
- Construction Use Scenario (Scenario 4) The total cancer risk and the hazard index ratio did not exceed target values.
- Residential Use (Future) Scenario (Scenario 5) The total cancer risk for both children and adult *residential* receptors exceeded target values. The hazard index ratio exceeded the target value for children, but not for adults. For children, the major contributing factor to the calculation of cancer risk is incidental ingestion of *arsenic*, beryllium, *several PAHs*, and Aroclor-1254 in surface soil (*pathway risk = 9E-05*). The major route of exposure for exceedance of the hazard index (for children) is incidental ingestion of vanadium in soil (*pathway HI = 3E+00*). For adults, the major contributing factor to the calculation of cancer risk is incidental ingestion of *arsenic*, beryllium, *several PAHs*, and *PCBs* in soil (*pathway risk = 5E-05*) and dermal contact with PCBs in soil (*pathway risk = 1E-04*). It should be noted that PCBs were detected infrequently at the SMC facility and are not likely to be of concern.

Compounds missing quantitative dose response assessments were evaluated qualitatively.

The qualitative analysis of risks did not identify any compounds expected to have a significant impact on the assessment, although the exclusion of strontium and titanium produces some uncertainty in the final estimates. The uncertainty analysis described the major sources of uncertainty, as identified previously, with respect to the contaminants detected at this site. The most significant sources of uncertainty identified for this site include the use of shallow and deep ground water to the south of the site as a potable source and the limited quantity of the analytical data for selected monitoring wells; future residential use of the SMC site; and identification of PCBs as site contaminants of concern. An additional monitoring well location has been recommended for placement to the south of the SMC facility (along Weymouth Road). This well is expected to further delineate ground water contamination in this area; specifically to help distinguish the chromium plume, and evaluate potential impacts of contaminants such as arsenic and beryllium on private well water quality.

As requested by NJDEPE, a central tendency risk estimate was calculated for the pathways associated with the greatest risk using the 95% UCL exposure point concentration and most likely (50th percentile; central tendency) exposure (MLE) parameters. This sensitivity analysis provided insight into the magnitude of uncertainty associated with the exposure pathways contributing the majority of excess risk. In particular, risks which exceed 1E-06 for the RME, but not the MLE, include:

- Ingestion of Surface Water (Scenario 1 Current Trespassing),
- Dermal Contact with Soil (Scenario 2 Current Commercial/Industrial Use),
- Incidental Ingestion of Soil (Scenario 4 Future Construction), and
- Dermal Contact with Soil (Scenario 5 Future Residential).

Elevated hazard indices which exceed 1E+00 for the RME, but not the MLE, is limited to incidental ingestion of soil (Scenario 5 - Future Residential, adult only).

As requested by NJDEPE, the uncertainty assessment also addresses the issue of evaluation of laboratory contaminants in blank samples using the EPA (1989) method versus the

NJDEPE method. This evaluation of the variance between policies with regard to target compounds detected in blank samples indicates that use of the EPA (1989) method would not alter the conclusions of the risk assessment.

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1.0 INTRODUCTION

This report provides a quantitative Human Health Evaluation for Shieldalloy Metallurgical Corporation's (SMC) Newfield, New Jersey facility, as required under Administrative Consent Order (1988). Its primary objectives are to examine exposure pathways and contaminant concentrations in environmental media, and to estimate the potential for adverse effects associated with the contaminants of concern at the site under current and future land use conditions. This assessment evaluates health risks associated with chemical contaminant exposures. An addendum to this report which addresses radiological contamination and associated health risks *is presented as Appendix D*.

Specific exposure scenarios have been considered and developed to represent potential situations in which humans receptors may be exposed to contaminants originating from the site. Efficacy of specific remedial programs are not included as part of this analysis.

Human health risks associated with each site are presented with regard to potential effects from the contaminants of concern. These effects may include potential risks of cancer or non-cancerous (systemic) effects. A quantitative risk assessment for carcinogens involves calculations of the lifetime incremental probabilities of cancer that take into account exposure concentrations and the carcinogenic potencies of the chemicals. Health effects associated with exposures to noncarcinogenic chemicals are evaluated primarily with regard to reference dose (RfD) values. This approach for non-cancer effects is most useful when exposure doses of the chemical are below the RfD thresholds. However, there is often no quantitative way to measure the degree of risk created when concentrations exceed the standard thresholds.

Ultimately, the risk assessment presented in this report is expected to be used within a risk management framework. In making decisions concerning what, if anything, should be done

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at a site (including, for example, the collection of additional data or implementation of a remedial program), the results of the risk assessment should be used in concert with other information on the site. The risk assessment also identifies site or land use conditions that present unacceptable risks. The results of the risk assessment identify contaminants and exposure pathways contributing the greatest risk to the receptor population. From this information, recommendations for future activities at the site can be made such that public health is protected.

This evaluation focuses most strongly on the baseline conditions at the site. However, the results of this study will help decision makers focus on the areas, contaminants, media, pathways and receptors of greatest concern at the site, thereby helping to identify future remedial alternatives for the site.

2.0 HUMAN HEALTH EVALUATION

2.1 <u>Methodology</u>

The methodology is structured utilizing the most current methods accepted by the EPA in the Interim Final Risk Assessment Guidance for Superfund, Volume I (Human Health Evaluation Manual - Part A) (1989). Where assumptions are made, they are realistic but conservative, i.e., protective of human health. In keeping with accepted practices for conducting such assessments, all assumptions are carefully discussed and an assessment made of the uncertainty associated with the overall health risk estimates.

Following the guidelines accepted by the EPA, the basic components of the human health evaluation will be organized and presented as follows:

- Data Collection;
- Data Evaluation;
- Contaminant Fate and Transport;
- Exposure Assessment;
- Toxicity Assessment; and
- Risk Characterization (including an uncertainty assessment).

2.2 Identification of Chemicals of Potential Concern

2.2.1 Data Collection

Key elements of the field investigation program are listed in Table 2-1. The primary goal

of the field investigation program was to obtain data to:

- Characterize the hydrogeologic regime in the study area, including hydraulic properties of overburden deposits;
- Characterize the type(s) of contamination present in the study area;
- Determine areal and vertical extent of contamination in the media sampled;

• Identify pathways of contaminant migration; and

Characterize the nature and extent of contaminant migration.

The field investigation activities were completed between October 1990 and April 1991. Results of these activities are presented in the Remedial Investigation (RI) Technical Report (TRC, 1991).

A Radiological Characterization Study required for NRC license renewal has been conducted by SMC for submittal (IT/PS-92-106, April 1992). The purpose of the Radiological Characterization Study is to determine the extent of radiological contamination at and around the facility. The results of the Radiological Characterization Study and radiological sampling and analyses from wells under the ACO will be included in appendices of the final RI report and in the Feasibility Study for the site.

2.2.2 Data Evaluation

As detailed in the RI report (TRC, 1991), SMC has been operating at the Newfield, NJ facility since 1955. Past raw materials and production processes include: chromium oxide and chromium metal production, vanadium pentoxide and ferrovanadium production, uranium oxide, thorium oxide, and ferrocolumbium and columbium nickel production. Field studies have revealed the presence of numerous organic and inorganic contaminants in the soils, surface water, sediments and ground water.

In order to organize the data into a form manageable and appropriate for the baseline health evaluation, the following steps were followed during the data evaluation process as described by EPA (1989):

1) Gather and sort all data by medium (i.e. surface soil, ground water);

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- 2) Evaluate methods of analysis;
- 3) Evaluate the sample quantitation limits;
- 4) Evaluate the data qualifiers and codes;
- 5) Evaluate blank data;
- 6) Evaluate tentatively identified compounds (TIC's);
- 7) Evaluate background data;
- 8) Develop data sets by medium; and
- 9) Develop a set of chemicals of potential concern from the entire data set.

Briefly, the specific methods used for the SMC site include the following, which correlate

with the previously described steps.

- 1) All analytical data was initially sorted by media (surface soil, subsurface soil, sediments, surface water, ground water and air);
- 2) An evaluation of analytical methods was not considered to be necessary as all data used in the quantitative analysis was analyzed by EPA's Superfund Contract Laboratory Program (CLP) procedures. Note: Due to a miscommunication with the laboratory performing the total chromium and hexavalent chromium determinations in soil, all samples were extracted using a 24-hour cold water extraction followed by a colorometric analysis, rather than use of the requested alkaline digestion method. A technical agreement was reached between TRC and NJDEPE that only samples with total chromium results greater or equal to 100 mg/kg needed to be reanalyzed using the alkaline digestion method. Thus, the data set for chromium VI in this risk assessment consists of alkaline digestion method results, where available, and water leach method results, where alkaline digestion method results are not available;
- 3) Unusually high sample quantitation limits (SQL's) were not commonly reported in any of the matrices analyzed. This indicates that in most cases, matrix or chemical interferences in the analytical determinations did not cause a loss of sensitivity at this site. One-half of the SQL was used for a non-detectable reading if there was evidence that the chemical is present in that medium. However, for non-detects where it appeared more likely that the chemical could be present at a value greater than 1/2 the SQL, the entire SQL was used. The decision to use the full SQL or 1/2 the SQL was based upon extent and degree of contamination within each medium and potential for migration between media. If a chemical

was not detected in a single medium, transport and fate information was used to determine if its presence in related media should dictate that it be included in the analysis of this apparently non-impacted medium;

- 4) Data validation qualifiers were assessed during the data evaluation process. As indicated in EPA guidance (EPA, 1989), data qualified with U, J or UJ qualifiers were used in the quantitative risk assessment when appropriate. Not-detect values were not ignored based on the presence of "hits" within the same media;
- 5) Field and laboratory blanks were used to segregate actual site contamination from cross contamination from field or laboratory procedures. As indicated in EPA (1989), sample results were considered positive only if concentrations exceeded ten times the concentration of a common laboratory contaminant in a blank, or five times the concentration of a chemical that is not considered a common laboratory contaminant. (Note: As requested by NJDEPE, an evaluation of the variance between EPA (1989) and NJDEPE policies with regard to target compounds detected in blank samples has been included in Section 2.7.3 Uncertainty Assessment;
- 6) Tentatively identified compounds (TICs) were reported infrequently in surface and subsurface soil samples across the site. TICs were detected at 100-1000 mg/kg. Elevated levels of TICs were identified in soil boring 93 (SB-93) (tentatively identified as an organic acid at a concentration of 20,000 ug/kg) and SB-44 (tentatively identified as sulfur at a concentration of 30,000 ug/kg). Due to the uncertainty associated with the quantitative and qualitative nature of these TICs, a quantitative assessment of risk associated with exposure was not included in this assessment;
- 7) Background soil sampling locations were identified for this site. Surface soil samples 58, 59, and 60 (RA-58, RA-59 and RA-60) were collected from the northwest portion of the site and used as reference points. National background levels (USGS, 1984) were also used as a screening method to evaluate non-site related chemicals or commonly encountered naturally occurring chemicals in soil. Neither site-specific background or national background levels were used to eliminate naturally occurring inorganics from the risk assessment. Monitoring well 14S (SC-14S) and 3D (W-3D) are located upgradient of the site, and were used as an indication of background ground water conditions. Due to the intermittent nature of the Hudson Branch at upstream locations, it was not possible to accurately determine background or reference points; and
- 8) Tables 2-2 through 2-5 provide the chemicals and concentrations sampled in surface soils, subsurface soils, surface water and ground water, respectively. Surface runoff sample data were not included in the quantitative assessment because the four runoff samples were collected from major drainage pathways (near their off-site discharge points) during a heavy rainfall and, therefore, were

not considered to be representative of normal surface water runoff. Sediments were not included in this assessment as the nature and extent of contamination was not materially different from soils. Air sampling data was not utilized in the risk analysis based on a short timeframe of sample collection (within a single season).

2.2.3 Field Investigation Summary

The following discussion provides a summary of the field investigation activities which took place between October 1990 and April 1991. Complete details of the field investigation are provided in the Remedial Investigation Technical Report (TRC, 1991). This section serves only as a summary of these activities. Volatile organic compounds and metals (inorganics) were the primary contaminants detected in environmental media at the SMC facility.

In evaluating detected contaminant levels, they were compared against available regulatory action levels. For soils and sediments, contaminant levels were compared to New Jersey Interim Soil Action Levels (referred to hereafter as action levels). For ground water samples, contaminant levels were compared to federal and New Jersey Maximum Contaminant Levels (MCLs). Surface water contaminant levels were compared to New Jersey Water Pollution Control Act (NJWPCA) Maximum Values of Protection of Aquatic Life (Freshwater) and federal MCLs. Air monitoring results were compared to federal Acceptable Ambient Levels (AALs). A summarized discussion is presented in this risk assessment report for informational purposes only. The Remedial Investigation Technical Report (TRC, 1991) contains a complete discussion of contamination at the SMC facility.

It should be noted that "action levels" provide an initial means for the evaluation of contaminant levels and areas of potential concern. It is necessary to evaluate the detected contaminant levels and associated potential risks to human health and the environment with

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respect to site-specific land use conditions and exposure pathways. These activities are conducted in this comprehensive baseline risk assessment, in accordance with NJDEPE and USEPA guidance.

For each environmental media sampled, a discussion of the contaminant types detected, the environmental distribution of contaminants, and a comparison of detected levels to regulatory action levels is presented below. Tables 2-2 through 2-5 summarize the analytical data for contaminants in surface soil (0-2' depth), subsurface soil (test pits and borings greater than 2' depth, but no deeper than 12'), surface water and ground water, respectively. This information is presented to provide the reader with an overview of site contamination and to present the calculated representative site exposure point concentrations as used in each exposure scenario. Comparisons to site background were also presented when appropriate, and are discussed in Section 2.3 of this report.

<u>Soil Samples</u> - Soil samples collected from surface soils, test pits and soil borings at the SMC facility primarily exhibit inorganic compounds. Volatile organic, semi-volatile organic, and PCB compounds were detected in soil samples but at levels which do not exceed New Jersey Interim Soil Action Levels. DDT was detected in two soil boring samples at levels of 26 milligrams/kilogram (mg/kg) and 31 mg/kg, which exceed the New Jersey Interim Soil Action Level of 1-10 mg/kg for DDT.

Inorganics were detected most frequently at levels exceeding New Jersey Interim Soil Action Levels. The presence of individual inorganic compounds is discussed below:

<u>Beryllium</u> (range of detection 0.08-6.01 mg/kg; action level 1 mg/kg) was detected at 152 locations (out of a possible 192 locations) (Tables 2-2 and 2-3) and was detected 66 times in soil samples (53 times in near-surface soil samples) at levels exceeding the action level of 1 mg/kg. The maximum detected concentration of beryllium was 60.1 milligrams/kilogram (mg/kg), detected in a surface sample collected in the southwestern

portion of the Undeveloped Plant Property, along the observed floodplain of the Hudson Branch. Other areas exhibiting elevated beryllium levels (with maximum detected level of beryllium noted) include the Lagoon Area (19.4 mg/kg), the Railroad Siding Area (20 mg/kg), and along the eastern and western sides of the By-products Storage Area (29.3 mg/kg and 22.5 mg/kg, respectively). Each of these elevated levels were detected in surface soils.

<u>Chromium</u> (range of detection 1.5-5,870 mg/kg; action level 100 mg/kg) was detected at 185 locations (out of a possible 192 locations) (Tables 2-2 and 2-3) and was detected at concentrations exceeding the action level of 100 mg/kg a total of 41 times (35 times in near-surface soil samples). The maximum detected concentration of total chromium was 5,870 mg/kg, detected in a surface sample collected in the southwestern portion of the Undeveloped Plant Property, along the observed floodplain of the Hudson Branch. Other areas exhibiting elevated total chromium levels (with maximum detected concentrations noted) include the Department 106 Area (2,280 mg/kg), the Department 102 Area (1,630 mg/kg), the Railroad Siding Area (260 mg/kg), and along the eastern and western sides of the By-products Storage Area (176 mg/kg and 473 mg/kg, respectively). Each of these elevated levels were detected in surface soils.

<u>Nickel</u> (range of detection 1.5-3,360 mg/kg; action level 100 mg/kg) was detected at 142 locations (out of a possible 192 locations) (Tables 2-2 and 2-3) and was detected at concentrations exceeding the action level of 100 mg/kg a total of 29 times (26 times in near-surface soil samples). The maximum detected concentration of nickel was 3,360 mg/kg, detected in a surface sample collected in the southwestern portion of the Undeveloped Plant Property, along the observed floodplain of the Hudson Branch. Other areas exhibiting elevated nickel levels (with maximum detected concentrations noted) include the Lagoon Area (912 mg/kg), the Railroad Siding Area (339 mg/kg), and along the eastern and western sides of the By-products Storage Area (530 mg/kg and 1,110 mg/kg, respectively). Each of these elevated levels were detected in surface soils.

<u>Vanadium</u> (range of detection 3.1-12,100 mg/kg; action level 100 mg/kg) was detected at 188 locations (out of a possible 192 locations) (Tables 2-2 and 2-3) and was at concentrations exceeding the action level of 100 mg/kg a total of 81 times (62 times in near-surface soil samples). The maximum detected concentration of vanadium was 12,100 mg/kg, detected in a surface sample collected in the southwestern portion of the Undeveloped Plant Property, along the observed floodplain of the Hudson Branch. Other areas exhibiting elevated vanadium levels (with maximum detected concentrations noted) include the Department 106 Area (1,190 mg/kg), the Lagoon Area (3,950 mg/kg), the Railroad Siding Area (4,110 mg/kg), the Tank T12 Area (1,810 mg/kg), and along the eastern and western sides of the By-products Storage Area (3,990 mg/kg and 4,750 mg/kg, respectively). Each of these elevated levels were detected in surface soils.

In addition to these inorganics, several other metals were detected at levels exceeding action levels, although less frequently than those discussed above. These metals and the frequency with which they were detected at concentrations exceeding action levels include antimony (1 time), barium (6 times), lead (1 time), cadmium (1 time), and selenium (1 time). They were detected in the same areas (as identified above) in which other inorganics exceeded action levels. The lead exceedance in the sample was not from the background location. Total detection frequencies for these metals in soils include antimony (31/192), barium (189/192), lead (190/192), cadmium (12/192) and selenium (25/192) (Tables 2-2 and 2-3).

Surface Water Samples - Surface water samples included five water samples collected from the Hudson Branch, as well as four runoff samples collected during a rainfall event from major drainage pathways (near their off-site discharge points). Volatile organic and semi-volatile organic compounds were detected infrequently in surface water samples (Table 2-4), and at levels which do not exceed NJWPCA levels or federal MCLs. Pesticide/PCB compounds were not detected in surface water samples. As with the soil samples, inorganic contaminants were typically detected in surface water samples at levels exceeding regulatory action levels. Total chromium and lead levels (detected at maximum levels of 8,520 micrograms per liter (ug/l) and 1,240 ug/l, respectively) exceeded regulatory levels (50 ug/l and 0.75 ug/l, respectively) at seven sample locations each, beryllium (detected at a maximum level of 468 ug/l) exceeded the regulatory level (56 ug/l) at three locations. The highest levels of inorganics were generally detected at runoff sample locations, with concentrations generally decreasing as a function of distance downstream of the SMC facility.

Stream Sediment Samples - Five sediment samples were collected from the Hudson Branch. Volatile organic, semi-volatile organic, and pesticide/PCB compounds were detected in the samples, but at levels which do not exceed action levels. Again, inorganic compounds were commonly detected at levels exceeding action levels. Beryllium, total chromium and vanadium action levels (1 mg/kg, 100 mg/kg, and 100 mg/kg, respectively) were exceeded in each of the sediment samples. Antimony was detected in four of the five samples at levels greater than the action level of 10 mg/kg. In general, the highest levels of inorganics were detected in sediment sample SD02, which was collected south of the lagoon areas on the SMC facility. While inorganic concentrations generally decreased with distance downgradient of the SMC facility, a slight increase was observed in the sediment sample collected at the most downgradient sampling point (SD05).

Ground Water Samples - Two rounds of ground water sampling were conducted: the first in December 1990 and the second in April 1991. Sampling locations changed between sampling rounds, with 52 samples collected in the first round and 39 collected in the second round. In addition to the variations in the well locations sampled, the ground water extraction wells which are used for SMC's current ground water pump and treat system varied from one sampling round to the next. Prior to the December sampling event, SMC was pumping primarily from recovery wells IW2 and SC6D. On January 21, 1991, SMC modified the pumping strategy to increase the extraction of ground water from the lower Cohansey Sand, including ground water extraction at wells RIW2, RW6D and W9 and modification of extraction rates at wells IW2 and SC6D. The modified pumping program could be partially accountable for variations in detected contaminant concentrations at monitoring wells between sampling rounds. Specifically, the addition of ground water extraction at the location of recovery well W9 could impact the contaminant concentrations detected at wells A and SC22D.

<u>Volatile Organics</u> - Trichloroethene (TCE) was the volatile organic compound most commonly detected at levels exceeding MCLs. In the first round, the MCL for TCE (1 ug/l) was exceeded in 23 of 27 well samples, while in the second round it was exceeded

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in 23 of 33 samples. In shallow wells screened in the upper Cohansey sand, the highest levels of TCE in each sampling round (120 ug/l and 840 ug/l, respectively) are detected in the general location of the Former Manpro-Vibra Degreasing Unit. Lower levels (5 to 55 ug/l) are detected downgradient to the southwest, extending to the northeast portion of SMC's 7.5 acre parcel. In the lower Cohansey Sand, maximum concentrations of TCE were detected in the first sampling round south of the Lagoon Area (70 ug/l) and to the southwest, with a "hot spot" detected in the northeast corner of SMC's 7.5 acre parcel (330 ug/l). During the second sampling round, maximum TCE concentrations shifted west, from south of the Lagoon Area (35 ug/l) to the southwest portion of the Undeveloped Plant Property (120 ug/l). The "hot spot" previously identified in the northeast portion of the 7.5 acre parcel was confirmed by the second round of sampling (430 ug/l).

Other volatile organics were detected at levels exceeding MCLs at a much lower frequency (1 to 4 times per sampling round), including 1,1-dichloroethene, 1,2-dichloroethene (total), benzene, toluene, and xylene. In both rounds, benzene, toluene and xylene were detected in well SC23S, which was located adjacent to an underground storage tank location. Methylene chloride and acetone, common laboratory contaminants, were typically detected in ground water samples but were also detected in laboratory blanks, indicating their presence may be associated with laboratory contamination.

<u>Semi-Volatile Organics</u> - No semi-volatile organic compounds were detected in either sampling round at concentrations exceeding MCLs.

<u>Pesticide/PCBs</u> - No pesticides/PCBs were detected in the first sampling round. Pesticides/PCBs were not analyzed for in the second round (agreed to by NJDEPE).

<u>Inorganics</u> - Filtered and unfiltered ground water samples were collected for inorganics analysis during the first sampling round. Major anion and cation analysis was also conducted on 15 first round samples to be used in conjunction with Eh and pH data to determine the valence state of chromium in the ground water. Only unfiltered samples were collected during the second round of sampling, and only unfiltered samples were used in this risk assessment.

In general, total chromium and lead were the inorganics most commonly detected above MCLs during the first sampling round, while total chromium and antimony were most commonly detected above MCLs during the second sampling round. The major anion and cation analysis indicated that chromium exists primarily in a trivalent state in the ground water. Although some variability was found, comparison of filtered and unfiltered ground water sample analyses indicated that soluble inorganics are present in the ground water, with metals concentrations in filtered samples typically at similar concentrations to those detected in unfiltered samples. The extent of chromium and other inorganics in the ground water based on unfiltered ground water samples is discussed in detail below.

<u>Total Chromium</u> - During the first sampling round, total chromium was the inorganic most commonly detected at levels exceeding the MCL (100 ug/l). Hexavalent chromium was also commonly detected, although no MCL has been established for hexavalent chromium. Total chromium was detected in the upper Cohansey Sand beneath the Manufacturing Area at concentrations ranging to 20,800 ug/l in the first round, with concentrations generally decreasing to the southwest. An elevated concentration (11,700 ug/l) was detected in a well located near the pumping wells, southwest of the facility. Lesser concentrations (1,180 ug/l and 368 ug/l) were detected further southwest of the pumping wells. In the second round of sampling, total chromium in the upper Cohansey Sand was detected at a maximum level of 7,960 ug/l beneath the Manufacturing Area, ranging to 5,190 ug/l in the area of the pumping wells. Total chromium levels did not extend as far to the southwest as they did in the first sampling round.

In the lower Cohansey Sand, total chromium levels ranged to 108,000 ug/l, detected at a well located just south of the Lagoon Area. Concentrations decreased to the southwest, generally mirroring the southwestern extent of total chromium in the upper Cohansey Sand in the first sampling round, although detected levels of total chromium in these areas were higher in the lower sands (12,600 ug/l and 26,400 ug/l compared to 1,180 and 368 ug/l). In the second sampling round, the maximum total chromium level was again detected south of the Lagoon Area (62,000 ug/l). The southwestern extent of total chromium also mirrored that identified in the shallow sands, with concentrations in the lower sands (12,600 ug/l) exceeding those detected in the upper sands (956 ug/l).

<u>Hexavalent Chromium</u> - For hexavalent chromium in the upper Cohansey Sand, first round sampling results indicated the highest detected level (26,400 ug/l) was located just west of the Lagoon Area, with a second area of elevated concentration (10,600 ug/l) located west of the By-product Storage Area. The contaminant plume extends to the southwest, but not to the same extent as total chromium was detected during the same sampling round. During the second sampling round, detected hexavalent chromium levels decreased in the By-product Storage Area (2,100 ug/l). The wells located west and southwest of the Lagoon Area (IWC2, Layne and K wells) exhibiting elevated hexavalent chromium levels (26,400 ug/l, 19,900 ug/l and 15,100 ug/l, respectively) in the first sampling round were not resampled during the second round; however, a well adjacent to the Layne well (well B) exhibited only 1,600 ug/l hexavalent chromium during the second round. Hexavalent chromium levels downgradient to the southwest remained relatively constant in the second round, with the maximum detected concentration (13,000 ug/l) located in the area of the pumping wells.

Hexavalent chromium in the lower Cohansey Sand was detected at the highest level (60,900 ug/l) in the southwestern portion of the Undeveloped Plant Property, with concentrations extending to the southwest and increasing slightly at a well located in the northeast portion of SMC's 7.5 acre parcel. The southwest extent of the plume generally agrees with the extent of the total chromium plume determined during first round sampling. In the second round of sampling, the maximum level of hexavalent chromium (69,000 ug/l) was detected south of the Lagoon Area, extending west and southwest,

although not into SMC's 7.5 acre parcel. The extent of hexavalent chromium mirrors the extent of total chromium measured during the same sampling round.

<u>Other Inorganics</u> - Lead was detected in ground water at levels exceeding the MCL (5 ug/l) 16 times during the first sampling round and 10 times during the second sampling round. Lead concentrations in ground water also exceeded the Federal Safe Drinking Water action limit for lead of 15 ug/l. These exceedances occurred 12 times during the first sampling and 5 times during the second sampling round. The highest level of lead (137 ug/l) was detected at an upgradient shallow well location (W3S). Shallow wells in the northwestern portion of the facility, near the locations of the Railroad Siding Area and Underground Storage Tanks also exhibited relatively high levels of lead (49 to 84 ug/l). MCLs were also exceeded in wells screened within the lower Cohansey Sand, with concentrations generally decreasing to the southwest for both the lower and upper sands. Second round results generally confirmed the lead levels detected in the first round.

Antimony was detected in ground water at levels exceeding the MCL (10 ug/l) 12 times during the first sampling round and 18 times during the second sampling round. During both sampling rounds, maximum levels (2,140 ug/l and 1,340 ug/l) were detected south of the Lagoon Area in well SC22D. A well located in the northeast portion of SMC's 7.5 acre parcel (IW2 - screened from 40 to 70 feet), which was sampled only during the first sampling round, exhibited 573 ug/l antimony, indicating a potential "hot spot". A well located approximately 300 feet northeast of IW2, SC4D, exhibited antimony at 258 ug/l during the first round and 272 ug/l during the second round. Downgradient wells located to the southwest exhibited lesser concentrations of antimony (19 to 45.7 ug/l), although these levels did exceed the MCL.

Other inorganics detected at levels exceeding their associated MCL at frequencies of 1 to 4 times per sampling round include arsenic, beryllium, cadmium, mercury, nickel, and selenium.

Included in the ground water investigation was the sampling of a monitoring well, SC23S, which had been installed downgradient of an inactive underground storage tank which previously held unleaded gasoline. The analytical data from monitoring well SC23S indicated that a discharge of fuel products had occurred. The Closure Plan and DICAR have been submitted to, received and approved by the NJDEPE for closure of the leaking tank near well SC-23S (NJDEPE, 1992).

Table 2-5 presents a summary of ground water contaminant concentrations for monitoring wells SC-22, SC-13, D and W2. These wells were chosen as representative of potential contaminant migration to private wells located to the south of the SMC facility and, therefore, outside of the well restriction area. Comparison of contamination in these wells to upgradient water quality is presented in Table 2-5.

<u>Air Samples</u> - A total of 72 air/dust samples were collected during twelve sampling events at the SMC facility. Titanium was the only metal species detected at a concentration exceeding federal Acceptable Ambient Levels (AALs), and it was detected at these levels at one sample location in only two (2) of twelve (12) sampling events. No site-specific air criteria for metal species have been developed by NJDEPE for the SMC facility.

A review of the meteorological and chemical concentration data indicates variability in contaminant levels, which would be expected given the various meteorological conditions under which the monitoring occurred, as well as a relative consistency between the areas in which the highest particulate concentrations were detected and potential upgradient source areas, depending on the wind conditions on a particular day. Based on the air monitoring results, it is likely that particulate sources are not collocated and that particulate source locations are variable based on ongoing site operations (especially material storage activities within the By-Products Storage Area).

Air/dust sample results were not used in this risk assessment for the following reasons:

- Air/dust samples were taken under non-operational conditions at the SMC facility;
- Air/dust samples were taken over a twelve-week period which may not be representative of annual dispersion events;
- Contribution of source areas (in particular, material storage in the By-Products Storage Area) can not be readily separated from surface contaminant erosion; and

• Scenarios of most concern which addresses exposure to fugitive dust constructed for this risk assessment include events involving activities on-site rather than non-operational conditions.

Fugitive dust modeling was used to evaluate dispersion of surficial contaminants at the SMC facility (EPA, 1988). This approach is highly conservative in that concentrations of modeled suspended contaminants are greater than monitored suspended contaminants.

2.3 Contaminant Fate and Transport

This section of the risk assessment evaluates the fate and transport of contaminants associated with the site and provides an indication of future contaminant movement. Section 2.2.3 outlines the occurrence of contamination across the site in surface soil, subsurface soil, and ground and surface water. Observed contamination consists mainly of numerous inorganics in the surface and subsurface soils, ground water and surface water, and VOCs in the ground water.

2.3.1 Potential Routes of Migration

To determine the fate of contaminants of potential concern at the site, information on the physical/chemical and environmental fate properties was collected for site contaminants. This information is presented in Table 2-6 for selected contaminants of concern. Several of the environmental media studied have the potential for off-site migration, primarily surface soils and ground water. Subsurface soils are not likely to be at risk of transport off-site unless exposed by excavation. Although the subsurface soils contain several chemicals of concern, the mode of transport of the chemicals would be primarily through leaching and ground water transport.

Contaminants in surface soils can migrate or be carried from the site by surface runoff (resulting from precipitation), in the form of fine particulates sorbed to windblown dust, and by users of the site via vehicle tires, shoes, etc. In addition, contaminants can move from the surface soils (leaving the soils in place) through leaching by infiltration of precipitation and transport by ground water, and volatilization to ambient air. Finally, transport of contaminants to plants or animals which may potentially be consumed by humans is a possible route of migration.

The sampling results have demonstrated that ground water has been impacted by the site thus presenting a possible migration path for contaminants which have leached downward through soils. In accordance with NJS 40:63-52, et seq., the City of Vineland has designated an area of the city as an aquifer exclusion zone, requiring mandatory connection with public water systems and sealing of domestic and supply wells. Thus, migration off the site via production wells is not occurring.

2.3.2 Contaminant Distribution and Observed Migration

The following section examines contaminant presence across the site, (also discussed in Section 2.2.3), in combination with the migration pathways to provide an understanding of contaminant persistence and migration at the site. The discussions below are presented with respect to individual contaminants or contaminant groups. Contaminants observed in the environmental samples collected from the site include inorganics, volatile organic compounds, semi-volatile organic compounds and pesticides/PCBs.

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Inorganic Analytes

Many metals have an affinity for soils (particularly clay particles and organic matter in soils) which reduces their mobility. Under extremes of pH, some metals can be rendered mobile. The presence of the inorganic analytes, particularly the naturally occurring elements, must be examined in the context of site background concentrations, as presented in Table 2-2. The analytes which appeared elevated above site background surface soil levels in one or more samples are: aluminum, antimony, arsenic, barium, beryllium, cadmium, cobalt, copper, chromium, iron, manganese, lead, mercury, nickel, selenium, silver, vanadium, cyanide, boron, niobium, strontium, titanium and zinc. The analytes which appeared elevated above site background in subsurface soil samples include aluminum, antimony, arsenic, barium, beryllium, codalt, copper, chromium, cobalt, copper, chromium, lead, manganese, nickel, selenium, silver, vanadium, boron, titanium and zinc.

All inorganics with the exception of antimony (1/10), selenium (2/10), silver (1/10), cadmium (1/10), mercury (3/10) and cyanide (3/10) were widespread in ground water samples, suggesting migration has occurred from soils. Comparison of inorganic concentrations in ground water on-site to upgradient concentrations (monitoring well SC-14S and W-3D) indicates that a general trend of elevated concentrations occurs for all inorganics with the exception of zinc.

Detailed analysis of the ground water results indicates that inorganic contamination exists beneath the SMC facility, extending in a general plume to the southwest. While chromium is the major inorganic contaminant in the south-westerly plume, beryllium, nickel and vanadium levels are also significantly elevated, suggesting movement of these analytes in the ground water.

Further evidence of the potential migration of inorganics off-site was indicated in the five surface water (SW) samples collected from the Hudson Branch (SW-1 through SW-5) and the four runoff samples collected south of the SMC facility (SW-6 through SW-9). Aluminum, barium, beryllium, chromium, copper, manganese, nickel, vanadium, zinc and fluoride were detected in these samples, with concentrations generally decreasing as a function of distance from the site, again suggesting movement of these analytes in the stream.

Analysis of stream sediments taken from the Hudson Branch also support the off-site migration of inorganic contaminants, showing a general decrease in contamination with distance downstream. However, there was a slight increase in sediment inorganic levels in sediment sample 05 (SD-05), the sampling point located the greatest distance from the SMC site. This suggests that there may be an additional off-site source of inorganic contamination.

Volatile Organic Compounds

In general, volatile organic compounds (VOCs) were detected infrequently, with some exceptions (e.g., trichloroethane (11/14), tetrachloroethane (7/14) and toluene (5/14) in surface soil; trichloroethene (10/38) and acetone (9/38) in subsurface soil), and at low concentrations in soils on-site. VOCs were not detected in ground water with the exception of trichloroethene (2/7) and tetrachloroethene (1/7). Only three VOCs were detected in surface water, each at a frequency of 1/5 (chloromethane, 1,2-dichloroethene and trichloroethene). These VOCs were detected at sampling point SW-4, which is downgradient of the SMC facility, suggesting either migration of the VOCs or an off-site contamination source.

The principal mechanism for the natural removal of aromatic VOCs is through volatilization (EPA, 1979). Vapor pressures (@ approximately 20°C) of the VOCs of concern range from 7 mm Hg (ethylbenzene) to 1011 mm Hg (chloromethane) and Henry's Law Constants range from 2.74 x 10^{-5} atm-m³/mol (2-butanone) to 1.11 x 10^{-2} atm-m³/mol

(chloromethane) (see Table 2-6 for Physical/Chemical and Environmental Fate Properties). The role of biodegradation in the natural attenuation of these compounds is compound specific. Ranges of half lives of VOCs in surface water tend to be short (1-2 weeks) with a few exceptions. Similarly the role of adsorption is compound specific (e.g. acetone has little tendency to be retained by soils); the amount adsorbed is highly related to the amount of organic carbon in the soil and is represented numerically by the organic carbon/water partition coefficient (K_{∞}). The compounds with higher K_{∞} (e.g., ethylbenzene) would be preferably partitioned to organic matter in soils and thus would be less likely to be leached from the soils and transported to the ground water. Some aromatic hydrocarbons are highly mobile. Benzene, for example, has a moderate solubility (1750 mg/l), low K_{∞} (83 ml/g) and short half life (1-6 days in surface water). Therefore, benzene, because of its tendency to volatilize and biodegrade, would be mobile but would not be expected to be very persistent in the environment. Conversely, xylenes, with their lower solubilities (198 mg/l) and higher K_{∞} (240 ml/g), would not be as mobile as benzene, but would be more persistent in the environment as they would tend to sorb to soil particles. Examples of VOCs identified in the surface soil samples included tetrachloroethene, trichloroethene and toluene, probably as a result of their relatively high K_{∞} , low water solubility and low vapor pressure.

Subsurface soils contained many VOCs; primarily at low concentrations. Subsurface soils showed the greatest pattern of occurrence of VOCs of the four media sampled. VOCs detected most frequently and at the greatest concentration in subsurface soils include acetone and trichloroethene. In general, these contaminants are only moderately mobile in soils, and their presence in subsurface soils may be enhanced by past site practices. Based on the mobility,

vapor pressure, water solubility and potentially, site practices, of these VOCs, it is not unusual that increasing patterns of detection were found in subsurface soils as compared to surface soil.

Four monitoring wells were used in this risk assessment. One sample was taken from each well during round one and one sample was taken from three of these wells for round two, for a total of seven samples. Only two VOCs were detected in ground water samples. Trichloroethene was detected in 2 of 7 samples at concentrations of 35 mg/l and 70 mg/l (SC-22D). Therefore, TCE was detected in the same well during both the first and second rounds of sampling. Tetrachloroethene was detected in 1 of 7 samples at a concentration of 1 mg/l. The chemical/physical and environmental fate data indicate that these hydrocarbons have the potential to migrate downward in soils to ground water.

Ground water beneath the site exits the site primarily to the southwest both as shallow and deep ground water. Contamination present in downgradient monitoring wells SC-2D, SC-21S and SC-21D is considered to be indicative of potential migration of contaminants in ground water off-site. Examination of patterns of VOC occurrence in these wells (both shallow and deep) indicates that some migration of VOCs, in particular trichloroethene, may be occurring. The presence of trichloroethene in the stream sediment sample SD-5, located farthest downstream from the SMC facility, suggests another source of contamination off-site.

Semi-Volatile Organic Compounds

The semi-volatile organic compounds were identified primarily in soils sampled on-site. The semi-volatile organic compounds, particularly the PAHs, are persistent in the environment due to their complex chemical nature. Some of the lighter PAHs (fewer aromatic rings) would be subject to biodegradation or volatilization, but the chemical persistence generally increases with increasing number of aromatic rings. Semi-volatile organic compounds are generally characterized by high boiling point, low vapor pressure, and low solubility (except phenols) (Table 2-6).

The semi-volatile organic compounds will be divided into the following groups for discussion: polynuclear aromatic hydrocarbons (PAHs) and naphthalene, phenols, and phthalates.

Polynuclear aromatic hydrocarbons (PAHs) were infrequently detected in surface and subsurface soils on-site with the most frequent detection occurring for fluoranthene (9/34 in the subsurface soil). No PAHs were detected in ground water or surface water. PAHs generally have a very low solubility (<4.0 mg/l). The K_{∞} 's of PAHs are generally greater than 2,500 ml/g, with many greater than 100,000 ml/g. This indicates that PAHs readily adsorb to organic carbon in soils, and most likely accounts for the lack of contamination in ground water samples. However, there is an indication that PAHs can migrate off-site as evidenced by the presence of fluoranthene, pyrene, benzo(b)fluoranthene and chrysene in stream sediments, particularly from sampling point SD-04, located downstream from the SMC site. The route of migration is most likely due to surface runoff during storm events.

Phenols and phenol compounds were rarely detected in any of the media sampled. Phenols and phenol compounds are generally more soluble in water than other semi-volatile organic compounds and display a relatively low volatility (the vapor pressure of phenol is less than the aromatic hydrocarbons). Based on the relatively low K_{∞} and high solubility of phenols, they would not tend to adsorb to soils' organic matter; but would tend to leach from soil into ground water. Only phenol and pentachlorophenol were detected in surface soil, while phenol, 2,4,5-trichlorophenol and pentachlorophenol were detected at a frequency of only 5% in subsurface soil.

Phenols were not detected in ground water or surface water. However, phenol was detected in stream sediments at sampling points SD-01 and SD-04, and pentachlorophenol was detected at sampling point SD-01. It is unclear if phenols are migrating off-site, or if there is an off-site source of contamination.

Phthalate compounds were reported infrequently in samples from all environmental media collected at the site. Di-n-butylphthalate and bis(2-ethylhexyl)phthalate were detected at <5% in surface and subsurface soils and in surface water. It should be noted that phthalates are considered to be common laboratory contaminants and are widespread in the environment (ATSDR, 1987; ATSDR, 1989). Phthalate esters generally occur in association with other semi-volatile organic compounds. They generally exhibit low solubility and high K_{∞} , and so would not be particularly amenable to water transport. This is somewhat consistent with the site data which show the phthalates occur at much greater concentrations in soil samples as compared to ground water. Only bis(2-ethylhexyl)phthalate was detected in ground water at 4 mg/l (below the detection limit of 10 mg/l) in SC-13D. There is some evidence of migration of phthalate compounds since both di-n-butylphthalate and bis(2-ethylhexyl)phthalate was detected in 3 of the 4 surface runoff samples collected south of the SMC facility. As indicated previously, it is unclear if an off-site source of contamination if present.

Pesticides and PCBs

The pesticide 4,4-DDT was detected in 5 of 34 subsurface soil samples but was not detected in surface soil. The PCBs (Aroclor-1248, Aroclor-1254 and Aroclor-1260) were detected at least one time in surface soil, while only Aroclor-1260 was detected in subsurface soil (1/40). PCBs and pesticides were not detected in ground water or surface water. In general, pesticides and PCBs have an affinity for organics in soils (e.g., K_{∞} of DDT is 243,000 ml/g), which tends to render them immobile. In addition, many pesticides and PCBs are very persistent.

While pesticides and PCBs at the site appear confined to soils, there is some evidence that these compounds may be migrating off-site since 4,4-DDE, 4,4-DDD and 4,4-DDT and Aroclor-1254 were detected at sampling points SD-01 and SD-04. In addition, it should be noted that agriculture in areas surrounding the plant and adjacent to the Hudson Branch, as well as other industry in the area, could be off-site sources of contamination.

2.4 Selection of Chemicals of Concern

The purpose of the selection process is to identify the site-related constituents which are likely to contribute significantly to the estimates of human health risk. The approach for selection of constituents of concern (COCs) included consideration of detection frequency but does not include comparison to available background data. A constituent was excluded if it was not detected in the medium of interest. Constituents were excluded if found in less than 5% of the samples for the medium (with a minimum of 20 samples). These constituents were excluded regardless of whether they were detected in more than 5% of the samples in another medium. (Note: The 5% exclusion test is not used if fewer than 20 samples were collected for the area under consideration.)

Background samples RA-58, RA-59, and RA-60 were not used to exclude COCs from the risk assessment. Rather, this background data is used to evaluate any naturally occurring inorganics that are associated with elevated cancer risk or non-cancer hazard quotients in the uncertainty analysis.

For ground water, COCs were not excluded on the basis of comparison to background (upgradient) ground water quality.

For surface water, COCs were not excluded on the basis of comparison to concentrations upstream.

Table 2-7 presents the final list of COCs selected for inclusion in the risk assessment.Table 2-8 presents the list of constituents excluded as COCs in the risk assessment.

2.5 Exposure Assessment

2.5.1 Development of Exposure Scenarios

The most critical aspect of a technically sound exposure assessment is the identification of exposure routes, together with the identification of human receptors. A portion of the SMC site is currently an active industrial facility, and the property is covered with buildings and pavement. There is also an undeveloped portion of the site which is partially devoid of any ground cover (e.g., vegetation, pavement). Access to the SMC site is restricted at the road by a gate and guard. The restricted industrial area is surrounded by a chain link fence, which is topped by barbed wire. A portion of the undeveloped SMC site is unrestricted and, therefore, accessible to trespassers. Based on discussions with field personnel, SMC personnel, NJDEPE,

and a site visit, the following potential current human exposure scenarios were identified:

- Persons having access to the site (i.e., nearby residents) may be potential receptors (especially children playing on the site). Information from field personnel indicates that children do not trespass on the site or do so on a highly infrequent basis.
- SMC employees who are required on a daily basis to load/unload storage material on the undeveloped portion of the site (unpaved and unvegetated) would be exposed to site contaminants.
- Use of ground water as a potable drinking water or agricultural source is restricted. However, residents who live outside of the well restriction area (along East Weymouth Avenue) may currently be exposed to contaminants in ground water. The NJDEPE is currently investigating the presence of residential wells in this area.

Two potential future exposure pathways exist at the site, including:

- Construction of buildings on the site (i.e., development of the site as house lots or for further industrial development of the site), presenting a potential for exposure of construction workers to site contaminants.
- Residential use of the site, presenting a potential for exposure of adults and children to site contaminants.

Each scenario includes a particular potential "receptor population", and a consideration of the pathways by which those receptors may encounter contaminants of concern. The values and assumptions used for each exposure scenario were prepared in keeping with generally accepted values in the discipline of risk assessment; the values are not based on detailed time-activity studies, with the exception of current industrial for which activity patterns have been established. Specific assumptions and details for each exposure scenario are presented in Appendix A.

2.5.2 Exposure Scenarios Addressed in the Health Assessment

Scenario 1 - Trespassing Scenario (Current)

Appendix A presents the models for the exposure routes and assumptions associated with children trespassing on the unrestricted portion of the site as it currently exists. It is assumed that children living within the immediate vicinity of the site may trespass on an infrequent basis (30 days per year). Additionally, on days in which children trespass/play on-site, it is assumed that all soil ingestion (100 mg/day) for that day occurs on-site and that the ingestion rate for surface water is 50 ml/day (EPA, 1989). Children are not likely to enter the site on a regular basis and without adult supervision before the age of 9 years due to the distance of the site from residences. Regular exposures of this nature are not expected beyond the age of 18 years because of changes in the use of recreational time. Play activities are expected to involve contact with surface soil outside of the fenced industrial area and stream water from the Hudson Branch. As a result, they may receive dermal and ingestion exposures to contaminants in soil and water. *Thus, the following exposure pathways were selected for inclusion in the current trespassing scenario:*

• Dermal absorption of contaminants in surface soils and surface water

• Incidental ingestion of contaminants in surface soils and surface water

Exposure pathways not selected for inclusion in the current trespassing scenario and the accompanying rationale for exclusion include:

• Dermal absorption of contaminants in sediments from the Hudson Branch (sediment samples SD-1 through SD-5). Contaminant type and concentrations were not materially different from surface soil and were expected to present similar or lower risks than those from surface soil.

- Dermal absorption or ingestion of contaminants in ground water, or inhalation of volatiles from ground water. Ground water is not accessible to a trespasser at the site.
- Inhalation of contaminants in fugitive dust. The unrestricted portion of the site is well vegetated with areas of grass, shrubs, and trees and, thus, this pathway is not likely to be of concern.

Figure 2-1 presents the surface soil sampling locations utilized to estimate exposure to environmental concentrations of contaminants in soil. Surface water data utilized in this scenario include SW-1 through SW-5. Run-off samples (SW-6 through SW-9) were not included in this assessment. Contaminant type and concentrations were not materially different from surface soil and were expected to present similar or lower risks than those from surface soil. For dermal exposures, penetration of contaminants in soil and water was modeled as described in Appendix A (EPA, 1989). Absorption of soil and water contaminants after ingestion is also provided in Appendix A (NJDEPE, 1991).

Table 2-9 illustrates the routes of exposure and associated exposure parameter values for Scenario 1 - Trespassing (Current).

Scenario 2 - Industrial Use Scenario (Current)

Currently, employees at the Shieldalloy Metallurgical Corporation facility provide daily transport of materials from the industrial building to an undeveloped (fenced) portion of the site for storage. This storage area is completely devoid of any type of ground cover (e.g., vegetation, pavement). These SMC employees could be exposed through inhalation to contaminants in dust, as well as through dermal and ingestion exposures to contaminants in soil. It is assumed that exposure time will be limited to one hour per day based on known activity patterns at the site. Activities include periodic trips to pick-up and dump slag on the unpaved portion of the site and other miscellaneous maintenance visits. Thus, the following exposure pathways were selected for inclusion in the current industrial use scenario:

- Dermal absorption of contaminants in surface soils
- Incidental ingestion of contaminants in surface soils

Exposure pathways not selected for inclusion in the current industrial use scenario and the accompanying rationale for exclusion include:

- Dermal absorption of contaminants in sediments or surface water from the Hudson Branch. The Hudson Branch is outside the industrial area of the site. Activities are contained within the fenced area.
- Dermal absorption or ingestion of contaminants in ground water, or inhalation of volatiles from ground water. Ground water is not used as a potable source for the facility.

Figure 2-2 presents surface soil sample locations used to estimate the exposure point concentrations for this scenario. In general, surface soil samples located outside of the by-product storage area or samples taken beneath paved areas were not included in the analysis. The inhalation rate is based upon workers undergoing moderate exertion (EPA, 1991). Dermal penetration and absorption of contaminants in soil was modeled as described in Appendix A (NJDEPE, 1991). The soil ingestion rate used is 100 mg/day (EPA, 1991).

Table 2-9 illustrates the routes of exposure and associated exposure parameter values for Scenario 2 - Industrial Use (Current).

Scenario 3 - Residential Scenario (Current)

In accordance with NJS 40:63-52, et seq., the City of Vineland has designated an area of the city as an aquifer exclusion zone, requiring mandatory connection with public water systems and sealing of domestic and supply wells (Figure 2-3). Residences located outside of this well restriction, primarily to the south of the site (along East Weymouth Road) may use private wells as a potable drinking water source and thus may potentially be exposed to contaminated ground water. The NJDEPE is currently investigating the use of private wells in this area.

This scenario was constructed to evaluate the possible risks associated with current residential ground water use. Thus, the following exposure pathways were selected for inclusion in the current residential scenario:

- Ingestion of ground water,
- Inhalation of volatile organic compounds from ground water released into bathroom air during showering, and
- Dermal contact with contaminants in ground water.

These exposures are assumed to occur on 350 days/year for 30 years. The exposure period for bathing is 12 minutes/day and adults are assumed to ingest 2 liters of water per day. Exposure pathways not selected for inclusion in the current residential scenario and the accompanying rationale for exclusion include:

- Dermal absorption of contaminants in sediments and surface water from the Hudson Branch. While residents may potentially have access to the Hudson Branch, these exposures are considered under the current trespassing scenario and not repeated here.
- Dermal absorption or ingestion of contaminants in surface soil. Surface soil at residential locations is not impacted by the site and therefore not of concern. While residents may potentially have access to the unrestricted portions of the site, these exposures are considered under the current trespassing scenario and not repeated here.
- Inhalation of contaminants in fugitive dust. Residential areas are located such that movement of fugitive dust from non-vegetated areas of the site is not likely to be of concern. Furthermore, physical features such as tree lines inhibit movement of such windborne dusts.

Monitoring wells SC-22, SC-13, W2 and D were chosen in discussions with field personnel, SMC personnel and NJDEPE as monitoring points representative of current contamination to the south of the SMC site (Figure 2-4). It is not certain at this time whether private wells have been drilled into shallow or deep ground water. Because of this uncertainty, two potential exposure points were used to address risk from ground water use. That is, separate data sets, exposures and risks were assembled for shallow and deep ground water contamination.

Table 2-9 illustrates the routes of exposure and associated exposure parameter values forScenario 3 - Residential (Current).

Scenario 4 - Construction Scenario (Future)

Appendix A presents the model inputs for the exposure routes that construction workers involved in site development (e.g., building homes) could potentially encounter. Excavation and site preparation activities could cause workers to receive inhalation exposure to contaminants in dust, as well as dermal and ingestion exposures to contaminants in soil. *Thus, the following exposure pathways were selected for inclusion in the current construction scenario:*

- Dermal absorption of contaminants in subsurface soils
- Incidental ingestion of contaminants in subsurface soils

Exposure pathways not selected for inclusion in the current construction scenario and the accompanying rationale for exclusion include:

• Dermal absorption of contaminants in sediments or surface water from the Hudson Branch. The Hudson Branch is outside the industrial area of the site. Activities are likely to be contained within the fenced area.

Dermal absorption or ingestion of contaminants in ground water, or inhalation of volatiles from ground water. Ground water is used as a potable source for the facility.

Figure 2-5 presents the subsurface soil sampling locations (greater than two feet, but less than 12 feet in depth based on generic building foundations) used to model exposure estimates for construction workers. It is assumed that workers are engaged in construction, with excavation and site preparation activities lasting for 180 working days. It is also assumed that remediation of contaminants would not occur prior to construction. The inhalation rate is based upon workers undergoing moderate exertion (EPA, 1991), and dermal penetration of contaminants in soil was modeled as described in Appendix A (NJDEPE, 1991). The soil ingestion rate used is 480 mg/day (EPA, 1991).

Table 2-9 illustrates the routes of exposure and associated exposure parameter values for Scenario 4 - Construction (Future).

Scenario 5 - Residential Scenario: Children and Adults (Future)

A future use residential scenario was constructed to evaluate the possible risks associated with residing on the site and using the ground water under current conditions of contamination. All surface soil sampling locations (including borings 0-2 feet) and surface samples taken from beneath paved areas were included in the calculation of exposure point concentrations (Figure 2-5). Use of the ground water as a potable drinking water source is not included as this area is supplied with public water. The relevant exposure pathways are indoor and outdoor ingestion of dust/soil (this will be evaluated in 0-6 year old children and for adults), outdoor dermal exposure to soil contaminants (adults) and outdoor inhalation of contaminants in dust

(adults). Exposure pathways not selected for inclusion in the future residential scenario and the accompanying rationale for exclusion include:

- Dermal absorption or incidental ingestion of contaminants in sediments or surface water from the Hudson Branch. These exposures are considered in the current trespassing scenario and are not repeated here.
- Dermal absorption or ingestion of contaminants in ground water, or inhalation of volatiles from ground water. Use of the ground water as a potable drinking water source is not included as this area is supplied with public water.

Appendix A presents the model inputs for the exposure routes that children and adults who live on-site might receive. These exposures are assumed to occur 350 days/year for 6 years for children and 30 years for adults (EPA, 1989; 1991). The time period for outdoor exposure to fugitive dusts is 4 hours/day for adults. Children are assumed to ingest 200 mg of soil/house dust per day, while for adults, the value is 100 mg soil/day.

Table 2-9 illustrates the routes of exposure and associated exposure parameter values forScenario 5 - Residential (Future).

2.5.3 Estimating Environmental Concentrations

All exposure point concentrations used in assessing receptor dose were calculated as specified in Chapter 6 of the Risk Assessment Guidance for Superfund (EPA, 1989). This statistical method uses a confidence interval to calculate a theoretical concentration from actual on-site samples. The confidence interval to be used is the 95% upper confidence limit. The results of this method represent an "upper-bound" on the average concentration; the probability that the actual average concentration on the site exceeds this value is estimated to be less than 5%. The confidence intervals for this application were calculated for a log-normal distribution. This distribution was chosen based on an examination of the measured data. Most measured

concentrations are relatively low, with a few values higher than the majority by at least one order of magnitude. For this type of data set, the log-normal distribution is more suitable than the standard normal distribution. The 95th % upper confidence limit was calculated for each compound in each environmental media based on actual compound concentrations found on-site. The upper confidence limits used in this assessment were calculated using the following formula:

$$UCL_{95} = \exp \left(Y_{ave} + 0.5 Sy_2 + \frac{Sy H_{95}}{\sqrt{n-1}} \right)$$

where:

 $UCL_{95} =$ the 95th percentile upper confidence limit average concentration valuey=lnC $Y_{ave} =$ the average of the natural logarithms of all concentrationsSy=the standard deviation of the logarithms of the concentrationsn=the number of samples

 H_{95} = a statistical parameter which depends upon n and Sy, obtained from a look-up table (Gilbert, 1987).

As indicated in Section 2.2.2 (Data Evaluation), non-detected values were included in the calculation of exposure point concentrations (i.e., soil concentrations). These non-detected values included both detection limits and estimated sample quantitation limits (SQLs). In general, detection limits were used as reported, while SQLs were evaluated in light of detection limits and quantifiable concentrations ("hits") of each contaminant. Each SQL was independently analyzed and used either as the estimated SQL or one half (1/2) of the SQL.

When few data points are available for statistical analysis (<10 data points), the 95% UCL is artificially inflated and exceeds the maximum detected concentration. In these cases,

the maximum detected value was used as the exposure point concentration rather than the 95% UCL.

2.5.4 Evaluating Uncertainty

The exposure estimates produced for each receptor in each scenario are based on numerous parameters having varying degrees of uncertainty. This discussion will focus on these parameters, and the associated range of uncertainty. Table 2-10 and the discussion which follows are separated into those parameters which apply to all scenarios (i.e., global variables), and those which apply specifically to an individual scenario.

• Global Variables (All Scenarios)

Table 2-10 lists the ranges of parameters and associated values which are used in each of the scenarios. Body weight ranges for children (age 0-6 years and 9-18 years) were derived from EPA (1990). The actual values used represent an average body weight for each of the groups. Similarly, for adults (18-65 years), a range of body weights is presented, along with the average body weight for the group. While there is a range of body weights for each age group, these ranges are not large, and are not expected to contribute a significant degree of uncertainty to this assessment.

For Scenario 1, the exposure duration (ED) for children was assumed to be nine years, based upon the age range of children (9 to 18) likely to trespass onto the site. In theory, this duration might range from 1 to 18 years; however, it is unlikely that children younger than 9 years of age would visit the site. For Scenario 2 (industrial exposure), employees were expected to spend 25 years on-site, which is representative of the amount of time expected for employment at one location. For Scenario 3 (current residential), only adults were considered and they were assumed to have an ED equal to 30 years, which is the national upper-bound (90th percentile) time at one residence. For Scenario 4 (construction), workers were expected to have an ED of 1 year, based on the amount of time spent developing the site. Finally, for Scenario 5 (future residential), the exposure durations for children and adults were considered separately. Children ages 0-6 were expected to spend the entire six year timeframe on-site. For adults, the ED value was assumed to be 30 years, reflecting the national upper-bound (90th percentile) time at one residence. The ranges associated with ED are only large when considering adults. However, the values used are expected to provide conservative estimates and overstate the potential risk.

Averaging time (AT) which is a pathway specific period of exposure for non-carcinogenic effects, calculated as a product of exposure duration and the number of days/year, is dependent on exposure duration (ED), which was presented above. AT is not expected to lend a large degree of uncertainty to the exposure estimates.

The potential ranges of absorption factors (AF) for *cadmium and PCBs range from 0.001* to 0.01, and 0.006 to 0.06, respectively (EPA, 1992b). This range is not likely to contribute a large degree of uncertainty to the exposure estimates. The values chosen for AF are the upper-bound values for each of the two ranges.

The permeability constant (PC) for each chemical was assumed to be equal to the penetration rate of water, rather than on a compound specific basis (EPA, 1989). Thus, the assumed PC may lend a degree of uncertainty in that some compounds will not readily penetrate skin, while others will penetrate at a rapid rate.

The range of adherence factor of soil to skin is small (0-2.77 mg/cm²). Based upon the adherence of potting soil to skin, a value of 1.45 mg/cm² was used in the exposure estimates.

The fraction of soil ingested (FI) from the site ranges from 0-1 (EPA, 1989). As a highly conservative estimate, and on an event-based approach, was assumed that all soil ingested came from the site.

Finally, concentrations of contaminants in all media were presented as a 95% UCL or as a maximum detected concentration. For some chemicals the range of potential concentrations across the site is very large or the frequency of detection is very low, introducing a high degree of uncertainty to the exposure estimates. However, the exposure estimates are expected to over predict rather than under predict, and therefore are protective of human health.

• Scenario 1 - Recreational/Trespasser Exposure (Current Use)

The exposure frequency (EF may range from 1 to 365 days/year) may introduce the greatest degree of uncertainty. The value used (30 days for children; NJDEPE, 1994) was based on *easy access to unrestricted portions of* the site. Skin surface area, exposure time and soil ingestion rate also present a large range of values but these parameters are not expected to introduce a large degree of uncertainty into the exposure estimates.

• Scenario 2 - Industrial Exposure (Current Use)

This site is currently an active industrial facility. SMC employees are responsible for moving material from buildings on the site to an undeveloped portion of the property on a daily basis. During this time workers may be exposed to site contaminants following inhalation of fugitive dusts, dermal contact with soil or incidental ingestion of soil. Of the parameters

presented in Table 2-10, the modeled ambient dust concentration is expected to present the largest degree of uncertainty to the exposure estimates. Exposure point concentrations available at the site include concentrations in soils. Airborne concentrations of contaminants (i.e., fugitive dusts) were sampled during the field program. Comparison of monitored and modeled exposure point concentrations indicate that the modeled concentrations are highly conservative and thus overly protective of human health. Names and citations for the transport models used to estimate exposure point concentrations from laboratory measurements of field samples are given in Appendix A. As a caveat, it is always more accurate to have data for exposure point concentrations in the medium of concern at the exposure point of concern, and the use of transport models represents a good faith attempt to estimate unknown values from known values. However, the use of the models does introduce uncertainty into the results. Of the remaining parameters, the ranges of skin surface area are quite large, and may also contribute a large degree of uncertainty to the exposure estimates. The EF for Scenario 2 is not expected to contribute a large degree of uncertainty to the exposure assessment. Of the possible range of values (1-365 days/year), the value chosen (250 days/year) is most likely to be representative of exposure. The soil ingestion rate can also vary over a large range of values (0-480 mg/day), and the value of 100 mg/day was chosen for this scenario to reflect that the exposure would take place on an industrial site.

• Scenario 3 - Residential Scenario (Current Use)

Of the parameters presented in Table 2-10, inhalation exposure to VOCs emanating from tap water during showering is expected to present the largest degree of uncertainty. Exposure point concentrations available at the site include concentrations of VOCs in shallow ground water. However, airborne concentrations of contaminants (i.e., volatilization) were not sampled during the field program and thus exposure point concentrations must be modeled. Names and citations for the transport models used to estimate exposure point concentrations from laboratory measurements of field samples are given in Appendix A. As a caveat, it is always more accurate to have data for exposure point concentrations in the medium of concern at the exposure point of concern, and the use of transport models represents a good faith attempt to estimate unknown values from known values. However, the use of the models does introduce uncertainty into the results. Other exposure parameters are not expected to introduce major uncertainties into the quantitative assessment, and the values chosen are representative estimates.

• Scenario 4 - Construction Scenario (Future Use)

Of the parameters presented in Table 2-10, the modeled ambient dust concentration is expected to present the largest degree of uncertainty to the exposure estimates. Airborne concentrations of contaminants (i.e., fugitive dusts) were sampled during the field program. Comparison of monitored and modeled exposure point concentrations indicate that modeled concentrations are highly conservative and thus overly protective of human health. Names and citations for the transport models used to estimate exposure point concentrations from laboratory measurements of field samples are given in Appendix A. As mentioned previously, it is always more accurate to have data for exposure point concentrations in the medium of concern at the exposure point of concern. However, the use of transport models, while introducing some degree of uncertainty into the results, represents a good faith attempt to estimate unknown values from known values. Of the remaining parameters, the ranges of skin surface area are quite large, and may also contribute a large degree of uncertainty to the exposure estimates. Scenario 5 - Residential Scenario (Future Use)

Of the parameters presented in Table 2-10, the modeling of ambient dust concentrations are expected to present the largest degree of uncertainty. The use of transport models to estimate these unknown values and the degree of uncertainty introduced to an exposure estimate was discussed above.

2.6 Toxicity Assessment

Appendix B of this report presents a short description of the toxic effects of each chemical of concern, including a summary of the dose-response information pertinent to quantitative risk assessment, as available. Furthermore, Tables B-1 through B-4 present a summary of toxicity values associated with chronic and subchronic noncarcinogenic effects, for the oral and inhalation routes, respectively. Tables B-5 and B-6 summarize the slope factors associated with potential carcinogenic effects of chemicals of concern by the oral and inhalation routes, respectively.

2.7 <u>Risk Characterization</u>

2.7.1 Quantitative Risk Assessment

For potential carcinogens, risks are estimated as probabilities. The compound-specific potency factors for carcinogens are generally estimated through the use of mathematical extrapolation models (e.g., the linearized multistage model). These models estimate the largest possible linear slope, within a 95% confidence interval, at low extrapolated doses. Thus, the potency factor is characterized as a 95% upper-bound estimate, such that the true risk is not likely to exceed the upper-bound estimate and may be lower.

The evaluation of risk from noncarcinogenic health hazards is based on the use of RfDs (EPA, 1992; EPA, 1991a). RfDs are estimates of daily exposure to the population (including sensitive subpopulations) that are likely to be without appreciable risk of deleterious effects for the defined exposure period. The RfD is calculated by dividing the no adverse effect level (NOAEL) or lowest observed adverse effect level (LOAEL) derived from animal or human studies by an uncertainty factor, which is multiplied by a modifying factor. RfDs incorporate uncertainty factors which serve as a conservative downward adjustment of the numerical value and reflect scientific judgement regarding the data used to estimate the RfD. For example, a factor of 10 is used to account for variations in human studies involving average, healthy subjects. An additional factor of 10 may also be used for each of the following:

- extrapolation from chronic animal studies to humans,
- extrapolation from a LOAEL to a NOAEL, and
- extrapolation from subchronic to chronic studies.

Finally, based on the level of certainty of the study and database, an additional modifying factor (between zero and ten) may be used.

The results of the quantitative risk analysis are presented in two basic forms. In the case of human health effects associated with exposure to potential carcinogens, risk estimates are expressed as the lifetime probability of additional cancer risk associated with the given exposure. In numerical terms, these risk estimates are presented in scientific notation in this report. Thus, a lifetime risk of 1E-04 means a lifetime incremental risk of one in ten thousand; a lifetime risk of 1E-06 means an incremental lifetime risk of one in one million and so on.

In the cases of exposure to non-carcinogens, the Hazard Index Ratio is used. As noted in previous sections, the fundamental principles used to construct the RfD utilized in calculating the Hazard Index Ratio are predicated on long term or chronic (usually measured in years) exposures and health effects. However, the RfD used was either the RfD derived from chronic studies (RfD_c) or the RfD which was derived from subchronic studies (RfD_s). Wherever possible, the RfD was matched to the type of exposure (chronic vs. subchronic) such that in scenarios involving subchronic exposures (e.g., construction), the RfD_s values were used, and those scenarios involving chronic exposure (trespasser, commercial/industrial use, current and future residential use), the RfD_c values were used.

Cancer and non-cancer health risks are discussed below for trespasser (Scenario 1 current use), commercial/industrial (Scenario 2 - current use), residential (Scenario 3 - current use), construction (Scenario 4 - future use), and residential (Scenario 5 - future use) scenarios. Within the current trespasser and future residential scenarios, the risks to children (9-18 years old, current trespasser scenario; 0-6 years old, future residential scenario) and adults are presented separately. In each case, daily doses of the compounds of concern have been calculated for each exposure pathway modeled, and these doses were then used to calculate cancer risk levels and hazard index ratios. Cancer risk levels are the lifetime probability of excess cancer due to the exposure pathways resulting from use of the site. Cancer risk levels are derived by multiplying exposure dose by the appropriate cancer slope factor for each compound and exposure route. Non-cancer health risk is quantitated by the hazard index ratio which is the ratio of the exposure dose to the RfD (both in mg/kg/day). The calculated risk is compared to the acceptable lifetime cancer risk range (1E-04 to 1E-06) for evaluating the need for remediation, as stated in 40 CFR Part 300 (EPA, 1990b). EPA (1990b) considers a cancer risk of 1E-06 as the point of departure for determining risk-based remediation goals. Regarding

non-carcinogenic health hazards the Risk Assessment Guidance for Superfund (EPA, 1989) states that:

"When the total hazard index for an exposed individual or group of individuals exceeds unity, there may be concern for potential health effects."

Thus, the cancer risk and hazard index ratios that constitute a concern are >1E-06 and >1E+00, respectively. Tables 2-11 through 2-22 summarize cancer risk levels and hazard index ratios for all scenarios. Appendix A (Tables A.1.1 through A.5.9) contains cancer risk levels and hazard index ratios for all contaminants, pathways and scenarios.

Scenario 1 - Trespassing Scenario (Current): Cancer Risks and Hazard Index Ratios

Table 2-11 summarizes the cancer risks and hazard index ratios for all exposure pathways considered *for the trespassing scenario*. Tables A.1-1 through A.1-12 (Appendix A) contain the spreadsheets used to calculate dose, cancer risk and hazard index ratios for Scenario 1.

Exposure of children to contaminants while trespassing on-site is associated with a total cancer risk of 2E-06, which is a factor of two times greater than 1E-06. The predominant factor contributing to this risk is incidental ingestion of arsenic and beryllium in surface water (7E-07 and 1E-06, respectively).

Trespassing on-site is associated with a total hazard index (HI) ratio of 1E-01 which is below the target HI value of 1E+00. Incidental ingestion of inorganics in surface water (Hudson Branch) (HI=1E-01) are the primary contributors to this hazard index.

Scenario 2 - Commercial/Industrial Use Scenario (Current): Cancer Risks and Hazard Index Ratios

Table 2-12 summarizes the cancer risks and hazard index ratios, respectively, for all exposure pathways considered for this scenario. Tables A.2-1 through A.2-9 (Appendix A) contain the spreadsheets used to calculate dose, cancer risk and hazard index ratios for Scenario 2.

Exposure of adults to contaminants on-site during a current industrial use of the site is associated with a cancer risk of 8E-05, which exceeds 1E-06 by a factor of 80. This risk is attributed primarily with dermal contact with PCBs (5E-05), and incidental ingestion of arsenic, beryllium, and PCBs in surface soil (3E-05).

Current industrial use of the site is associated with a total hazard index ratio of 7E-01 which is below the target value of 1E+00. Incidental ingestion of vanadium in soil (HQ=5E-01) and inhalation of chromium III in fugitive dust (HQ=1E-01) are the primary contributors to this hazard index.

Scenario 3 - Residential Use Scenario (Current): Cancer Risks and Hazard Index Ratios

Table 2-13 summarizes the cancer risks and hazard index ratios, respectively, for all exposure pathways considered in this scenario. Tables A.3-1D through A.3-10D and A.3-1S through A.3-10S (Appendix A) contain the spreadsheets used to calculate dose, cancer risk and hazard index ratios for Scenario 3.

Exposure of adults to contaminants in ground water detected in wells located to the south of the SMC facility was included in this assessment to provide a simple analysis of current ground water use conditions. This exposure is associated with a cancer risk range of 8*E*-03

(deep ground water) to 4E-02 (shallow ground water), which exceeds 1E-06 by factors of 8,000 and 40,000, respectively. Ingestion of arsenic and beryllium in deep ground water accounts for 95% of this risk. Ingestion of trichloroethene is also associated with a cancer risk value which exceeds 1E-06 by a factor of 9 (i.e., 9E-06). Inhalation of airborne volatiles from deep ground water accounts for approximately 5% of the total risk due to deep ground water. The pathway risk for inhalation of airborne volatiles from deep ground water is 4E-04, which exceeds 1E-06 by 400-fold. Trichloroethene is the primary constituent of concern for this pathway. Finally, dermal contact with arsenic in deep ground water contributes a cancer risk of 1E-05, which exceeds 1E-06 by 10-fold.

Ingestion of arsenic and beryllium in shallow ground water accounts for nearly 100% of the total scenario risk. Dermal contact with arsenic was associated with a cancer risk of 2E-05, which exceeds 1E-06 by 20-fold. Inhalation of airborne chemicals from shallow ground water was not of concern as VOCs were not detected in shallow ground water.

The hazard index ratios associated with current ground water use are 2E+02 (deep ground water) to 6E+02 (shallow ground water), which exceed the target value of 1E+00 by 200- and 600-fold, respectively. The elevated HI indices are associated with antimony (deep ground water only), arsenic, beryllium (shallow ground water only), chromium III and VI (deep ground water only), selenium (deep ground water only), vanadium, cyanide (shallow ground water only), and boron (shallow ground water only). The HQs associated with these individual COCs each exceed 1E+00.

Scenario 4 - Construction Use Scenario (Future): Cancer Risks and Hazard Index Ratios

Table 2-14 summarizes the cancer risks and hazard index ratios, respectively, associated with chemicals and exposure pathways included in this scenario. Tables A.4-1 through A.4-9 (Appendix A) contain the spreadsheets used to calculate dose, cancer risk and hazard index ratios for Scenario 4.

The total cancer risk for the construction scenario is 1E-06, which is equal to the target value of 1E-06. Incidental ingestion of arsenic, beryllium, benzo(b)fluoranthene, and DDT in subsurface soil (1E-06) is the primary component of this risk. Inhalation of dust-borne contaminants and dermal contact with soil do not appreciably contribute to the cancer risk.

The total hazard index ratio associated with construction activities is 1E+00, which equals the target value of 1E+00. Incidental ingestion of soil contaminants (HI=9E-01) makes the primary contribution to the hazard index. Inhalation of fugitive dust makes a minor contribution (HI=1E-01).

Scenario 5 - Residential Use Scenario (Future): Cancer Risks and Hazard Index Ratios

• Children

Table 2-15 summarizes the cancer risks and hazard index ratios, respectively, for childhood ingestion of soil and housedust associated with future residential use of the site. Tables A.5-2, A.5-5 and A.5-8 (Appendix A) contain the spreadsheets used to calculate dose, cancer risk and hazard index ratios for childhood receptors in Scenario 5. The cancer risk for children age 0-6 years residing on-site is 9E-05, which exceeds 1E-06 by 90-fold. Arsenic, beryllium, several carcinogenic PAHs, and PCBs contribute the majority of this risk.

Table 2-15 also presents the range of hazard index ratios by exposure pathway. The HI for children is 3E+00, which exceeds 1E+00 by a factor of 3. Vanadium in surface soil contributes the majority of this exceedance with an HQ of 3E-01. None of the COC-specific HQs individually exceed the target value of 1E+00.

• Adults

Table 2-15 presents a summary of the cancer risks by compound and exposure pathway for *adults in* Scenario 5. The total cancer risk for adults residing on-site is 2E-04, which exceeds the target level by a factor of 200. The major contributors to this risk are dermal exposure to PCBs in soil (1E-04) and incidental ingestion of several COCs (arsenic, beryllium, several carcinogenic PAHs, and PCBs) in soil (5E-05).

Table 2-15 also presents the hazard index ratios for adults in Scenario 5. The total HI for all pathways is 4E-01, which is less than the target value of 1E+00. Incidental ingestion of vanadium in surface soil accounted for the majority of this HI (HI=3E-01). None of the COC-specific HQs individually exceed the target value of 1E+00.

Summary of Cancer and Non-Cancer Health Risks

This site currently contains elevated levels of certain key toxicants, which are responsible for driving the risk assessment. The current residential scenario was associated with the greatest cancer risk and HI values, due largely to the ingestion of ground water (as a potable drinking water source) which was absent from Scenarios 1, 2, 4 and 5. Scenario 5 (future residential) did not include the use of ground water as a potable drinking water source due to a well restriction zone; however, elevated risks due to long-term exposure to surface contaminants were

evident. Risks associated with Scenarios 1 (current trespassing) and 4 (future construction) were low due to either exposure to lower concentrations of contaminants outside the industrialized area or a shortened exposure duration, respectively. In general, inhalation of contaminants in fugitive dust was not a major exposure pathway.

The COCs associated with the greatest cancer risks in Scenario 1 - Trespassing (Current) include arsenic and beryllium in surface water. Cancer risks associated with other pathway COCs did not exceed 1E-06. Non-cancer HIs did not exceed the target value of 1E+00.

For Scenario 2 - Commercial/Industrial (Current), the cancer risks exceeded 1E-06 primarily for dermal contact with PCBs and incidental ingestion of arsenic, beryllium, and PCBs in soil. Cancer risks associated with other pathway COCs did not exceed 1E-06. Non-cancer HIs did not exceed the target value of 1E+00.

Ingestion of arsenic, beryllium, and trichloroethene in deep ground water, inhalation of trichloroethene from deep ground water, and dermal contact with arsenic in ground water are the primary exposure routes on COCs for Scenario 3 - Residential (current - deep ground water). Ingestion of arsenic and beryllium in shallow ground water and dermal contact with arsenic in shallow ground water are the primary exposure routes for Scenario 3 - Residential (current - shallow ground water). Elevated HIs for deep ground water use were associated with ingestion of antimony, arsenic, chromium III and VI, selenium, and vanadium. Elevated HIs for shallow ground water use were associated with ingestion of arsenic, beryllium, cyanide, and boron.

For Scenario 4 - Construction (Future), cancer risks exceeded 1E-06 primarily for incidental ingestion of arsenic, beryllium, benzo(b)fluoranthene, and DDT in soil. Cancer risks

associated with other pathway COCs did not exceed 1E-06. Non-cancer HIs did not exceed the target value of 1E+00.

Childhood residential ingestion exposure (Scenario 5) to arsenic, beryllium, several carcinogenic PAHs, and Aroclor-1254 in soil is associated with a cancer risk greater than 1E-06. Although the HI for this pathway exceeded 1E+00, none of the individual COCs exceeded 1E+00.

Adult residential exposure to arsenic, beryllium, several carcinogenic PAHs, and PCBs are associated with cancer risks greater than 1E-06. The HIs for soil exposures did not exceed the target value of 1E+00.

Exposure to arsenic in *soil and* ground water is of primary importance. Arsenic is a group "A" carcinogen, whose carcinogenic efforts are most notable in the skin after oral absorption. While the arsenic oral slope factor for carcinogenic effects is based upon the evidence of human skin cancer, arsenic exposure by the oral route has also been associated with elevated cancer incidences in bladder, lung, liver, kidney and colon (EPA, 1992 - IRIS File).

Comparison of mean (95% UCL) arsenic concentrations in surface and subsurface soil to background soil concentrations (Tables 2-2 and 2-3) indicates that arsenic may be present due to naturally occurring conditions. Thus, risks associated with arsenic exposure in soil may be overstated.

Arsenic was detected at 4/10 sampling locations, at a range of 3.6 to 748 ug/l, although elevated concentrations were detected only in SC-22. Maximum detected values were used as exposure point concentrations. Background (upgradient) arsenic in ground water at this site is <2 ug/l. Thus, it appears that arsenic concentrations are elevated in SC-22 and that excess cancer risk due to arsenic ingestion may be site related.

Beryllium in soil and ground water is an additional primary component of excess cancer risk. Beryllium is a Class B2 carcinogen (probable human carcinogen) whose most notable carcinogenic effects occur in the lung. Comparison of mean (95% UCL) beryllium concentrations in surface and subsurface soil to background beryllium soil concentrations (Tables 2-2 and 2-3) indicates beryllium levels may be elevated in the industrial areas of the site. However, unrestricted areas of the site (outside the fenced industrial area) do not appear to be impacted by industrial operations.

Beryllium was detected in four out of ten well sampling locations at a range of 8.2-570 ug/l (SC-22 deep and SC-13 shallow). The background beryllium concentration at this site is <1 ug/l. Thus, it appears that elevated concentrations of beryllium in ground water and associated excess cancer risk may be site related.

Trichloroethene in ground water is the third primary component of excess cancer risk associated with current use of ground water to the south of the SMC facility. Trichloroethene is a Class B2 carcinogen (probable human carcinogen) whose most notable carcinogenic effect following ingestion is on the liver. Trichloroethene was detected 2/7 locations (SC-22, deep ground water only) at a range of 35-70 ug/l. The background trichloroethene concentration at this site is 17 ug/l. Thus, it appears that elevated concentrations of trichloroethene in ground water and associated excess cancer risk may be site-related.

The contaminants in ground water causing the greatest hazard index ratios are antimony (deep ground water only), arsenic, beryllium (shallow ground water only), chromium (deep ground water only), selenium (deep ground water only), vanadium, cyanide (shallow ground water only) and boron (shallow ground water only). Arsenic and beryllium were discussed in light of cancer risks and will not be repeated here. Antimony ingestion is associated with

decreased longevity, fasting blood glucose levels and alteration of cholesterol levels. Antimony was detected in two of ten well sampling locations at a range of 1340-2140 ug/l. Background for the site is <21 ug/l. Thus, it appears that antimony levels are elevated at the site and that ingestion of ground water may pose a health risk.

Chromium is thought to be an essential nutrient in humans. Short term, high levels of chromium VI are irritating to the G.I. tract, and adverse effects in the kidney and liver may occur. Chromium VI was detected in three of ten monitoring wells, at a range of 0.008 (shallow) to 1400 (deep) ug/l. The background chromium concentration is 0.3 ug/l. Thus, it appears that chromium is elevated in deep ground water and that excess non-cancer health effects may be associated with the ingestion of ground water containing chromium VI.

Chronic selenium ingestion has been shown to produce clinical selenosis. Selenium was detected in two of ten locations (deep ground water only) at a range of 49.6-130 ug/l. Site background is reported as <2 ug/l. Thus, selenium appears to be elevated in deep ground water and ingestion may contribute to adverse health effects.

Chronic ingestion of 5 mg/l vanadium in drinking water produced no observable effects in rats (Appendix B). Vanadium was detected in 8/10 locations at a range of 8.4-128,000 ug/l. Site background is reported as 8.3 ug/l. Thus, it appears that vanadium concentrations in ground water to the south of the site are elevated. However, because no observable effects were noted in the study used to base the RfD, it is difficult to determine at what exposure level adverse health effects may be produced.

Cyanide ingestion has been shown to produce weight loss, thyroid effects and myelin degeneration. Cyanide was detected three times in shallow ground water at a concentration range of 30.1-26,400 ug/l. Site background is reported as <10 ug/l. Thus, it appears that

cyanide is elevated in shallow ground water and ingestion may contribute to adverse health effects.

Chronic boron ingestion is associated with testicular lesions, while occupational exposure has been associated with pulmonary edema and hemorrhage in the alveolus. Boron was detected at four of seven locations in shallow ground water only, at a range of 130-14,700 ug/l. A site background concentration is not available. Exceedance of the target HI of 1E+00 by boron alone ($HI_{boron} = 5E+00$) suggests a potential for adverse health effects from the ingestion of boron in ground water.

2.7.2 Qualitative Analysis of Risks

Selected compounds were addressed qualitatively rather than quantitatively because compounds were lacking cancer slope factors or RfD values. It is not possible to include these cases in the quantitative analysis, and instead, the possible effect they could have on the assessment is discussed qualitatively.

• Inorganics

Aluminum is one of the most abundant metals in the earth's crust, and it is ubiquitous in air, water and soil (Goyer, 1986). The toxicity of aluminum can be divided into three major categories: (1) the effect of aluminum compounds on the gastrointestinal tract; (2) the effect of inhalation of aluminum compounds; and (3) systemic toxicity of aluminum (Alfrey, 1981). Data has been evaluated and found to be inadequate for quantitative risk assessment (EPA, 1992; 1991a), such that neither an inhalation nor oral RfD are available. The range of detection for aluminum in soils is 257-104,000 mg/kg (Tables 2-2 and 2-3), as compared to a site background concentration of 4405 mg/kg. The 95% UCL for Scenarios 1, 2, 4 and 5 ranges from 4651-26,159 mg/kg, suggesting elevated aluminum concentrations on-site. Lack of a quantified dose-response relationship and elevated aluminum concentrations in soils may have an impact on the outcome of the risk assessment and may contribute some degree of uncertainty. However, it should be noted that doses and risks associated with inhalation of fugitive dusts are very low, and incidental ingestion of non-carcinogenic inorganic compounds generally do not contribute a significant risk in the scenarios presented in this report.

Currently, no oral or inhalation RfD for cobalt has been published by the EPA. Cobalt is an essential component of Vitamin B12, which is required for the production of red blood cells (see Appendix B). The range of detection for soil sample results is 0.95-87.1 mg/kg, as compared to a site background of 2.3 mg/kg and a U.S. mean background in soil of 5.9 mg/kg (range equal to 0.3-70 mg/kg) (USGS, 1984). Although the 95% UCL for cobalt in soil background is elevated over site background for Scenarios 1, 2, 4 and 5, comparison to the mean U.S. background concentration or the range of U.S. concentrations in soil suggests the levels on-site are not out of a normal range. Therefore, a cobalt RfD (oral or inhalation) is not expected to be crucial to the outcome of the risk assessment.

The range of detection of copper in soil is 0.88-887 mg/kg, which exceeds the site background concentration of 16.6 mg/kg. Similarly, calculated 95% UCL concentrations of copper (Tables 2-2 and 2-3) exceed reported U.S. mean concentrations for Scenarios 1, 2 and 5. Site concentrations exceed reported U.S. ranges for copper in only one surficial location. An inhalation RfD for copper is not available from EPA (see Appendix B). Because copper has been shown to cause local G.I. irritation following ingestion, it is not practical to extrapolate

from the oral route to the inhalation route. Thus, the contribution of copper to health risks following inhalation is uncertain. However, it should be noted that doses and risks associated with inhalation of fugitive dusts are very low.

The EPA weight of evidence for the carcinogenicity of lead is "B2" - a probable human carcinogen; however, a quantitative risk estimate has not been provided (see Appendix B). The Record of Decision (ROD) for NL Industrial Taracorp site (Granite City, Illinois) (EPA, 1990) provides a basis for a recommended 500 mg/kg cleanup level for lead. This ROD supports the 500 mg/kg level specifically for the Granite City site and other Superfund sites in general. Similarly, the OSWER Directive No. 9355.4-02 recommends an interim soil cleanup level of 500-1,000 mg/kg for lead in soil. This interim soil cleanup level is considered to be protective of direct contact at residential settings, and may not be directly applicable to an industrial setting such as at SMC. Lead concentrations appear to be elevated (greater than 500 mg/kg) in surface soil at only 2 out of 116 possible locations (RA-44 and RA-12), such that some minor degree of concern over the lack of quantitative cancer risk is noted. It should be noted that the 95% UCL for any scenario does not exceed 500 mg/kg.

There is no inhalation RfD for nickel at this time (see Appendix B). The range of detection of nickel in soil is 1.5-3360 mg/kg, which exceeds the reported U.S. background range (<5-700 mg/kg). However, nickel concentrations only exceed this range at three locations (RA-12, RA-14 and RA-28). Comparison of 95% UCL nickel concentrations to site and mean U.S. background concentrations indicate elevated nickel contamination on-site. However, because risks associated with inhalation of fugitive dusts carrying site contaminants are generally low, it is not likely that omission of the evaluation of systemic effects resulting from nickel

inhalation would significantly impact the risk assessment. Furthermore, the inhalation route is assessed for the carcinogenic effects of nickel.

Currently, no inhalation RfD for selenium has been published by the EPA (see Appendix B). The range of detection for soils is 0.43-5.1 mg/kg (Tables 2-2 and 2-3), as compared to a U.S. background range of 0.1-3.9 mg/kg. Comparison of 95% UCL for selenium to site background (0.49 mg/kg) indicates some elevation for Scenario 2 only (1.5 mg/kg). Selenium was detected infrequently in soils (25/192). Thus, although levels on-site appear to be slightly elevated, a lack of a quantified dose-response relationship is not likely to have a significant impact on the outcome of the risk assessment. Further, it should be noted that doses and risks associated with inhalation of fugitive dusts are very low.

An inhalation RfD is not available for silver at this time (EPA, 1992; 1991a). Silver concentrations on-site range from 0.37-4 mg/kg. Site background was reported as 0.86 mg/kg, which was exceeded by the 95% UCL for each scenario (1, 2, 4 and 5). Thus, levels on-site appear to be slightly elevated, and lack of a quantified dose-response relationship may contribute some uncertainty to the risk assessment. However, as indicated previously, it should be noted that doses and risks associated with inhalation of fugitive dusts are very low and, in general, do not contribute to excess risk.

Thallium is one of the more toxic metals and can cause neural, hepatic and renal injury. It may also cause deafness and loss of vision. An inhalation RfD for thallium is not available at this time (EPA, 1992; 1991a). Thallium was detected one time out of 192 possible sampling locations and was not detected in the site background sample. Based on the infrequent rate of detection, the omission of thallium from the quantitative risk assessment is not of concern.

The major toxicologic effects of boron are on the lung. Through occupational exposure, boron has been shown to induce pulmonary edema and hemorrhage in the alveolus (Menzel and Amdur, 1986; Dixon, 1986). The chronic inhalation RfD for boron has not been determined (EPA, 1992; 1991a). The range of detected boron concentrations on-site is 29.1-239 mg/kg, which exceeds the reported U.S. background range of <20-150 mg/kg. Comparison of site background (21.4 mg/kg) or mean U.S. background (31 mg/kg) to the 95% UCL for boron indicates boron concentrations should be considered to be elevated on-site for Scenario 2 (current industrial use). Because the primary effects of boron are on the lung, the absence of boron from the risk assessment should be noted. However, concentrations of contaminants in fugitive dusts and resulting doses tend to be small and, in general, do not contribute significantly to the quantitative analysis.

No oral or inhalation RfDs for niobium were located in IRIS or HEAST (EPA, 1992; 1991a). Niobium has not been evaluated by the EPA for evidence of carcinogenicity (EPA, 1992; 1991a). Niobium concentrations ranged from 52-845 mg/kg, with an apparent "hot spot" of 845 mg/kg at RA-44. With the exception of this "hot spot", niobium concentrations on-site did not appear to be greatly elevated when compared to site background (42.5 mg/kg) or U.S. background ranges in soil (<10-50 mg/kg). Niobium was detected infrequently (7/68) in soils.

Strontium, a metabolic analog of calcium, is readily absorbed from the gastrointestinal tract or the lungs into the bloodstream and is subsequently deposited in bone (Hobbs and McClellan, 1986). The adverse health effects associated with strontium exposure are currently under review by an EPA work group (EPA, 1992; 1991a) and consequently chronic oral and inhalation RfD values are not available at this time. Strontium has not been evaluated by the EPA for evidence of carcinogenicity (EPA, 1992; 1991a). Comparison of the ranges of

site-related (22.8-228 mg/kg) and U.S. background concentrations (<5-700 mg/kg) of strontium indicate site concentrations are not unusual. However, comparison of the 95% UCL values to site background (21.4 mg/kg) or mean U.S. background (53 mg/kg) suggest strontium concentrations associated with Scenario 2 are elevated.

Occupational exposure to titanium may be heavy and is associated with hyperplasia of the bronchial epithelium and pulmonary fibrosis following inhalation exposure (Menzel and Amdur, 1986). No RfDs were found in either IRIS or HEAST. Titanium has not been evaluated by the EPA for evidence of carcinogenicity (EPA, 1992; 1991a). Titanium concentrations on-site range from 29.4-941 mg/kg in soils, which is within the reported U.S. background range of 70-15,000 mg/kg (USGS, 1984). Comparison of the 95% UCL values for scenarios (Tables 2-2 and 2-3) suggest a slight elevation of titanium concentrations on-site. Thus, omission of this compound from the quantitative risk assessment may introduce a small degree of uncertainty.

No RfDs for zirconium were found in either IRIS or HEAST (EPA, 1992; 1991a). Zirconium has not been evaluated by the EPA for evidence of carcinogenicity (EPA, 1991a). Zirconium concentrations on-site ranged from 39.1-159 mg/kg in soils. No site-related background data is available. The reported range of U.S. background concentrations of zirconium in soil is <20-20,000 mg/kg, with a mean value of 220 mg/kg. Based on this information, it appears that site-related concentrations are not elevated and thus, the omission of zirconium from the quantitative risk assessment is not likely to be of concern.

• Volatile Organics

The risk assessment for trichloroethene is under review by an EPA workgroup. As a result, oral and inhalation RfDs have not been established (EPA, 1992). Trichloroethene was detected twice in deep ground water monitoring wells to the south of the site at concentrations of 35 and 70 mg/l. The reference (upgradient) concentration of trichloroethene is 17 mg/l. Elevated ground water concentrations of trichloroethene suggest omission of this compound may contribute to an underestimate of systemic effects. However, it should be noted that this volatile organic was included in the quantitative carcinogenic risk analysis.

• Semi-Volatiles

RfDs are not available for the carcinogenic PAHs (phenanthrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene. These PAHs were detected infrequently and at low concentrations in soils, and were not detected in surface and ground water. Based on structure activity relationships, it is possible to address the systemic toxicity of the carcinogenic PAHs by utilization of the RfD for naphthalene. However, it should be noted that: a) the RfD for naphthalene is the lowest of the group of PAHs, and b) the chemical and physical properties of naphthalene are most unlike any other PAH. A simple comparison of exposure doses of each carcinogenic PAH to the RfD for naphthalene indicates that omission of these PAHs from the quantitative risk analysis for systemic effects is not likely to introduce an underestimate of risk. Furthermore, the carcinogenic effects of these compounds are assessed quantitatively.

Seven carcinogenic PAH compounds, including benzo(a)pyrene, were included in the quantitative risk assessment. All were assigned the cancer slope factor derived for benzo(a)pyrene, which is among the most potent members of this chemical class. Most

carcinogenic members of this class have been shown to induce skin cancer upon topical administration, while the more heavily studied agent, benzo(a)pyrene, has also been shown to cause lung and stomach tumors (ATSDR, 1990).

Dermal cancer risk for PAHs was not calculated because of uncertainty regarding the carcinogenic potency of the agents by the dermal route. However, given the preponderance of evidence in rodents that these agents are carcinogenic by dermal exposure, it is likely that this analysis underestimates the cancer risk due to PAH compounds present in water and soil. The increase in cancer risk that could be associated with dermal exposure to PAHs in soil is not likely to be substantial since the dermal dosage to these agents was generally less than that received via oral exposure to PAHs in soil. Further, the dermal dose represents the absorbed dose, which is only 5% of the exposure dose for PAHs.

• Pesticides/PCBs

The PCBs Aroclor-1248, Aroclor-1254 and Aroclor-1260 were detected infrequently in soils on-site (1/54, 4/54 and 2/54, respectively) (Tables 2-2 and 2-3). Although data is inadequate to provide a dose-response relationship for systemic effects, these compounds are included in the quantitative assessment of carcinogenic risks. Based on this information, omission of these PCBs from the quantitative assessment of systemic effects is not expected to produce an underestimation of risk.

• Tentatively Identified Compounds (TICs)

TICs are not quantitatively addressed because their chemical identities were poorly characterized. In the vast majority of samples, the TICs are listed as "unknown". In the few

isolated cases where a specific chemical is listed as a TIC, the levels are generally low. Without a better indication of the contaminants which comprise the TIC listing, no qualitative or quantitative assessment can be made.

2.7.3 Uncertainty Assessment

• Uncertainty Associated with the Exposure Assessment

The scenarios developed for the site include exposures resulting from probable current use by trespassers, as a current active industrial facility, current residential ground water usage, potential future construction on the site, and potential future use of the site as a residential area. The risks associated with these scenarios are conditional on these land uses occurring. Observations made during field investigations indicate that activities such as trespassing have not occurred on the site, and evidence to the contrary is not available. Thus, the uncertainty associated with the exposure frequency and duration for Scenario 1 is not likely to be large, and is not likely to contribute significantly to an overestimation of risk. Current zoning for the site is industrial, and the site is currently active as an industrial facility. Thus, the uncertainty associated with Scenario 2 and with this land use is low. Use of shallow ground water as a potable source (Scenario 3) and resulting risks is associated with a large degree of uncertainty. The shallow ground water flow direction in the vicinity of monitoring wells SC-22S (shallow well), SC-13S (shallow well), and D (shallow well) are presented in Figures 14 and 16 of the Draft Final Remedial Investigation (RI) Report (TRC, 1991). These figures clearly indicate that the shallow ground water flow direction is to the southwest along the Hudson Branch. SMC's shallow ground water will follow the site topography until it intersects the Hudson Branch, then it will flow in the same direction as the Hudson Branch. This flow pattern was observed in the TCE, hexavalent chromium, and total chromium plumes presented in the Draft Final RI Report (Figures 22, 24, 26, 28, 30 and 32 (TRC, 1991)). SMC's off property shallow ground water impact will be along the Hudson Branch west of East Boulevard. Thus, it is unlikely that contaminants will reach private wells that are or may be located along East Weymouth Avenue. An additional monitoring well location has been recommended for placement to the south of the SMC facility (along Weymouth Road). This well is expected to further delineate ground water contamination in this area; specifically to help distinguish the chromium plume, and evaluate potential impacts of contaminants such as arsenic and beryllium on private well water quality.

The deep ground water flow direction in the vicinity of monitoring well SC-22D (deep well), SC-13D (deep well), and W2 (deep well) are presented in Figures 15 and 17 of the Draft Final RI Report (TRC, 1991). These figures clearly indicate that the present deep ground water flow direction is toward the southwest. This ground water flow direction could be the result of ground water pumping by the recovery wells installed by SMC along the Hudson Branch. Inspection of Figures 23, 25, 27, 29, 31 and 33 of the Draft Final RI Report (TRC, 1991), reveals that significant concentrations of TCE and chromium were detected in monitoring well SC-22D and of chromium in monitoring well W2. At present, the direction of contamination is being controlled by ground water pumping at recovery well W9. The potential impact of contaminants south of the Hudson Branch will be addressed during the Phase II RI by installing a monitoring well directly south of SC-22D. Thus, it is uncertain at this point whether contaminants are migrating and impacting current and future wells located along East Weymouth Avenue. This uncertainty in future use of the site adds a degree of uncertainty to the risks associated with Scenario 3. An additional monitoring well location has been recommended for placement to the south of the SMC facility (along Weymouth Road). This well is expected to

further delineate ground water contamination in this area; specifically to help distinguish the chromium plume, and evaluate potential impacts of contaminants such as arsenic and beryllium on private well water quality.

Construction or development of the site is a potential future activity at the SMC facility; thus, Scenario 4 has a smaller degree of uncertainty associated with it.

Finally, it is unlikely that the site would be developed for residential use. The uncertainty associated with this scenario (Scenario 5) is quite large and is likely to contribute significantly to an overestimation of risk associated with the site.

Table 2-16 summarizes the exposure pathways considered for the risk assessment, and reasons for exclusion or inclusion. Ingestion of ground water as a future use scenario was not addressed as there is a well restriction in the vicinity of the site.

Two models were used to characterize exposure point concentrations. The first, a model used to estimate concentrations of chemicals in fugitive dust, was taken from AP-42 (EPA, 1988) (see Appendix A). The key model assumptions include the time frame during which the construction on-site is likely to take place and the use of a yearly average wind speed. The potential impact of these assumptions will be to underestimate risk if construction occurs for a longer period of time than originally estimated, or, if daily wind speeds exceed the annual average wind speed. Comparison of modeled contaminant concentrations in dust to monitored contaminant concentrations (TRC, 1991) indicate the fugitive dust modeling is extremely conservative and, thus, overly protective of human health. The second model, volatilization of chemicals during home use of ground water (i.e., showering) (see Appendix A) was taken from Andelman (1985). A key assumption for this model is likely to include the fraction of

contaminant volatilized, which is assumed to be 0.9 (90%). This assumption is likely to overpredict, rather than underpredict, risk.

The primary uncertainties associated with exposures in each scenario include:

- Scenario 1 the frequency of use and types of activities associated with children trespassing on the site.
- Scenario 2 the generation of fugitive dust due to current site activities is likely to be overly conservative, such that risk estimates may be overestimated.
 - Scenario 3 risks associated with ingestion of ground water rely on: a) the use of ground water as a potable source in the vicinity of the site, and b) the use of maximum detected values as representative of ground water contamination.
- Scenario 4 the exposure duration for construction workers was based on a conservative assumption, but may over- or underestimate the risk estimate.
- Scenario 5 future use of the site as a residential area is highly unlikely and contributes a large degree of uncertainty when evaluating the associated risks.
- Uncertainty Associated with Blank Evaluation

As requested by NJDEPE, this section provides an evaluation of the variance between EPA (1989) and NJDEPE policies with regard to target compounds detected in blank samples. Evaluation of common laboratory contaminants in blank samples for this risk assessment is based upon the EPA approach described in EPA (1989). NJDEPE has also developed a policy to evaluate blank contamination. This discussion focuses on the potential changes in the evaluation of blank contamination data using the NJDEPE approach, and the potential impacts of this policy on the risk assessment.

Media considered in the risk assessment included surface soil, subsurface soil, ground water, and surface water. An associated blank sample was determined for each sample using information contained in the RI report (TRC, 1991), and in the sample logs from the field investigation. A list was compiled of compounds detected in blanks associated with each of these media. A comparison was made between the blank evaluation method outlined in EPA (1989) and the method developed by NJDEPE.

• Surface Soil

Compounds detected in the blank samples associated with surface soil include five VOCs (acetone, chloroform, methylene chloride, trichloroethene, and tetrachloroethene), two SVOCs (di-n-butylphthalate and pentachlorophenol), one pesticide (4,4'-DDT), and eleven inorganics (boron, calcium, copper, iron, lead, magnesium, manganese, selenium, sodium, vanadium, and zinc).

Of these 19 compounds detected in blanks associated with surface soil, only the data for four of these (boron, manganese, zinc, and acetone) would be treated differently with the application of the NJDEPE blank evaluation method versus the EPA (1989) method. That is, for acetone, boron, manganese, and zinc some of the data points included in the risk assessment based on the EPA (1989) blank evaluation method would be rejected using the NJDEPE blank evaluation method. This would result in a reduced frequency of detection and potentially alter the selection of these compounds as COCs and/or alter the exposure point concentration(s). For example, acetone would not have been included as a COC in the risk assessment based on the NJDEPE method for blank evaluation.

All four compounds were selected as COCs in surface soil (Table 2-7), and thus were included in calculation of exposure and risk in Scenarios 1 (current trespassing), 2 (current commercial/industrial), and 5 (future residential). None of these four compounds have been classified as carcinogens such that cancer risks were not evaluated. However, each of these four compounds were evaluated quantitatively with regard to non-cancer endpoints but were not associated with elevated HQs in any of the scenarios (e.g., Scenarios 1, 2, and 5; see Appendix A). Thus, it is unlikely that use of the EPA (1989) method of blank evaluation (versus the NJDEPE method) would alter the conclusions of the risk assessment. Both blank evaluation methods agree on the treatment of the data for the remaining 15 compounds detected in surface soil blanks.

• Subsurface Soil

Compounds detected in blanks associated with subsurface soil are the same as those listed for surface soil. Of the compounds detected in blanks associated with subsurface soil only the data for five of these (boron, manganese, zinc, acetone, and methylene chloride) would be treated differently with the application of the NJDEPE blank evaluation method. For boron, manganese, and zinc some of the data points included in the risk assessment based on the EPA (1989) blank evaluation would be rejected using the NJDEPE blank evaluation method. This would result in a reduced frequency of detection and potentially alter the selection of the compounds as COCs and/or alter the exposure point concentration(s). These three inorganics were selected as COCs in subsurface soil (Table 2-7). None of these three inorganics are classified as carcinogens, such that cancer risks were not evaluated. However, these inorganics were evaluated quantitatively with regard to non-cancer endpoints and were not associated with elevated HQs in Scenario 4 (see Appendix A). Thus, it is unlikely that use of the EPA (1989) method of blank evaluation (versus the NJDEPE method) would alter the conclusions of the risk assessment for these three inorganic COCs. For acetone and methylene chloride some of the data points rejected based on the EPA (1989) blank evaluation approach would be included

based on the NJDEPE blank evaluation method. This would result in an increase in the frequency of detection and might alter the exposure point concentration(s). However, both acetone and methylene chloride were selected as COCs in subsurface soil (Table 2-7), and inclusion of additional sampling points would not affect this selection. Methylene chloride is classified as a B2 carcinogen and was evaluated quantitatively with regard to cancer in the risk assessment for Scenario 4 (future construction). Risks associated with exposure to methylene chloride were low (five to eight orders of magnitude less than 1E-06). Acetone is not classified as a carcinogen such that cancer risks were not evaluated. Acetone and methylene chloride were evaluated quantitatively with regard to non-cancer endpoints and were not associated with evaluation (versus the NJDEPE method) would alter the conclusions of the risk assessment. Both blank evaluation methods agree on the treatment of the data for the remaining 14 compounds detected in subsurface soil blanks.

• Ground Water

Compounds detected in blanks associated with ground water include two VOCs (acetone and methylene chloride) and one inorganic (zinc). Both blank evaluation methods agree on the treatment of the data for these compounds. Thus, the use of the EPA (1989) method of blank evaluation (versus the NJDEPE method) would not alter the conclusions of the risk assessment.

<u>Surface Water</u>

Compounds detected in surface water include two VOCs (acetone and methylene chloride) and four inorganics (lead, manganese, vanadium, and zinc). For compounds detected in blank associated with surface water, only the data points for zinc would be treated differently with the application of the NJDEPE blank evaluation method versus the EPA (1989) method. Some of the data points for zinc included in the risk assessment (based on the EPA (1989) blank evaluation method) would be rejected based on the NJDEPE blank evaluation method. This would result in a reduced frequency of detection and potentially alter the selection of this compound as a COC and/or alter the exposure point concentration. Zinc was selected as a COC in surface water (Table 2-7) and evaluated quantitatively in Scenario 1 (current trespassing) for non-cancer endpoints. The HQs for zinc in surface water are not elevated (Appendix A). Zinc is not classified as a carcinogen and is not evaluated with regard to cancer risk. Thus, it is unlikely that the use of either the NJDEPE or EPA (1989) methods for blank evaluation would impact the conclusions of the risk assessment.

In summary, this evaluation of the variance between policies with regard to target compounds detected in blank samples indicates that use of the EPA (1989) method would not alter the conclusions of the risk assessment.

• Uncertainty Associated with Site Data

Some significant uncertainties exist in the data used for this site. In most cases these uncertainties are likely to overestimate, rather than underestimate, the risk. A few examples of data uncertainties include chemicals detected infrequently in all media were assumed to occur in that media at estimated or maximum detected concentrations; and "U" data (non-detect values) were included as one half the SQL or the SQL, used in calculation of the 95% UCL, and considered as potential locations of contamination.

Specific examples of data uncertainties warrant detailed analysis. This section explores these uncertainties and presents this analysis by scenario.

Cancer risk estimates and hazard index ratios associated with Scenario 1 were low. That is, the estimates did not exceed target values for systemic or carcinogenic risk. The greatest risk associated with Scenario 1 was ingestion exposure to surface water contaminants in the Hudson Branch. Arsenic and beryllium were the compounds which contributed the majority of the risk estimate. The data uncertainty associated with these compounds is related to the use of a maximum detected value as representative of the exposure point concentration rather than the 95% UCL. As discussed in the data evaluation section, when a 95% UCL is calculated for data sets containing fewer than ten data points, the resulting 95% UCL is artificially inflated and Thus, in order to maintain a conservative exceeds the maximum detected concentration. approach throughout the assessment, the maximum detected value was chosen as the exposure point concentration. The impact of this approach is readily evident in that for both arsenic and beryllium, the maximum detected value is more than an order of magnitude larger than any other detected value. Furthermore, this value occurred in one location for both compounds (SW-2). In summary, risks associated with Scenario 1 are likely to be greatly overstated due to uncertainties associated with the data.

Cancer risks were associated with Scenario 2, current industrial use of the site. The primary route of exposure associated with these risks was dermal contact with PCBs in soil, and incidental ingestion of *arsenic*, beryllium and PCBs in soil. Data uncertainties play a role only in the case of PCBs, which were detected infrequently (1/14 and 4/14, respectively) in surface soil. Due to the low number of data points, a 95% UCL could not be calculated and the maximum detected value was used as the exposure point concentration. For Aroclor-1254, the

maximum value is more than an order of magnitude greater than other concentrations detected in soil. For Aroclor-1248, no other locations of contamination were detected. In summary, excess risk associated with exposure to PCBs in surface soil is likely to be overstated by (at least) an order of magnitude.

Scenario 3 (current ground water use) presented some of the largest risks estimated in this assessment. Use of the deep ground water as a potable aquifer was associated with a cancer risk of *8E-03* and a hazard index ratio of 2E+02. The route of exposure of most concern is ingestion of ground water (cancer risk of 8E-03 and hazard index of 2E+02), although inhalation of volatile organics is of concern (cancer risk of 4E-04). The contaminants of concern for Scenario 3 (deep ground water) include antimony, arsenic, beryllium, chromium III, chromium VI, selenium, vanadium and trichloroethene. The first data uncertainty associated with this scenario is the representative nature of contamination in SC-13, SC-22, W2 and D versus private well water quality.

Review of individual well data for a private well (Mohan) to the south of the SMC facility (and south of SC-22) for the period January to December 1989 indicates no impact on the basis of Cr VI and Cr III analysis. This data was not used in the quantitative risk assessment for the following reasons:

- The specific depth and screened interval information of the Mohan deep and shallow wells are unknown;
- The homeowners collect the water samples rather than qualified field personnel such that RI QA/QC protocols may or may not be followed; and
- The water samples are collected at the tap, while all other ground water samples are taken by bailer.

The remaining data uncertainties involve the infrequent rate of detection of these contaminants and the inability to calculate a 95% UCL. Antimony, arsenic, beryllium, chromium (III and VI), selenium and trichloroethene were detected only in SC-22D (in both sampling rounds). Thus, while an attempt was made to choose monitoring wells which were representative of ground water contamination conditions to the south of the site, only data from a single well was considered in this assessment. Thus, it is likely that the risk estimates greatly overstate the current use conditions.

Scenario 3 (shallow ground water use) was also associated with excess cancer risk (4E-02) and elevated hazard index ratios (6E+02), due to ingestion exposure. Similar to Scenario 3 (deep ground water use), the primary contaminants of concern include arsenic, beryllium, boron, cyanide, and vanadium. Data uncertainties are discussed in relation to each contaminant, although it should be noted that the maximum detected value was used rather than a 95% UCL due to the small data set. Arsenic was detected only in SC-22 (both rounds of sampling); beryllium was detected only in SC-13 (both rounds of sampling); boron was detected only in SC-13 (both rounds of sampling); boron was detected only in SC-13 (both rounds of sampling); boron was detected four times at a wide range of concentrations. Based on this information, it should be noted that a great deal of uncertainty is associated with this data, and the review of risks associated with Scenario 3 should be evaluated in light of this uncertainty.

Cancer risks and hazard index ratios associated with Scenario 4 were low. The greatest risk associated with Scenario 4 (future construction use) was incidental ingestion of DDT in subsurface soil. DDT was detected infrequently (five times out of 34 possible locations), and the range of concentrations was large (0.0093-31 mg/kg), and the maximum value was used as

the exposure point concentration rather than the 95% UCL. Thus, some degree of uncertainty is associated with the risks presented for Scenario 4.

Scenario 5 (future residential use) was associated with excess cancer risk and elevated hazard index ratios. Data uncertainties play a role only in the case of PCBs, which were detected infrequently (1/14 and 4/14, respectively) in surface soil. Due to the low number of data points, the 95% UCL could not be calculated and the maximum detected value was used as the exposure point concentration. For Aroclor-1254, the maximum value is more than an order of magnitude greater than other concentrations detected in soil. For Aroclor-1248, no other locations of contamination were detected: In summary, excess risk associated with exposure to PCBs in surface soil is likely to be overstated by (at least) an order of magnitude.

• Uncertainty Surrounding Cancer and Non-Cancer Risks

For the risk estimation of cancer and of chronic non-cancer health effects, risks from all exposure pathways and for all chemicals have been summed to yield the total site risk for a given receptor. This is a conservative approach, since, in general, different chemicals do not have the same target organ or mechanism of action. Thus, their toxic effects may be, at least in some cases, independent and not additive. Further, chemicals may antagonize one another through competition for enzymes and binding sites, and by inhibition of pathways needed for chemical transport (absorption, cellular uptake, etc.) or metabolic activation. However, it is also possible that certain chemicals can be synergistic such as is the case when a promotor-type carcinogen greatly enhances the expression of genetic damage induced by a low dose of an initiator.

Uncertainties Associated with Toxicity Values

Uncertainty in the risk characterization may stem from exclusion of chemicals in the quantitative risk assessment. Chemicals which were not included in the quantitative risk assessment were excluded due to either lack of detection in the chemical analysis or as a consequence of missing toxicity data.

Chemicals with missing toxicity values are not expected to introduce a large degree of uncertainty into the risk estimates, as described in Section 2.6.2. Briefly, the exclusion of strontium and titanium may or may not underestimate the cumulative hazard index ratio due to a large degree of uncertainty associated with dose-response information.

In numerous cases in which a toxicity value was available for one exposure route but not another, a dose route extrapolation was performed. These extrapolations were utilized to go between the oral and inhalation routes of exposure if the toxic/carcinogenic effects were systemic rather than local. The compounds for which this was done are noted in Appendix B. The oral to inhalation dose route extrapolation can underestimate potency from inhalation exposure if the chemical is irritating, insoluble, slowly absorbed or highly reactive. Under these conditions, the dose to specific lung regions may be greater than that to the G.I. tract or internal organs, creating the possibility that the lung would be at greater risk. At this site, this possibility is greatest for the oral-to-inhalation extrapolation of RfD values for the metals arsenic, beryllium, nickel and zinc. However, inhalation of these metals was due to the dust inhalation pathway which was a minor exposure route. Therefore, underestimation of toxicity values for inhalation exposure should not have a large effect on the outcome of this risk assessment.

A correction factor was not used for dermal RfDs and slope factors to take into account the difference between absorbed vs. exposure doses in oral vs. dermal data, based on guidance from EPA Region II. In general, the oral toxicity values are based upon an exposure dose, while the dermal doses for the modeled pathways are in terms of an absorbed dose. The absence of the use of such a correction factor provides a less conservative approach in estimating risk.

• Sensitivity Analysis

As requested by the NJDEPE, a central tendency risk estimate was calculated for the pathways associated with the greatest risk (outlined below) using the 95% UCL exposure point concentration and most likely (50th percentile) exposure (MLE) parameters.

The primary routes of exposure for each scenario are as follows:

- Scenario 1 incidental ingestion of surface water from the Hudson Branch (associated with a cancer risk of 2E-06).
- Scenario 2 dermal contact with soil (associated with a cancer risk of 5E-05). Incidental ingestion of soil also contributed as an exposure pathway of concern, with a cancer risk of 3E-05.
 - Scenario 3 ingestion of shallow or deep ground water as a potable source (associated with cancer risks of 4E-02 and 8E-03, respectively, and non-cancer HIs exceeding 1E+00). Dermal contact with shallow and deep ground water is associated with cancer risks of 2E-05 and 1E-05, respectively. Inhalation of volatile organics in deep ground water also contributed as an exposure pathway of concern (associated with a cancer risk of 4E-04).
- Scenario 4 incidental ingestion of soil contributed as an exposure pathway of concern, but risks did not exceed 1E-06 and HIs did not exceed 1E+00.
- Scenario 5 incidental ingestion of soil is associated with cancer risks of 9E-05 (child) and 5E-05 (adult) and the HI for this pathway exceeded 1E+00 for children but not adults. Dermal exposure to contaminants in soil also contributed as an exposure pathway of concern, with a cancer risk of 1E-04.

Table 2-17 presents the MLE parameters used in this sensitivity analysis. It should be

noted that the guidance for selection of central tendency exposure parameters is incomplete

(EPA, 1993), and best professional judgement was used in instances where documented

information could not be obtained. Further, in some instances, commonly used RME parameters

(e.g., body weight) are actually averages and these values are used for the MLE case as well.

The results of this sensitivity analysis are presented in Table 2-18 and discussed below, by scenario.

• <u>Scenario 1 - Trespassing (Current)</u>

For the trespassing scenario, the primary exposure pathway associated with excess cancer risk is ingestion of surface water (Table 2-18). The values of exposure frequency (EF) and exposure duration (ED) were the only MLE parameters applied in this analysis (Table 2-17). Substitution of RME values with MLE values for EF and ED reduces the cancer risk value for ingestion of surface water by approximately an order of magnitude (Table 2-18) such that the MLE cancer risk does not exceed 1E-06.

• <u>Scenario 2 - Commercial/Industrial (Current)</u>

Dermal contact with soil and incidental ingestion of soil were the primary exposure pathways associated with excess risk cancer for the commercial/industrial scenario (Table 2-18). For dermal exposure, the exposed skin surface area (SA), absorption factors (ABS), adherence factors (AF), and ED were adjusted to reflect central tendency values (Table 2-17). The MLE cancer risk value for dermal contact with soil is approximately three orders of magnitude lower than the RME cancer risk value such that this pathway-specific risk is less than 1E-06. MLE parameters for incidental ingestion of soil include the soil ingestion rate (IR) and ED (Table 2-17). The MLE cancer risk value for ingestion of soil is an order of magnitude less than the RME cancer risk value, and exceeds 1E-06 by a factor of 3.

<u>Scenario 3 - Residential (Current)</u>

For the current residential scenario, the primary exposure pathways associated with excess cancer risk include ingestion of ground water, dermal contact with ground water, and inhalation of volatiles from ground water during showering (Table 2-18). Ingestion of ground water is also associated with an elevated HI.

The parameters used to describe the MLE for ingestion of ground water include IR and ED (Table 2-17). The MLE cancer risks for this pathway are approximately 25% of the RME cancer risks (for both shallow and deep ground water), and exceed 1E-06 by factors of 9,000 and 2,000 for shallow and deep ground water, respectively. Similar reductions in the HI are also seen, and the MLE HI for deep and shallow ground water continues to exceed 1E+00.

The parameters used to describe the MLE for dermal contact with ground water include ED and the exposure time (ET) (Table 2-17). The MLE cancer risks for this pathway are approximately an order of magnitude less than the RME cancer risks (for both shallow and deep ground water), and exceed 1E-06 by 4- and 2fold, for shallow and deep ground water, respectively (Table 2-18).

The parameters used to describe the MLE for inhalation of volatiles from ground water during showering include the inhalation rate, ED, and ET (Table 2-17). The MLE cancer risk for this pathway is approximately an order of magnitude less than the RME cancer risk, and exceeds 1E-06 by a factor of 60.

• <u>Scenario 4 - Construction (Future)</u>

The primary exposure pathway associated with excess cancer risk for Scenario 4 future construction is incidental ingestion of soil (Table 2-18). The parameters used to describe the MLE for incidental ingestion of soil include EF and ED (Table 2-17). The MLE cancer risk is approximately an order of magnitude lower than the RME cancer risk, and is less than 1E-06.

Scenario 5 - Residential (Future)

For the future residential scenario, the primary exposure pathways associated with excess cancer risk include childhood and adult incidental ingestion of soil, and dermal contact with soil (adult only). The soil ingestion pathway is also associated with an elevated HI for the child receptor (Table 2-18). The parameters used to describe the MLE for ingestion of soil include IR, EF, and ED (adults only) (Table 2-17). The MLE cancer risk for this pathway for the adult is approximately two orders of magnitude less than the RME cancer risk, and exceeds 1E-06 by a factor of 3. The MLE cancer risk for this pathway for the child is 5% of the RME cancer risk, and exceeds 1E-06 by a factor of 20. The MLE HI for this pathway for the child is 20% of the RME HI, and does not exceed the target of 1E+00.

The parameters used to describe the MLE for dermal contact with soil include SA, ABS, AF, EF, and ED (Table 2-17). The MLE cancer risk for this pathway is approximately four orders of magnitude less than the RME cancer risk, and does not exceed 1E-06.

In summary, this sensitivity analysis provides insight into the magnitude of uncertainty

associated with the exposure pathways contributing the majority of excess risk. In particular,

risks which exceed 1E-06 for the RME, but not the MLE, include:

- Ingestion of Surface Water (Scenario 1 Current Trespassing),
- Dermal Contact with Soil (Scenario 2 Current Commercial/Industrial Use),
- Incidental Ingestion of Soil (Scenario 4 Future Construction), and
- Dermal Contact with Soil (Scenario 5 Future Residential).

Elevated hazard indices which exceed 1E+00 for the RME, but not the MLE, is limited

to incidental ingestion of soil (Scenario 5 - Future Residential, adult only).

3.0 <u>REFERENCES</u>

Dixon, R.L. (1986). Toxic responses of the reproductive system. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaassen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 432-477.

EPA (1993). Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure (5/5/93).

EPA (1992). Integrated Risk Information Service (IRIS).

EPA (1992b). Dermal Exposure Assessment: Principles and Applications. Interim Report. EPA/600/8-91/011B.

EPA (1991). Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. OSWER Directive 9285.6-03.

EPA (1991a). Health Effects Assessment Summary Tables. Annual F4-1991.

EPA (1990). Exposure Factors Handbook. OHEA EPA/600/8-89/043.

EPA (1989). Risk Assessment Guidance for Superfund. Volume I Human Health Evaluation Manual (Part A).

EPA (1988). Compilation of Air Pollution Emission Factors. Volume I. Stationary and Air Sources (AP-42).

Gilbert, Richard O. (1987). <u>Statistical Methods for Environmental Monitoring</u>. Publisher: Van Nostrand Reinhold Company.

Hobbs, C.H. and R.O. McClellan (1986). Toxic effects of radiation and radioactive materials. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 669-705.

Menzel, D.B. and M.O. Amdur (1986). Toxic responses of the respiratory system. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaassen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 330-358.

New Jersey Department of Environmental Protection, ECRA 1982.

NJDEPE (1991). Personal communication.

NJDEPE (1994). Comments on Risk Assessment and Human Health and Environmental Evaluation Addendum.

TRC Environmental Consultants, Inc. (1991). Remedial Investigation Technical Report.

U.S.G.S. (1984). Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper #1270.

TABLES

TABLE 2-1

FIELD INVESTIGATION PROGRAM SUMMARY

Field Reconnaissance and Instrument Survey

Mobilization

Sampling Grid Layout

Surface Soil Sampling (64 samples)

Test Pit Operations (5 test pits located along former drainage ditch - 5 samples)

Soil Gas Surveys - used to locate 6 soil borings in former product storage areas

Collection of one round of surface water samples from the Hudson Branch, including runoff samples during a rainfall event from major drainage pathways, and one round of sediment samples from the Hudson Branch

Completion of 72 soil borings across the site to characterize soil quality and geology above the water table

Installation of ground water monitoring wells to identify geologic and hydrogeologic conditions; 19 wells installed at 14 locations, including 7 deep and 12 shallow wells

Collection of 2 rounds of ground water samples from on-site and off-site newly installed and existing monitoring wells; initial round (52 monitoring wells sampled) characterized ground water quality and the second round (39 monitoring wells sampled) confirmed first round results and further defined the nature and extent of contamination

Collection of 72 air samples over the course of 12 air sampling events conducted during non-operational periods at the SMC facility

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		RANGE	RANGE		CL (mg/kg)		SURFACE SOIL
COMPOUND NAME	FREQUENCY	OF SQL	OF DETECTION		LATED FOR		BACKGROUND CONCENTRATION
COMPOUND NAME	OF DETECTION		(mg/kg)	1	2	5	(mg/kg)
INORGANICS	Dementen	((0.6/~6/	· · · · · · · · · · · · · · · · · · ·			(
ALUMINUM	116/116	NA	952-104000	4651.9	26159.5	8422.5	1840 - 4090
ANTIMONY	19/116	3.6-16.4	4.7-39.5	6.1	5.1	5.9	12.3 - <12.8
ARSENIC	112/116	0.4-4.1	0.51-43.1	2.1	2.4	2.0	<2.1
BARIUM	115/116	40.5	6.3-739	40.9	257.6	77.4	<40.9 - <42.7
BERYLLIUM	98/116	0.18-1.0	0.23-60.1	1.7	15.4	5.4	<1.0 - <1.1
CADMIUM	11/116	0.61-1.6	0.62-5.3	1.1	1.0	0.9	<1.0 - <1.1
CHROMIUM (total)	115/116	0.8	1.5-5870	80.1	254.8	246.6	2.1 - 18.2
CHROMIUM III	NA	NA	NA	70	252.3	242.6	NA
CHROMIUM VI	38/44	0.12-0.22	0.12-53	10.0	2.5	4.0	<0.11
COBALT	75/116	0.97-10.6	1.3-87.1	3.8	6.9	4.3	<10.2 - <10.7
COPPER	115/116	0.93~1.1	1.1-887	17.4	32.7	15.6	<5.2 - 20.8
LEAD	116/116	NA	2.3-760 4.3-3150	73.8	118.9	56.1 436.1	6.7 - 17.9
MANGANESE	114/116 28/116	NA 0.04-0.16	0.04-2.5	209.1 0.2	1156.7 0.1	430.1	19.4 - 103 <0.089 - <.11
NICKEL	98/116	2.0-8.1	2.0-3360	53.5	837.0	223.6	<8.3 - 8.3
SELENIUM	18/116	0.32-10.3	0.44-5.1	0.5	1.5	0.7	<1.0 - <1.1
SILVER	13/116	0.65-3.1	0.37-3.3	1.1	1.6	1.2	<2.1
THALLIUM	NA	NA	NA	0.0	0.0	0.0	<2.1
VANADIUM	116/116	NA	5.4-12100	361.7	3383.1	1548.6	<10.4 - 53.7
ZINC	116/116	NA	3.75-1310	77.7	168.8	69.9	15.2 - 18.1
CYANIDE	1/114	0.5-2.2	0.7	NA	NA	0.7	<1.1
BORON	10/69	16.2-74.4	37.9-239	27.7	108.1	33.6	<20.9 - <21.4
NIOBIUM	7/68	32.4-149	52845	61.1	184.0	66.1	<40.5 - <42.5
STRONTIUM	15/69	16.2-74.4	22.8-228	27.9	160.3	41.6	<20.4 - <21.4
TITANIUM	72/72	NA	49.3-941	137.4	285.0	146.0	49.3 - 123
ZIRCONIUM	3/17	38.5-40.8	51.5-159	NA	101.0	90.2	NA
FLUORIDE	NA	NA	NA	NA	NA	NA	NA
VOLATILE ORGANICS							
CHLOROMETHANE	NA	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA	NA
ACETONE	1/14	NA	0.082	NA	NA	0.082	NA
CARBON DISULFIDE	1/14	0.005-0.006	0.003	NA	NA	0.0030	NA
1,2-DICHLORETHENE (total)	1/14	0.005-0.006	0.002	NA	NA	0.0020	NA
CHLOROFORM 2 BUTANONE	NA 2/14	NA 0.01-0.012	NA 0.008-0.009	NA NA	NA	NA 0.0051	NA
1,1,1-TRICHLOROETHANE	NA	NA	0.008-0.009 NA	NA NA	NA NA	0.0061 NA	NA NA
TRICHLOROBTHENE	11/14	0.005-0.006	0.001-0.005	0.0055	0.0040	0.0035	NA
BENZENE	1/14	0.005-0.006	0.15	NA	NA	0.1500	NA
TETRACHLOROETHENE	7/14	0.005-0.006	0.001-0.004	0.0040	NA	0.0036	NA
TOLUENE	5/14	0.005-0.006	0.001-0.007	0.0045	NA	0.0038	NA
BTHYLBENZENE	1/14	0.005-0.006	0.058	NA	NA	0.0137	NA
XYLENE (total)	1/14	0.005-0.006	0.36	NA	NA	0.0506	NA
BASE NEUTRAL / ACIDS	1]					
PHENOL	2/14	0.34-0.47	0.046-0.18	NA	NA	0.180	NA
2- CHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
BENZOIC ACID	3/14	1.7-2.4	0.059-0.15	NA	NA	0.150	NA
2,4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA	NA
NAPHTHALENE	1/14	0.34-0.47	0.13	NA	NA	0.130	NA
4-CHLORO-3-METHYLPHENOL	NA NA	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOR OPHENOL	NA 1/14	NA 1.2-2.4	NA 1.0	NA	NA	NA	NA
4-NITROPHENOL 2,4-DINITROTOLUENE	1/14	1.2-2.4	1.0 0.11	NA NA	NA	1.000	NA
PENTACHLOROPHENOL	9/14	1.8-2.4	0.040-0.79	0.074	NA NA	0.110 2.789	NA NA
PHENANTHRENE	3/14	0.34-0.47	0.040-0.79	NA 0.074	NA	0.130	NA
ANTHRACENE	1/14	0.34-0.47	0.043=0.13	NA	NA	0.130	NA
DI-I-BUTYLPHALATE	5/14	0.34-0.47	0.11-0.3	NA	0.21	0.093	NA
FLUORANTHENE	5/14	0.34-0.47	0.04-0.29	NA	NA	0.259	NA
PYRENE	4/14	0.34-0.47	0.042-0.055	0.055	NA	0.046	NA
BUTYLBENZYLPHTHALATE	1/14	0.34-0.47	0.12	NA	NA	0.120	NA
BENZO(1)ANTHRACENE	1/14	0.34-0.47	0.42	NA	NA	0.420	NA
CHRYSENE	4/14	0.34-0.47	0.52-0.58	0,338	NA	0.300	NA
bis(2-ETHYLHEXYL)PHTHALATE	5/14	0.35	0.062-0.25	NA	0.085	0.250	NA
BENZO(b)FLUORANTHENE	3/14	0.34-0.47	0.047-0.35	0.220	NA	0.267	NA
BENZO(k)FLUORANTHENE	1/14	0.34-0.47	0.16	NA	NA	0.16	NA
BENZO(4)PYRENE	1/14	0.34-0.47	0.74	NA	NA	0.74	NA
INDENO(1,2,3-cd)PYRENE	1/14	0.34-0.47	0.38	NA	NA	0.38	NA
BENZO(& h,i)PERYLENE	1/14	0.34-0.47	1.1	NA	NA	1.1	NA
PESTICIDES / PCB'S							
4,4-DDT	NA	NA	NA	NA	NA	NA	NA
AROCLOR - 1248	1/14	0.039-0.088	1.9	NA	1.900	1,900	NA
AROCLOR - 1254	4/14	0.084-0.18	0.013-1.5	NA	1.500	1.153	NA
AROCLOR-1260	1/14	0.077-0.18	0.022	<u>NA</u>	<u>NA</u>	0.022	<u>NA</u>

TABLE 2-2 SUMMARY OF SURFACE SOIL CONCENTRATION DATA

NA - EITHER NOT DETECTED OR NOT ANALYZED FOR INDICATED CONTAMINANT SUCH THAT CONTAMINANT

NOT CARRIED THROUGH THE QUANTITATIVE RISK ANALYSIS.

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» - FOR SCENARIOS 285 CHROMIUM III IS CALCULATED BY SUBTRACTING CHROMIUM VI FROM TOTAL CHROMIUM. FOR SCENARIO 1 CHROMIUM III IS CALCULATED ASS UMING THAT THE TOTAL CHROMIUM IS 7/8 CHROMIUM III AND 1/8 CHROMIUM VI.

,				
	TREATING	RANGE	RANGE	95% UCL
COMPOUND NAME	FREQUNCY	OF SQL	OF DETECTION	CALCULATED FOR SCENARIO 4*
	DETECTION	(mg/kg)	(mg/kg)	(mg/kg)
INORGANICS	1			
ALUMINUM	76/76	NA	257-86300	5116.05
ANTIMONY	12/76	3.3-19.6	4.6-15.7	5.52
ARSENIC	47/76	0.38-4.3 39.1-65.2	0.4269.8	1.30
BARIUM BERYLLIUM	74/76 54/76	0.19-1.6	2.6-452 0.08-18.3	24.60
CADMIUM	1/76	0.6-1.6	1.0	0.84
CHROMIUM (total)	70/76	0.80-2.2	0.89-834	74.81
CHROMIUM III (a)	NA	NA	NA	48.09
CHROMIUM VI	27/27	NA	0.1-569	26.72
COBALT	51/76	1.0-16.3	0.95-15.8	3.48
COPPER	66/76 74/76	0.89-8.2	0.88-21.4	4.34
MANGANESE	76/76	3.3	0.58-110	12.96 132.84
MERCURY	8/76	0.04-0.7	0.05-0.10	0.10
NICKEL	44/76	1.5-13.0	1.5-245	12.83
SELENIUM	7/76	0.34-10.8	0.43-4	0.58
SILVER	9/76	0.6-3.3	1.3-4	1.41
THALLIUM	1/76	0.69-21.7	1.1	1.10
VANADIUM	72/76	1.1-11.1	3.1-3660	304.87
ZINC	76/76 NA	4.0-4.4 NA	1.6-248	20.03 NA
BORON	2/24	19.1-32.6	NA 29.1-47.3	NA 24.51
NIOBIUM	NA NA	NA	29.1-47.3 NA	NA 24.01
STRONTIUM	NA	NA	NA	NA
TITANIUM	30/30	NA	29.4398	149.81
ZIRCONIUM	3/17	39.1-65.2	43.5-1120	106.11
FLUORIDE	NA	NA	NA	NA
VOLATILE ORGANICS				
CHLOROMETHANE	NA	Í NA	NA	NA
METHYLENE CHLORIDE	3/38	(0.005) b	0.15	0.15
ACETONE	9/38	(0.01) b	0.062-0.18	0.17
CARBON DISULFIDE	1/38	0.005-0.006	0.016	0.01
1,2-DICHLORETHENE (total)	1/38	0.005-0.006	0.003	0.0029
CHLOROFORM	2/38	0.005-0.006	0.001	0.0029
2-BUTANONE	1/38	0.010-0.012	0.007	0.0055
1,1,1-TRICHLOROETHANE TRICHLOROETHENE	1/38 10/38	0.005-0.006	0.004	0.0029
BENZENE	NA	NA	NA	NA 0.0040
TETRACHLOROETHENE	2/38	0.005-0.006	0.004	0.0030
TOLUENE	2/38	0.005-0.006	0.002	0.0029
ETHYLBENZENE	NA	NA '	NA	NA
XYLENE (total)	NA	NA	NA	NA
BASE NEUTRAL / ACIDS				
PHENOL	3/34	0.34-0.43	0.065-0.16	0.19
2-CHLOROPHENOL	1/34	0.34-0.43	0.047	0.20
BENZOICACID	1/34	1.7-2.2	0.095	1.10
2,4-DICHLOROPHENOL	1/34	0.34-0.43	0.11	0.20
NAPHTHALENE	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL 245-TRICHLOROPHENOL	1/34 5/34	0.34-0.43	0.039	0.20
2,4,3-TRICHLOROPHENOL 4-NITROPHENOL	5/34 1/34	1.7-2.2 1.7-2.2	0.036-0.2	1.40 1.08
24-DINITROTOLUENE	NA	NA	NA	1.08 NA
PENTACHLOROPHENOL	7/34	0.34-0.43	0.085-0.3	0.30
PHENANTHRENE	6/34	0.34-0.43	0.039-0.16	0.16
ANTHRACENE	NA	NA	NA	NA
DI-B-BUTYLPHALATE	9/34	0.34-0.43	0.05-1.2	1.20
FLUORANTHENE	9/34	0.34-0.43	0.037-0.24	0.20
PYRENE	7/34	0.34-0.43	0.039-0.25	0.21
BUTYLBENZYLPHTHALATE BENZO(*)ANTHRACENE	2/34 7/34	0.34-0.43 0.34-0.43	0.036-0.13	0.13
CHRYSENE	5/34	0.34-0.43	0.036-0.13 0.038-0.13	0.13 0.13
bis(2-ETHYLHEXYL)PHTHALATE	8/34	0.34-0.43	0.037-0.95	0.13
BENZO(b)FLUORANTHENE	3/34	0.34-0.43	0.04-0.24	0.21
BENZO(k)FLUORANTHENE	2/34	0.34-0.43	0.051-0.075	0.075
BENZO(a)PYRENE	2/34	0.34-0.43	0.044-0.066	0.066
INDENO(1,2,3-cd)PYRENE	1/34	0.34-0.43	0.037	0.037
BENZO(& b,i)PERYLENE	1/34	0.34-0.43	0.059	0.059
PESTICIDES / PCB'S				
4,4-DDT	5/34	0.0079-0.018	0.0093-31.0	31.00
AROCLOR-1248	NA	NA	NA	NA
AROCLOR-1254	NA	NA	NA	NA
AROCLOR-1260	1/40	0.077-170	0.028	0.028

TABLE 2-3 SUMMARY OF SUBSURFACE SOIL CONCENTRATIONS

NA: EITHER NOT DETECTED OR NOT ANALYZED FOR INDICATED CONTAMINANT SUCH THAT CONTAMINANT NOT CARRIED THROUGH THE QUANTITATIVE RISK ANALYSIS (1): THE CHROMIUM III IS CALCULATED BY SUBTRACTING CHROMIUM VI FROM TOTAL CHROMIUM

(b): CONTRACT REQUIRED QUANTITATION LIMIT USED IN PLACE OF SAMPLE QUANTITATION LIMIT

		RANGE	RANGE	95% UCL FOR
	FREQUNCY	OF	OF	CALCULATED
COMPOUND NAME	OF DETECTION	SQL (ug/L)	DETECTION (ug/L)	SCENARIO 1 (ug/L)
INORGANICS	5.00	N1 A	224-44800	44000.0
ALUMINUM	5/5 2/5	NA 22	44.2-151	44800.0 151.0
ARSENIC	3/5	2	2-34.6	34.6
BARIUM	5/5	NA	24.5-292	292.0
BERYLLIUM	4/5	1	1-25.1	25.1
CADMIUM	1/5	4	9	7.6
CHROMIUM (total)	5/5	NA	43.3-8520	8520.0
CHROMIUM III (b)	NA	NA	NA	8519.9
CHROMIUM VI	1/1	NA	0.054	0.05
COBALT	1/5	7	62.2	62.2
COPPER	5/5	NA	7.3-432	432.0
LEAD	4/5	130	3.8-28	65.0
MANGANESE	5/5	NA	131-2590	2590.0
MERCURY NICKEL	1/5 5/5	0.2 NA	21.4 17.1-618	21.4
SELENIUM	NA NA	NA	NA	618.0 NA
SILVER	NA	NA	NA	NA
THALLIUM	NA	NA	NA	NA
VANADIUM	5/5	NA	246-5700	5700.0
ZINC	5/5	NA	20.8-1070	1070.0
CYANIDE	1/5	10	11	10.6
BORON	2/2	NA	585-828	• 828.0
NIOBIUM	NA	NA	NA	NA
STRONTIUM	NA	NA	NA	NA
TITANIUM	NA	NA	NA	NA
ZIRCONIUM	NA	NA	NA	NA
FLUORIDE	5/5	NA	0.84-1.1	1.0
VOLATILE ORGANICS				
CHLOROMETHANE	1/5	10	9	7.7
METHYLENE CHLORIDE	NA NA	NA	NA	NA
ACETONE CARDON DISCUSSION	NA	NA NA	NA	NA
CARBON DISULFIDE 1,2-DICHLORETHENE (total)	1/5	5	NA 2	NA 2.5
CHLOROFORM	NA	NA	NA	2.5 NA
2-BUTANONE	NA	NA	NA	NA
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA
TRICHLOROETHENE	1/5	5	3	2.8
BENZENE	NA	NA	NA	NA
TETRACHLOROETHENE	NA	NA	NA	NA
TOLUENE	NA	NA	NA	NA
ETHYLBENZENE '	NA	NA	NA	ŇA
XYLENE (total)	NA	NA	NA	NA
BASE NEUTRAL / ACIDS				
PHENOL	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	NA	NA
BENZOICACID	NA	NA	NA	NA
24-DICHLOROPHENOL	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA
24,5-TRICHLOROPHENOL	NA	NA	NA	NA
-NITROPHENOL	NA	NA	NA	NA
2,4-DINITROTOLUENE	NA	NA	NA	NA
PENTACHLOROPHENOL	NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA
ANTHRACENE	NA	NA	NA	NA
DIBUTYLPHALATE	2/2	NA	1	1.0
FLUORANTHENE	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA
BENZO(1)ANTHRACENE	NA NA	NA	NA	NA
CHRYSENE	NA 1/5	NA 11	NA I	NA
bb(2-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE	NA	NA NA	2 NA	2.0 NA
BENZO(k)FLUORANTHENE	NA	NA	NA	NA
BENZO(I)PYRENE	NA	NA	NA	NA
NDENO(1,2,3-ed)PYRENE	NA	NA	NA	NA
BENZO(&L,i)PERYLENE	NA	NA	NA	NA
	↓			
PESTICIDES / PCB'S				
1,4-DDT	NA	NA	NA	NA
AROCLOR -1248	NA	NA	NA NA	NA
AROCLOR - 1254	NA	NA	NA	NA
AROCLOR - 1260	NA	NA	NA	NA

TABLE 2-4 SUMMARY OF SURFACE WATER CONCENTRATION DATA (a)

NA - EITHER NOT DETECTED OR NOT ANALYZED FOR INDICATED CONTAMINANT SUCH THAT CONTAMINANT

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NOT CARRIED THROUGH THE QUANTITATIVE RISK ANALYSIS.

(a) - DOES NOT INCLUDE FOUR RUNOFF SAMPLES COLLECTED DURING A RAINFALL EVENT (b) - CHROMIUM III IS CALCULATED BY SUBTRACTING CHR UMIUM IV FROM THE TOTAL CHROMIUM

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	FREQUENCY	RANGE OF	RANGE		ALCULATED ENARIO 3	GROUNDWATER BACKGROUND
COMPOUND NAME	OF	SQL	DETECTION	SHALLOW	DEEP	CONCENTRATION
	DETECTION	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
INORGANICS						
ALUMINUM	10/10	NA 1021	196~99400 1340-2140	39200.0	99400.0 2140.0	2550.0
ANTIMONY	2/10	19-21		NA 748.0		< 21
ARSENIC BARIUM	4/10 10/10	2 NA	3.6-748 9.8-507	86.7	352.0 507.0	< 2 128.0
BERYLLIUM	4/10	1	8.2-570	570.0	11.3	< 1
CADMIUM	1/10	4	7.7	7.7	NA	< 4
CHROMIUM (total)	9/10	3	7.4-102000	84.6	102000.0	91.7
CHROMIUM III (b)	NA	NA	NA	84.6	100600.0	NA
CHROMIUM VI	3/10	0.02	0.008-1400	0.008	1400.0	0.3
COBALT	4/10	4-5	5.2-43.8	7.5	43.8	< 5
COPPER	5/10	5-7 2-20	5.5-130	130.0	37.7	25.9
LEAD	5/10 10/10	2-20 NA	5-68.8 21.4-1370	68.8 598.1	24.4 176.0	16.2 74.8
MERCURY	3/10	0.2	0.68-0.793	0.68	0.98	< 0.2
NICKEL	5/10	7-8	8.7-212	212.0	8.7	9.7
SELENIUM	2/10	2-10	49.6-130	NA	130.0	< 2
SILVER	1/10	4-5	5.1	NA	5.1	< 5
THALLIUM	NA	NA	. NA	NA	NA	NA
VANADIUM	8/10	4-8	8.4-128000	128000.0	2000.0	8.3
ZINC	8/10	3	9.3-1080	1080.0	65.1	1080.0
CYANIDE	3/10	10	30.1-26400	26400.0	62.2	< 10
BORON	4/7 NA	100 NA	130-14700	14700.0 NA	158.0 NA	NA
NIOBIUM STRONTIUM	NA 2/7	100	NA 294-318	NA NA	NA 318.0	NA NA
TITANIUM	3/7	100	149-325	149.0	325.0	NA
ZIRCONIUM	NA	NA	NA	NA	NA	NA
FLUORIDE	NA	NA	NA	NA	NA	NA
VOLATILE ORGANICS						
CHLOROMETHANE	NA	NA	NA	NA	NA	NA
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	NA
ACETONE	NA	NA	NA	NA	NA	NA
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA
1,2-DICHLORETHENE (total)	NA	NA	NA	NA	NA	NA
CHLOROFORM	NA	NA	NA	NA	NA	NA
2-BUTANONE	NA	NA	NA	NA	NA	NA
1,1,1-TRICHLOROETHANE	NA 2/7	NA 5	NA af 70	NA	NA TO D	NA
TRICHLOROETHENE	2/7 NA	5 NA	35-70 NA	NA NA	70.0 NA	17.0 NA
TETRACHLOROETHENE	1/7	5	1	NA NA	NA 1.0	NA 1.0
TOLUENE	NA	ŇĂ	NA	NA	NA 1.0	NA I.U
ETHYLBENZENE	NA	NA	NA	NA	NA	NA
XYLENE (total)	NA	NA	NA	NA	NA	NA
BASE NEUTRAL / ACIDS						
PHENOL	NA	NA	NA	NA	NA	NA
2-CHLOROPHENOL	NA	NA	· NA	NA	NA NA	NA
BENZOICACID	NA	NA	NA	NA	NA	NA
2.4-DICHLOROPHENOL	NA	NA	NA	NA	NA	NA
NAPHTHALENE	NA	NA	NA	NA	NA	NA
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	NA	NA
2,4,5-TRICHLOROPHENOL	NA	NA	NA	NA	NA	NA
4-NITROPHENOL	NA	NA		NA	NA	NA
2,4-DINITROTOLUENE PENTACHLOROPHENOL	NA NA	NA NA	NA NA	NA	NA	NA
PHENANTHRENE	NA	NA	NA	NA NA	NA NA	NA NA
ANTHRACENE	NA	NA	NA	NA	NA	NA
DI-I-BUTYLPHALATE	NA	NA	NA	NA	NA	NA
FLUORANTHENE	NA	NA	NA	NA	NA	NA
PYRENE	NA	NA	NA	NA	NA	NA
BUTYLBENZYLPHTHALATE	NA	NA	NA	NA	NA	NA
BENZO(a)ANTHRACENE	NA	NA	NA	NA	NA	NA
CHRYSENE	NA	NA	NA	NA	NA	NA
bb(2-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE	1/5 NA	10 NA	4 NA	NA	4.0	< 11
BENZO(6)FLUORANTHENE BENZO(k)FLUORANTHENE	NA	NA NA	NA NA	NA NA	NA NA	NA NA
BENZO(a)PYRENE	NA	NA	NA	NA	NA	NA
INDENO(1,2,3-cd)PYRENE	NA	NA	NA	NA	NA	NA
BENZO(& L, i)PERYLENE	NA	NA	NA	NA	NA	NA
DECTIONES (DODIS						
PESTICIDES / PCB'S 4,4-DDT	NA	NA	NA	NA	NA	NA
	NA	NA	NA .	NA	NA	NA
AROCLOR-1248						
AROCLOR-1248 AROCLOR-1254	NA	NA	NA	NA	NA	NA

TABLE 2~5 SUMMARY OF GROUNDWATER CONCENTRATIONS (a)

NA: EITHER NOT DETECTED OR NOT ANALYZED FOR INDICATED CONTAMINANT SUCH THAT CONTAMINANT NOT CARRIED THROUGH THE QUANTITATIVE RISK ANALYSIS
(a): INCLUDES DATA FROM SC-13, SC-22, SC-D AND SC-W2 ONLY
(b): THE CHROMIUM III IS CALCULATED BY SUBTRACTING CHROMIUM VI FROM TOTAL CHROMIUM

TABLE 2-6 PHYSICAL, CHEMICAL AND ENVIRONMENTAL FATE PROPERTIES

	CASRN	Koc	Water Solubility	Henry's Law Constant	Vapor Pressure	Half life Soil	Half life Surface Wate
COMPOUND	QASHIN	(ml/g)	at 25'C(mg/L)	(atm*m3/mol)	(mm Hg)	(day's)	(day's)
INORGANICS						[
LUMINUM	7429-90-5	l					
NTIMONY	7440-36-0			NA I	1	i i	persistent
RSENIC	7440-38-2	i		NA	0	i i	persistent
ARIUM	7440-39-3			NA		i i	persistent
ERYLLIUM	7440-41-7			NA	0	i i	•
ADMIUM	7740-43-9			NA I	0	i i	persistent
HROMIUM (total)	7440-47-3			I NA I	0	i i	3
HROMIUM III a				i i		i i	
HROMIUM VI	i i			i i		1 1	
OBALT	7440-48-4	1					
OPPER	7440-50-8			I NA	0		
EAD	7439-92-1			I NA	0		persistent
ANGANESE	7439-96-5			NA	_		
IERCURY	7439-97-6			NA	2E-03		persistent
ICKEL	7440-02-0			NA	0		
ELENIUM	7782-49-2			NA	0		
ILVER	7440-22-4			NA	0		
HALLIUM	7440-28-0				0		
ANADIUM	7440-62-2			I NA I	~	!!	nereistert
	7440-66-6			I NA I	0		persistent 0.33-0.8
YANIDE							0.00-0.8
ORON IOBIUM						}	
TRONTIUM						; I	
ITANIUM	i l					i l	
IRCONIUM	i i					i i	
LUORIDE	i i			i i		i i	
	i i			i i		i i	
VOLATILE ORGANICS	1 1					1	
HLOROMETHANE	75-00-3	3.2	4700	1.11E-02	1011		
ETHYLENE CHLORIDE	75-09-2	8.7	1.3E+04	2E-03	440	[]	
CETONE	67-64-1	2.2	1E+06	2.06E-05	270	!	
ARBON DISULFIDE	75-15-0	54	2940	1.23E-02	360	!	
,2-DICHLORETHENE (total)	540-59-0	59	6300	6.56E-03	324		1-6
CHLOROFORM	67-66-3	31	8200	2.87E-03	151		0.3-30
	78-93-3	4.5	2.68E+05	2.74E-05	77.5		10 0.14–7
	71-55-6	152	1500	1.44E-02	123		
	79-01-6	126	1100	9.1E-03	57.9		1-90
	71-43-2	83 364	1750 150	5.59E-03	95.2 17.8		16 130
	108-68-3	300	535	6.37E-02	28.1	1 1	0.17
FOLUENE ETHYLBENZENE	100-41-4	1100	152	6.43E-03	7		0.17
(YLENE (total)	1330-20-7	240	198	7.04E-03	10	ł	1.5-9
		=				i i	
BASE NEUTRAL / ACIDS	i			i i		i i	
HENOL	108-95-2	14	9.3E+04	4.54E-07	0.341	i i	0.62-9
-CHLOROPHENOL	95-57-8	16	2.8E+04	5.6E-07	1.42		73
ENZOIC ACID	65-85-0	57	2700 @ 18 deg. C	7.0E-08	4.5E-03	<7	0.2-3.6
4-DICHLOROPHENOL	120-83-2	380	4600	2.75E-06 (5.9Ë-02	[1	6
APHTHALENE	91-20-3	550	30	4.6E-04	0.23		
-CHLORO-3-METHYLPHENOL			•				
4,5-TRICHLOROPHENOL	95-95-4	89	1190	2.18E-04	1	72	
-NITROPHENOL	100-02-7	17	2.5E+04	3.31E-08	1E-03	1-40	18
	121-14-2 87-86-5	62	270	8.67E-07	5.1E-03		0.4-10
ENTACHLOROPHENOL		53000	14	2.75E-06	1.1E-04		0 0 0 0
HENANTHRENE NTHRACENE	85-01-8	14000 14000	1 4.5E02	1.59E-04	6.8E-04 1.95E-04		0.38-2
	84-74-2	170000	4.52-02	1.02E-03	1E-05		
LUORANTHENE	206-44-0	38000	0.206	6.46E-06	5E-06		1-2
YRENE	129-00-0	38000	0.132	5.04E-06	2.5E-06		,-2
UTYLBENZYLPHTHALATE	85-68-7	2530	2.69	1.3E-06	8.6E-06	i	
ENZO(a)ANTHRACENE	56-55-3	1380000	5.7E-03	1.16E-06	2.2E-08	i	0.1-5
HRYSENE	218-01-9	200000	1.8E-03	1.05E-06	6.3E-09	i l	0.2
is(2-ETHYLHEXYL)PHTHALATE		100000	0,4	1.1E-05	6.2E-08	i i	
ENZO(b) FLUORANTHENE	205-99-2	550000	1.4E-02	1.19E-05	5E-07	i . I	1-2
ENZO(k)FLUORANTHENE	207-08-9	550000	4.3E-03	3.94E-05	5.1E-07	i	_
ENZO(a)PYRENE	50-32-8	5500000	1.2E-03	1.55E-06	5.6E-09	420-480	0.4
DENO(1,2,3-cd)PYRENE	193-39-5	1600000	5.3E-04	6.86E-08	1E-10	i	0.0208-2.0
ENZO(g,h,i)PERYLENE	191-24-2	1600000	7E-04	5.34E-08	1.03E-10	1	İ
	1	I	l	I İ		I	l
	1	1 .		1			_
PESTICIDES / PCB'S				1 5405 04 1	5.5E-06	1000-5500	EC 110
,4-DDT	50-29-3	243000	5E~03	5.13E-04		1000-3300	56-110
,4-DDT ROCLOR-1248	12672-29-6	436516	0.06	3.5E-03	4.94E-04	1000-3300	56-110
,4-DDT		436516 407380				1	56-110

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REFERENCES *Superfund Public Health Evaluation Manuel*, EPA (1986) *Multiple-Pathways Screening-Level Assessment of a Hazardous Waste Incineration Facility.* Oak Ridge National Laboratory (1984) *Groundwater Chemicals Desk Reference* Lewis Publishers, Inc. (1990) *Handbook of Environmental Fate and Exposure Data for Organic Chemicals*, Lewis Publishers, Inc. (1990)

TABLE 2-7

CONSTITUENTS INCLUDED IN THE HUMAN HEALTH RISK ASSESSMENT

Surface Soil	Sul	osurface Soil	Ground Water	Surface Water
InorganicsBase Neutral/AcidsAluminumPhenolAntimonyBenzoic AcidArsenicNaphthaleneBarium4-NitrophenolBeryllium2,4-DinitrotolueneCadmiumPentachlorophenolChromium IIIPhenanthreneChromium VIAnthraceneCobaltDi-n-butylphthalateCopperFluorantheneLeadPyreneManganeseButylbenzylphthalateNickelChryseneSeleniumBis(2-ethylhexyl)phthalateSilverBenzo(a)aptreneVanadiumBenzo(k)fluorantheneZincBenzo(a)pyreneBoronIndeno(1,2,3-cd)pyreneNiobiumBenzo(g,h,i)peryleneStrontiumTitaniumTitaniumPesticides/PCBsZirconiumAroclor-1254Volatile OrganicsAroclor-1260AcetoneCarbon Disulfide1,2-Dichloroethene (total)2-ButanoneTrichloroetheneBenzeneTetrachloroetheneEnzeneTetrachloroetheneEhzeneTetrachloroetheneEhzeneTetrachloroetheneEhzeneTolueneEthylbenzene	InorganicsAluminumAntimonyArsenicBariumBerylliumChromium IIIChromium VICobaltCopperLeadManganeseMercuryNickelSeleniumSilverVanadiumZincBoronTitaniumZirconiumVolatile OrganicsMethylene ChlorideAcetoneChloroformTrichloroetheneTetrachloroetheneToluene	Base Neutral/Acids Phenol 2,4,5-Trichlorophenol Pentachlorophenol Phenanthrene Di-n-butylphthalate Fluoranthene Pyrene Butylbenzylphthalate Benzo(a)anthracene Chrysene Bis(2-ethylhexyl)phthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene <u>Pesticides/PCBs</u> 4,4-DDT	Inorganics Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium III Chromium VI Cobalt Copper Lead Manganese Mercury Nickel Selenium Silver Vanadium Zinc Cyanide Boron Strontium Titanium Volatile Organics Trichloroethene Tetrachloroethene Base Neutral/Acids Bis(2-ethylhexyl)phthalate	Inorganics Aluminum Antimony Arsenic Barium Beryllium Cadmium Chromium III Chromium VI Cobalt Copper Lead Manganese Mercury Nickel Vanadium Zinc Cyanide Boron Fluoride Volatile Organics Chloromethane 1,2-Dichloroethene (total) Trichloroethene Base Neutral/Acids Di-n-butylphthalate Bis(2-ethylhexyl)phthalate

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TABLE 2-8

CONSTITUENTS EXCLUDED FROM THE HUMAN HEALTH RISK ASSESSMENT

Surface Soil	Subsurface Soil	Groun	d Water	Surfa	ice Water
Inorganics Thallium ¹ Cyanide ² Fluoride ¹ Volatile Organics Chloromethane ¹ Methylene Chloride ¹ Chloroform ¹ 1,1,1-Trichloroethane ¹ Base Neutral/Acids 2-Chlorophenol ¹ 2,4-Dichlorophenol ¹ 4-Chloro-3-methylphenol ¹ 2,4,5-Trichlorophenol ¹ Pesticides/PCBs 4,4-DDT ¹	Inorganics Cadmium ² Thallium ² Cyanide ¹ Niobium ¹ Strontium ¹ Fluoride ¹ <u>Volatile Organics</u> Chloromethane ¹ Carbon Disulfide ² 1,2-Dichloroethene(total) ² 2-Butanone ² 1,1,1-Trichloroethane ² Benzene ¹ Ethylbenzene ¹ Xylene (total) ¹ <u>Base Neutral/Acids</u> 2-Chlorophenol ² Benzoic Acid ² 2,4-Dichlorophenol ² Naphthalene ¹ 4-Chloro-3-methylphenol ² 4-Nitrophenol ² 2,4-Dinitrotoluene ¹ Anthracene ¹ Indeno(1,2,3-cd)pyrene ² Benzo(g,h,i)perylene ² <u>Pesticides/PCBs</u> Aroclor-1254 ¹ Aroclor-1254 ¹	Inorganics ⁴ Thallium ¹ Niobium ¹ Zirconium ¹ Fluoride ¹ Volatile Organics Chloromethane ¹ Methylene Chloride ¹ Acetone ¹ Carbon Disulfide ¹ 1,2-Dichloroethene (total) ¹ Chloroform ¹ 2-Butanone ¹ 1,1,1-Trichloroethane ¹ Benzene ¹ Toluene ¹ Ethylbenzene ¹ Xylene (total) ¹	Base Neutral/Acids Phenol ⁴ 2-Chlorophenol ¹ Benzoic Acid ¹ 2,4-Dichlorophenol ¹ Naphthalene ¹ 4-Chloro-3-methylphenol ¹ 2,4,5-Trichlorophenol ¹ 4-Nitrophenol ⁴ 2,4-Dinitrotoluene ⁴ Pentachlorophenol ⁴ Phenanthrene ¹ Anthracene ⁴ Di-n-butylphthalate ⁴ Fluoranthene ⁴ Pyrene ¹ Butylbenzylphthalate ⁴ Benzo(a)anthracene ¹ Chrysene ¹ Benzo(b)fluoranthene ⁴ Benzo(a)pyrene ⁴ Indeno(1,2,3-cd)pyrene ⁴ Benzo(g,h,i)perylene ¹ Pesticides/PCBs 4,4-DDT ⁴ Aroclor-1254 ¹ Aroclor-1260 ¹	Inorganics Selenium ¹ Silver ¹ Thallium ¹ Niobium ¹ Strontium ¹ Zirconium ¹ <u>Volatile Organics</u> Methylene Chloride ¹ Acetone ¹ Carbon Disulfide ¹ Chloroform ¹ 2-Butanone ¹ 1,1,1-Trichloroethane ¹ Benzene ¹ Tetrachloroethene ¹ Toluene ¹ Ethylbenzene ¹ Xylene (total) ¹	Base Neutral/Acids Phenol ¹ 2-Chlorophenol ¹ Benzoic Acid ¹ 2,4-Dichlorophenol ¹ Naphthalene ¹ 4-Chloro-3-methylphenol ¹ 2,4,5-Trichlorophenol ¹ 4-Nitrophenol ¹ 2,4-Dinitrotoluene ¹ Pentachlorophenol ¹ Phenanthrene ¹ Anthracene ¹ Fluoranthene ¹ Pyrene ¹ Butylbenzylphthalate ¹ Benzo(a)anthracene ¹ Chrysene ¹ Benzo(b)fluoranthene ¹ Benzo(a)pyrene ¹ Benzo(a)pyrene ¹ Indeno(1,2,3-cd)pyrene ¹ Benzo(g,h,i)perylene ¹ <u>Pesticides/PCBs</u> 4,4-DDT ¹ Aroclor-1254 ¹ Aroclor-1260 ¹

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¹ Either not detected or not analyzed for in the medium of concern.

² Excluded on the basis of detection frequency.

SUMMARY OF PARAMETER VALUES USED TO ESTIMATE EXPOSURE - I (VALUES SELECTED)

		CR ^A	SA ^B	ABSC	AF ^D	PCE	FI ^F	EF ^G	ED ^H	ET	BW ^J
Scenario	Exposure Route	(Units)	(cm²)		(mg/cm ²)	(cm/hr)		(d/yr)	(yr)	(Units)	(kg)
1 ^ĸ	Dermal Contact with Soil	NA ^L	8,600	CS ^M	1.45	NA	NA	30	9	NA	49
1	Ingestion of Soil	100 (mg/d)	NA	NA	NA	NA	1	30	9	NA	49
1	Dermal Contact with Surface Water	NA	8,600	NA	NA	8.4E-04	NA	30	9	4 (hr/d)	49
1	Ingestion of Surface Water	50 (ml/hr)	NA	NA	NA	NA	NA	30	9	NA	49
2 ^N	Dermal Contact with Soil	NA	6,300	CS	1.45	NA	NA	250	25	NA	70
2	Ingestion of Soil	100 (mg/d)	NA	NA	NA	NA	1	250	25	NA	70
2	Inhalation of Fugitive Dust	2 (m ³ /hr)	NA	NA	NA	NA	NA	250	25	NA	70
3°	Dermal Contact with Ground Water	NA	18,150	NA	NA	8.4E-04	NA	350	30	12 (min/d)	70
3	Ingestion of Ground Water	2 (1/d)	NA	NA	NA	NA	1	350	30	NA	70
3	Inhalation of Vapor Phase Chemicals	0.83 (m³/hr)	NA	NA	NA	NA	NA	350	30	24 (hr/d)	70
4 ^P	Dermal Contact with Soil	NA	6,300	CS	1.45	NA	NA	180	1	NA	70
4	Ingestion of Soil	480 (mg/d)	NA	NA	NA	NA	1	180	1	NA	70
4	Inhalation of Fugitive Dust	2 (m ³ /hr)	NA	NA	NA	NA	NA	180	1	NA	70
5 ⁰	Dermal Contact with Soil	NA	9,440	CS	1.45	NA	NA	350	30	NA	70
5	Ingestion of Soil/Dust	200 (mg/d) (child); 100 (mg/d) (adult)	NA	NA	NA	NA	1	350	6 (child); 30 (adult)	NA	14.5 (child); 70 (adult)
5	Inhalation of Fugitive Dust	0.83 (m ³ /hr)	NA	NA	NA	NA	NA	350	30	NA	70

A CR: Contact Rate

- ^B SA: Surface Area
- ^c ABS: Absorption Factor
- ^D AF: Adherence Factor
- ^E PC: Permeability Constant
- ^F FI: Fraction Ingested
 ^G EF: Exposure Frequency
- ^H ED: Exposure Duration
- ^I ET: Exposure Time
- ^J BW: Body Weight
- ^K Trespassing (Current) ^L NA: Not Applicable
- ^M CS: Chemical-Specific
- ^N Commercial/Industrial (Current)
- ^o Residential (Current)
- ^p Construction (Future) ^Q Residential (Future)

TABLE 2-10 SUMMARY OF PARAMETER VALUES USED TO ESTIMATE EXPOSURE - II (RANGE AND BASIS)

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PARAMETER	VALUE OR	VALUE USED	RATIONALE	REFERENC
 y yo constrained from the 	RANGE			
cenario 1-4: Global variables				
Body Weight (kg)	•			
- Child (scenario 1)	36-61.2	49 14.5	Value based on average of males and females between 9-18 yrs Value based on average of males and females between 0-6 yrs	EPA 1990 EPA 1990
– Child (scenario 5) – Adult	11.6-17.4 67.2-74.5	14.5 70	Value based on average of males and females between 18-65 yrs	EPA 1989
Exposure Duration (years)				li
-Scenario 1	1-18	9	Based upon the age range of child likely to enter the site.	
-Scenario 2	1-70	25	National upper-bound (90th percentile) at one job.	EPA 1991
-Scenario 3	1-70 1-70	30 1	National upper—bound (90th percentile) at one residence. Amount of time spent building new homes.	EPA 1991
Scenario 4 Scenario 5	1-70	1		
Child	0-6	6	Based upon child living all six years at the residence.	li –
Adult	1-70	30	National upper-bound (90th percentile) at one residence.	EPA 1991
Averaging Time Cancer-risks (days)	NA	25,550	Value based upon 70 year life expectancy.	EPA 1989
Noncancer~risks (days)				· ·
Scenario 1	350-25,550	3,285	Value based upon exposure duration.	
-Scenario 2	250-25,550 350-25,550	9,125 10,950	Value based upon exposure duration. Value based upon exposure duration.	
- Scenario 3 - Scenario 4	180	160	Value based upon exposure duration.	
-Scenario 5	100			
Child	350-2,190	2,190	Value based upon exposure duration.	l
Adult	350-25,550	10,950	Value based upon exposure duration.	
Absorption Factor	0.004-0.04	0.01		 EPA 19921
Cadmium PCBs	0.001-0.01 0.006-0.06	0.01 0.06		EPA 19921
	0.000-0.00			
Permeability Constant – Dermai contact in Water (cm/hr)		8.4E-04	Based upon the penetration rate of water.	EPA 1989
Adherence Factor (mg/cm2)	0-2.77	1.45	Based upon commercial potting soil adherence to hands.	ļļ
Fraction Ingestion From Contaminated Source	0-1	1	Assuming 100% of the soll ingestion occurs while on site.	
cenario 1-5 Chemical Concentration Justification			Of the mercentification is an end in expression of impate light	
Surface and subsurface soils; Ground and surface waters			95th percentile values used in exposure estimate were calculated using the methods described in text.	
	HINDING MINING AND AND AND AND AND AND AND AND AND AND	1196 ITELTOTENCENCETERIET		İNDODONUNUNU
cenario 1 - Recreational/Trespasser Exposure: Current Use		·····		
Exposure Frequency(days/year)	1-365	30	Based upon access to unrestricted areas of site.	NUDEPE 19
Dermal Contact With Chemicals in Soils	0-14 400	8,600	Based upon exposed arms, hands, and legs.	 EPA 1989
Skin Surface Area (cm2) Ingestion Of Chemicals in Soils	0 14,400	8,000	Based upon exposed arris, nands, and regs.	
Ingestion Rate (mg/day)	0-480	100	Soil ingestion rate for those over 6 years of age.	EPA 1991
Dermal Contact with Chemicals in Surface Water	0-14 440	8,600	Based upon exposed arms, hands, and legs.	 EPA 1989
Skin Surface Area (cm2) Exposure Time (hr/day)	0-14,440 0-24	4	Assume clothing remains wet.	
Ingestion Of Chemicals In Surface Water		•		li
Contact Rate (liter/hour)		0.05		EPA 1989
Exposure Time (hr/day)	0-24	1		
cenario 2 — Industrial Exposure: Current Use Exposure Frequency (days/year)	1-365	250	Based on an estimate of the number of days at work.	EPA 1991
Dermal Contact with Chemicals In Soils				
Skin Surface Area (cm2)	0-18,150	6,300	Includes hands, arms, head, neck and portion of the trunk.	1
ngestion Of Chemicals in Soils				
Ingestion Rate (mg/day) Inhalation Of Airborne Chemicals Absorbed to Dust	0-480	50	Based upon minimal contact with the soil.	EPA 1991
Ambient Dust Concentration (kg/m3)				
Inhalation Rate (m3/hr)		2	Adults during moderate exertion	l.
Exposure Time (hrs/day)	1-24	1	Based upon known activity patterns.	1
a de la complete de la complete de la complete de la complete de la complete de la complete de la complete de l La complete de la comp	ETERTI KENTEN KENTEN ETERTI I			
cenario 3 – Residential Scenario: Current Use	1-365	350	Two weeks spent away from home.	 EPA 1991
Exposure Frequency (days/yr) Ingestion of Chemicals in Drinking Water	1-303	557	ואי איפאי פאסוגמאמץ ביוויוטווס.	
Ingestion Rate (L/day)	0-2	2	Adult, 90th percentile	EPA 1989
Dermal Contact with Chemicals in Water				l
Skin Surface Area (cm2)	0-18,150	18,150	Adult total body exposure.	Į
	0-24	0.2	Bathing or showering time.	1
Exposure Time (hrs/day)		0.83	Light activity assumed.	 EPA 1990
Exposure Time (hrs/day) Inhalation Of Airborne (Vapor Phase) Chemicals			Based upon duration of a shower.	
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr)	0-24			
Exposure Time (hrś/daý) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day)	0-24	0.1		
Exposure Time (hrś/daý) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Illillillillillillillillillillillillilli	1196681751636919918119719617816	0.1)		8131211701751071810 1
Exposure Time (hrś/daý) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalaton Rate (m3/hr) Exposure Time (hrs/day) IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		0.1		18 19 19 19 19 19 19 19 19 19 19 19 19 19
Exposure Time (hrs/daý) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initialiti(Initi(Initi(Initialiti(Initialiti(Initialiti(Initi(Initialiti(Ini	1–365	0.1)))) ())))))))))))))))))))))))))))))))	Based on an estimate of the number of days building homes.	KAN YANA KANA KANA KANA KANA KANA KANA K
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Ininininininininininininininininininini	1196681751636919918119719617816	0.1)		A A A A A A A A A A A A A A A A A A A
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Tof Arborne (Vapor Phase) Chemicals Exposure Time (hrs/day) Inhibition (historical) Inhibition 1–365	0.1)))) ())))))))))))))))))))))))))))))))	Based on an estimate of the number of days building homes.	1 , , , , , , , , ,	
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Infinitial Infinitial nfinitial Infinitia Infinitia Infinitial Infinitia Inf	1 – 365 0 – 18, 150	0.1 }	Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk.	
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Exposure Time (hrs/day) Initial Initial Ini	1 – 365 0 – 18, 150	0.1 	Initialization of the number of days building homes. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil.	1 , , , , , , , ,
Exposure Time (hrs/day) (Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Illininiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	1-365 0-18,150 0-480	0.1 11111111111111111111111111111111111	International Internation Internation International Internation International Internat	1 , , , , , , , ,
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24	0.1 180 6300 480 2 8	Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day.	 EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initiality (Initiality) (Initiality) (Initiality) (Initiality) Exposure Frequency (days/year) Dermal Contact with Chemicals In Soils Skin Surface Area (cm2) Ingestion Of Chemicals in Soils Ingestion Rate (mg/day) Inhalation Of Arborne Chemicals Absorbed to Dust Ambient Dust Concertration (kg/m3) Inhalation Rate (m3/hr) Exposure Time (hrs/day)	1-365 0-18,150 0-480 1-24	0.1 180 6300 480 2 8	Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day.	 EPA 1989
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initiality (Initiality) (Initiality) (Initiality) (Initiality) Initiality) (Initiality) (Initiality) (Initiality) (Initiality) Information Rate (m2/ Information Rate (m2/day) Inhalation Of Arborne Chemicals Absorbed to Dust Ambient Dust Concertration (kg/m3) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation Rate (m3/hr) Exposure Time (hrs/day)	1-365 0-18,150 0-480 1-24	0.1 180 6300 480 2 8	Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day.	 EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initiality (Initiality) (Initiality) (Initiality) (Initiality) Exposure Frequency (days/year) Dermal Contact with Chemicals In Soils Skin Surface Area (cm2) Ingestion Of Chemicals in Soils Ingestion Rate (mg/day) Inhalation Of Arborne Chemicals Absorbed to Dust Ambient Dust Concertration (kg/m3) Inhalation Rate (m3/hr) Exposure Time (hrs/day)	1-365 0-18,150 0-480 1-24	0.1 180 6300 480 2 8 111111111111111111111111111111111	Initialization of the number of days building homes. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day.	EPA 1989
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initiality (Initiality) (Initiality) (Initiality) (Initiality) Initiality) (Initiality) (Initiality) (Initiality) (Initiality) Initiality) (Initiality) (Initiality) (Initiality) (Initiality) Information Rate (mg/day) Inhalation Of Arborne Chemicals Absorbed to Dust Ambient Dust Concentration (kg/m3) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initiality) (Initiality)	1-365 0-18,150 0-480 1-24	0.1 180 6300 480 2 8 111111111111111111111111111111111	Initialization of the number of days building homes. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day.	
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24 1-365	0.1 180 6300 480 2 8 111 1111111111111111111111111111111	Initial Initia	EPA 1989
Exposure Time (hrs/day) Inhalation Of Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Exposure Time (hrs/day) Inhalation (days/year) Dermal Contact with Chemicals In Soils Ingestion Rate (mg/day) Inhalation Of Arborne Chemicals Absorbed to Dust Armbient Dust Concentration (kg/m3) Inhalation Rate (m3/hr) Exposure Time (hrs/day) Inhalation S – Residential Sciencis Tuture Use Exposure Frequency (days/yr) Dermal S – Residential Sciencis In Soils Ingestion S – Residential Sciencis In Soil Skin Surface Area (cm2) Information S – Residential Sciencis In Soil Skin Surface Area (cm2) Information S – Residential Sciencis In Soil Skin Surface Area (cm2) Ingestion Cf Chemicals In Soils and House Dust Ingestion Rate (mg/day)	1-365 0-18,150 0-480 1-24 1-365 0-18,150	0.1 180 6300 480 2 8 111 1111111111111111111111111111111	Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day. Includes spent away from home. Exposure of an adult's arms, hands, legs and head.	EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24 11-24 1111111111111111111111111111	0.1 180 6300 480 2 8 11111111111111111111111111111111	Includes hands, arms, head, neck and portion of trunk. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day. Includes spent away from home. Exposure of an adult's arms, hands, legs and head. Children, 1 – 6 years old.	EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24 1-365 0-18,150	0.1 180 6300 480 2 8 111 1111111111111111111111111111111	Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day. Includes spent away from home. Exposure of an adult's arms, hands, legs and head.	EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24 11-24 1111111111111111111111111111	0.1 180 6300 480 2 8 11111111111111111111111111111111	Includes hands, arms, head, neck and portion of trunk. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day. Includes spent away from home. Exposure of an adult's arms, hands, legs and head. Children, 1 – 6 years old.	EPA 1989
Exposure Time (hrs/day) Inhalation Cf Arborne (Vapor Phase) Chemicals Inhalation Rate (m3/hr) Exposure Time (hrs/day) Initial Initial Init	1-365 0-18,150 0-480 1-24 11-24 1111111111111111111111111111	0.1 180 6300 480 2 8 11111111111111111111111111111111	Includes hands, arms, head, neck and portion of trunk. Based on an estimate of the number of days building homes. Includes hands, arms, head, neck and portion of trunk. Based upon extensive contact with the soil. Based upon moderate exertion. Based upon an eight hour work day. Includes spent away from home. Exposure of an adult's arms, hands, legs and head. Children, 1 – 6 years old.	EPA 1985

TABLE 2-11

SUMMARY OF CANCER AND NON-CANCER RISK ESTIMATES FOR SCENARIO 1 - TRESPASSING (CURRENT)

Pathway	Cancer Risks	Non-Cancer Hazard Indices
Incidental Ingestion of Soil	4E-07	1E-02
Dermal Contact with Soil	NA	2E-04
Ingestion of Surface Water	2E-06	1E-01
Dermal Contact with Surface Water	7E-08	1E-02
Total	2E-06	1E-01

NA: Not Applicable

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SUMMARY OF CANCER AND NON-CANCER RISK ESTIMATES FOR SCENARIO 2 - COMMERCIAL/INDUSTRIAL (CURRENT)

Pathway	Cancer Risks	Non-Cancer Hazard Indices
Incidental Ingestion of Soil	3E-05	6E-01
Dermal Contact with Soil	5E-05	9E-04
Inhalation of Fugitive Dust	1E-07	2E-01
Total	8E-05	7E-01

SUMMARY OF CANCER AND NON-CANCER RISK ESTIMATES FOR SCENARIO 3 - RESIDENTIAL (CURRENT)

Pathway	Cancer Risks	Non-Cancer Hazard Indices
Ingestion of Ground Water	8E-03 ^A 4E-02 ^B	2E+02 ^A 6E+02 ^B
Inhalation of Airborne Chemicals from Ground Water	4E-04 ^A NA ^B	NA ^{A,B}
Dermal Contact with Ground Water	1E-05 ^a 2E-05 ^b	3E-01 ^A 9E-01 ^B
Total	8E-03 ^A 4E-02 ^B	2E+02 ^A 6E+02 ^B

A

Deep Ground Water Shallow Ground Water B

SUMMARY OF CANCER AND NON-CANCER RISK ESTIMATES FOR SCENARIO 4 - CONSTRUCTION (FUTURE)

Pathway	Cancer Risks	Non-Cancer Hazard Indices
Incidental Ingestion of Soil	1E-06	9E-01
Dermal Contact with Soil	NA	NA
Inhalation of Fugitive Dust	7E-08	1E-01
Total	1E-06	1E+00

SUMMARY OF CANCER AND NON-CANCER RISK ESTIMATES FOR SCENARIO 5 - RESIDENTIAL (FUTURE)

Pathway		Cancer Risks	Non-Cancer Hazard Indices
Incidental Ingestion of Soil Child Adult		9E-05 5E-05	3E+00 3E-01
Dermal Contact with Soil Child Adult		NA 1E-04	NA 2E-03
Inhalation of Fugitive Dust Child Adult		NA 4E-08	NA 8E-02
Total	Child Adult	9E-05 2E-04	3E+00 4E-01

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lation	Exposure Route, Medium and Exposure Point	for Evaluation?	Reason for Selection or Exclusion	Risk	Ratio
Current Land Use					
				•	
Residents	Ingestion of ground water from private wells (shallow)	Yes	Impacts on monitoring wells to south of site	4E-02	6E+0
	Ingestion of ground water from private wells (deep)	Yes	Impacts on monitoring wells to south of site	8E03	2E+0
Residents	Dermal contact with well water (shallow)	Yes	Impacts on monitoring wells to south of site	2E05	9E-0
	Dermal contact with well water (deep)	Yes	Impacts on monitoring wells to south of site	1E-05	3E-0
Residents	Inhalation of vapors from private well water (shallow)	Yes	Impacts on monitoring wells to south of site	NA	NA
	Inhalation of vapors from private well water (deep)	Yes	impacts on monitoring wells to south of site	4E-04	NA
Residents	Ingestion of surface water on site	No	Adressed in trespasser scenario	NA	NA
Residents	Dermal contact with solls	Νο	No site related activities at residences	NA	NA
Residents	Inhalation of fugitive dusts	No	No site related activities at residences	NA	NA
Residents	Ingestion of soils on site	Νο	No site related activities at residences	NA	NA
Trespasser	Ingestion of soils on site	Yes	On site solls are accesible outside fence	4E-07	1E-0
Trespasser	Dermal contact with soils	Yes	On site solls are accesible outside fence	NA	2E-0
Trespasser	Dermal contact with surface water	Yes	On site surface water exist outside fence	7E-08	1E-0
Trespasser	Ingestion of surface water	Yes	On site surface water exist outside fence	2E-06	1E-0
Trespasser	Ingestion of sediments	No	Contaminant concentrations not materially different from surface soil	NA	NA
Trespasser	Inhalation of fugitive dusts	No	Site vegetated outside fenced in areas	NA	NA
Industrial Workers	Ingestion of ground water from local wells	No	Well restriction area	NA	NA
Industrial Workers	Ingestion of soils on site	Yes	Incidental ingestion expected	3E-05	6E-0
Industrial Workers	Dermal contact with soils	Yes	Contact with soils expected during industrial use	5E-05	9E-0
Industrial Workers	Inhalation of fugitive dusts	Yes	Generation of fugitive dust expected during Industriai use	1E-07	2E-0
Future Land Use					
Residents	 Ingestion of ground water from private				
	wells on the site	No	Well restriction area	NA	NA
Residents	Ingestion of soils on site (child)	Yes	Potential residential use of site	9E-05	3E+0
Residents	Ingestion of soils on site (adult)	Yes	Potential residential use of site	5E-05	3E-0
Residents	Dermal contact with soils	Yes	Potential residential use of site	1E-04	2E0
Residents	Inhalation of fugitive dusts	Yes	Potential residential use of site may produce areas devoid of cover	4E-08	8E-0
Residents	Inhalation of chemicals volatilized from	No	Well restriction area	NA	NA
noondonto	ground water during home use				
Construction Workers	Ingestion of ground water from local wells	No	Well restriction area	NA	NA
Construction Workers	Ingestion of solls on site	Yes	Incidental Ingestion expected	1E-06	9E-(
Construction Workers	Dermal contact with soils	Yes	Contact with soils expected during construction	NA	
Construction Workers	Inhalation of fugitive dusts	Yes	Generation of fugitive dust expected during construction	7E-08	1E0

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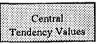
TABLE 2-16 SUMMARY OF EXPOSURE PATHWAYS AND RISKS

SUMMARY OF MOST LIKELY EXPOSURE PARAMETER VALUES FOR PATHWAYS EXCEEDING TARGET RISK VALUES

Scenario	Exposure Route	CR ^A (Units)	SA ^B (cm ²)	ABS ^C	AF ^D (mg/cm ²)	PC ^E (cm/hr)	FI ^F	EF ^G (d/yr)	ED ^H (yr)	ET ¹ (Units)	BW ¹ (kg)
1 ^ĸ	Ingestion of Surface Water	50 (mi/d)	NAL	NA	NA	NA	1	7	6	1 (hr/d)	49
2 ^M	Dermal Contact with Soil	NA	2,000	0.001 (cadmium); 0.006 (PCBs)	0.2	NA		250	45	NA	70
2	Ingestion of Soil	50 (mg/d)	NA	NA	NA	NA	1	250	4.5	NA	70
3 ^N	Ingestion of Ground Water	1.4 (l/d)	NA	NA	NA	NA	1	350	9	NA	70
3	Inhalation of Volatiles from Ground Water	15 (m³/d)	NA	NA	NA	NA	NA	350	9	15 (hr/d)	70
3	Dermal Contact with Ground Water	NA	18,150	NA	NA	8.4E-04	NA	350	9	7 (min/d)	70
4 ⁰	Ingestion of Soil	480	NA	NA	NA	NA	1	90	0.5	NA	70
5 ^p	Dermal Contact with Soil	NA	2,000	0.001 (cadmium); 0.006 (PCBs)	0.2	NA	NA.	150	g	NA	70
5	Ingestion of Soil	100 (mg/d) (child); 50 (mg/d) (adult)	NA	NA	NA	NA	1	150	6 (child); 9 (adult)	NA	15 (child); 70 (adult)

Α CR: Contact Rate

- B SA: Surface Area
- С ABS: Absorption Factor
- D AF: Adherence Factor
- Б PC: Permeability Constant



- F FI: Fraction Ingested
- EF: Exposure Frequency G
- H ED: Exposure Duration
- ET: Exposure Time I J
 - BW: Body Weight
- ^K Trespassing (Current)
 - ^L NA: Not Applicable
 - ^M CS: Chemical-Specific
 - ^N Commercial/Industrial (Current)
 - ^o Residential (Current)

^P Construction (Future)

^Q Residential (Future)

UNCERTAINTY ANALYSIS: COMPARISON OF RME AND MLE CANCER RISKS AND HAZARD INDEX RATIOS

		Cance	r Risk	E	Π
Scenario	Primary Route of Exposure	RME ^A	MLE ^B	RME	MLE
1 ^c	Ingestion of Surface Water	2E-06	3E-07	NA ^D	NA
2 ^E	Dermal Contact with Soil	5E-05	4E-08	NA	NA
2	Incidental Ingestion of Soil	3E-05	3E-06	NA	NA
3 ^F	Ingestion of Ground Water Shallow Deep	4E-02 8E-03	9E-03 2E-03	6E+02 2E+02	4E+02 1E+02
3	Dermal Contact with Ground Water Shallow Deep	2E-05 1E-05	4E-06 2E-06	NA NA	NA NA
3	Inhalation of Volatiles from Ground Water Deep	4 E -04	6E-05	NA	NA
4 ^G	Ingestion of Soil	2E-06	3E-07	NA	NA
5 ^H	Dermal Contact with Soil	3E-04	4E-08	NA	NA
5	Ingestion of Soil Adult Child	2E-04 4E-04	3E-06 2E-05	NA 3E+01	NA 7E-01

^A RME: Reasonably Maximum Exposure

^B MLE: Most Likely Exposure

^c Trespassing (Current)

^D NA: Not Applicable

^E Commercial/Industrial (Current)

F Residential (Current)

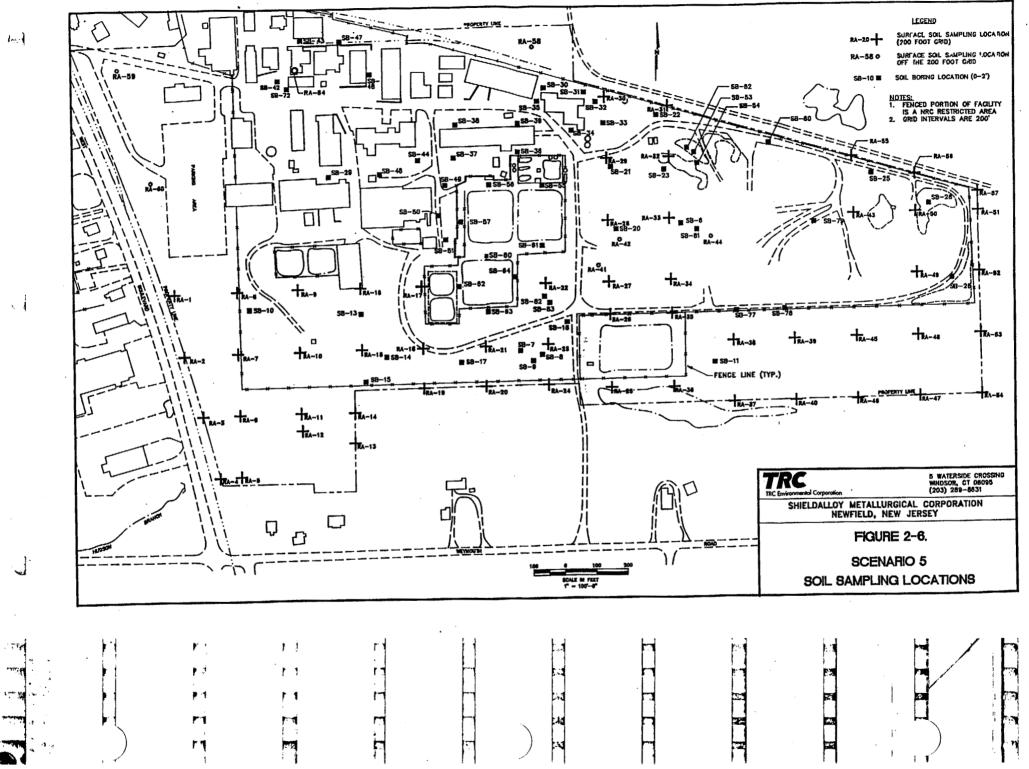
^G Construction (Future)

^H Residential (Future)

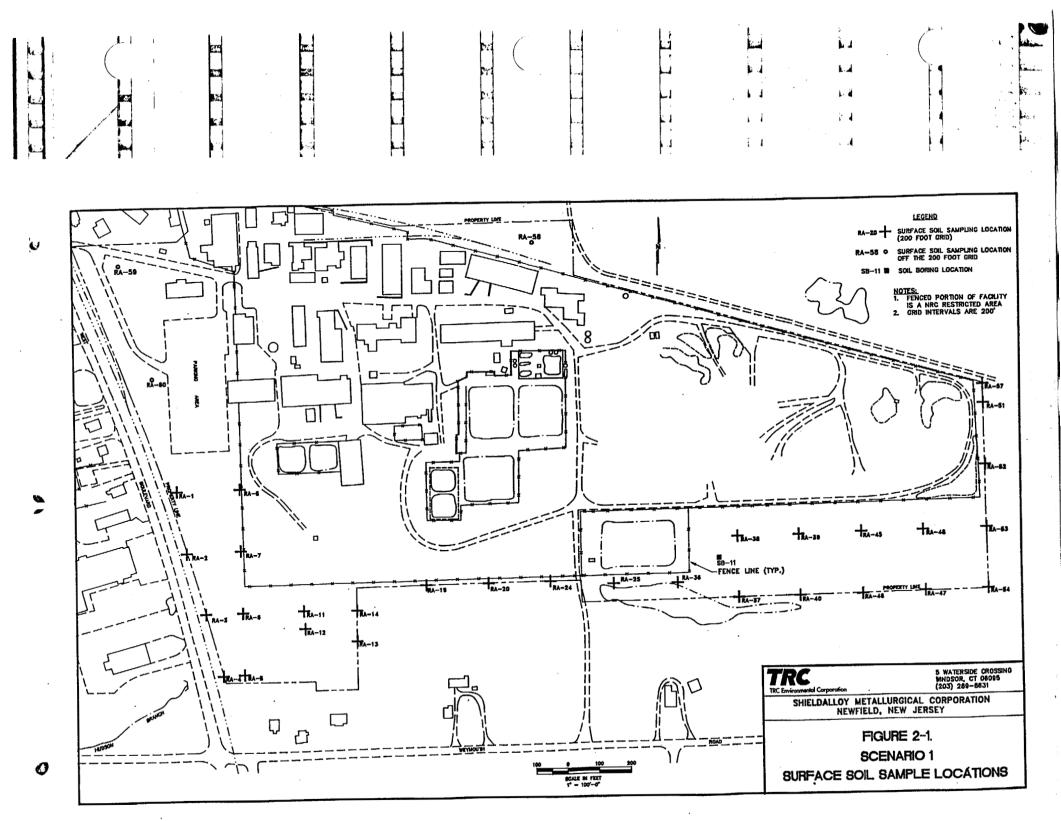
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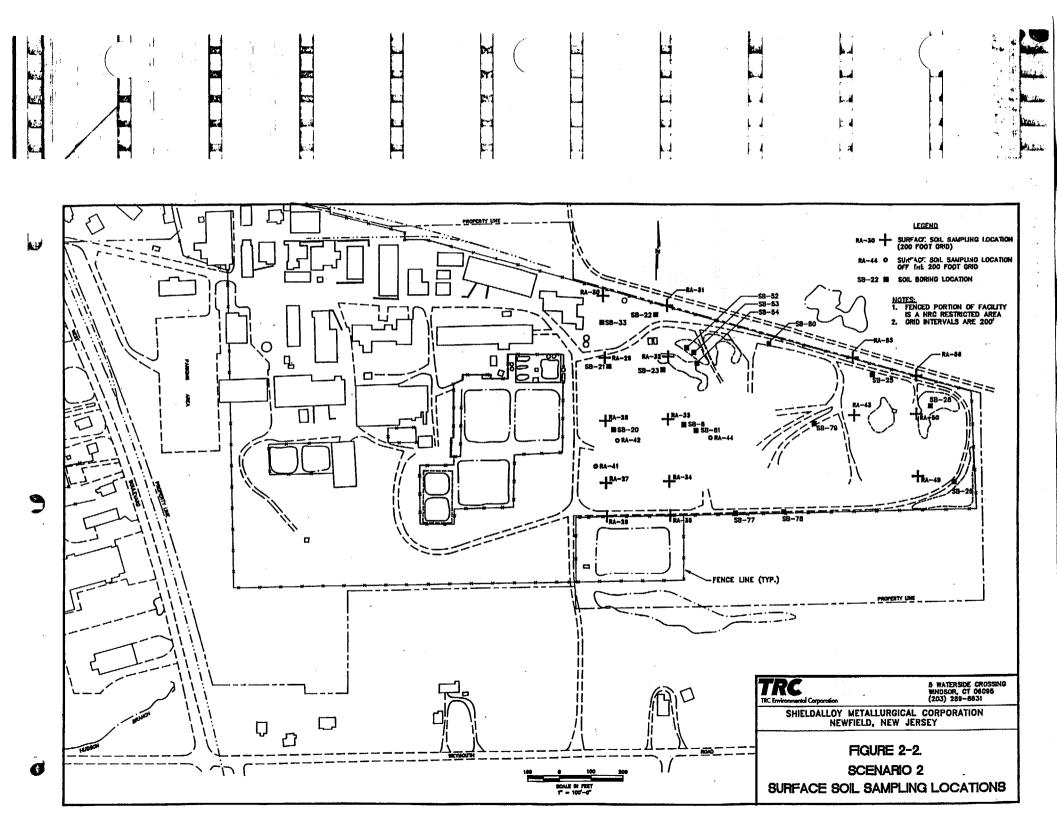
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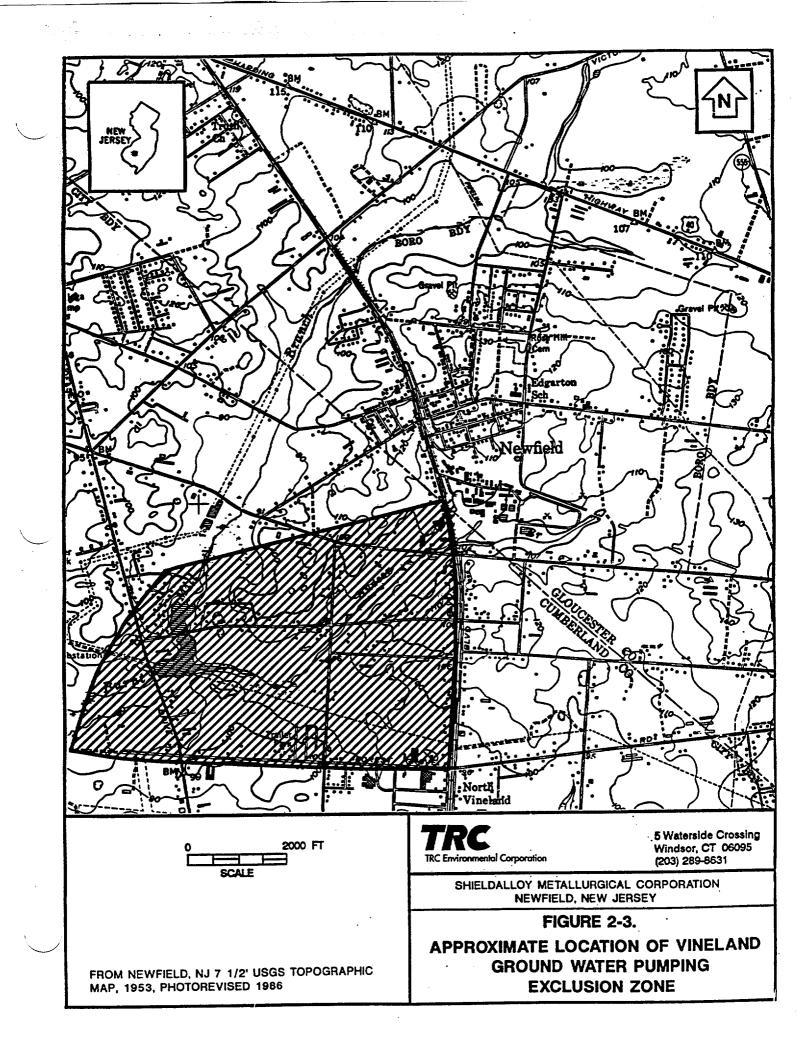
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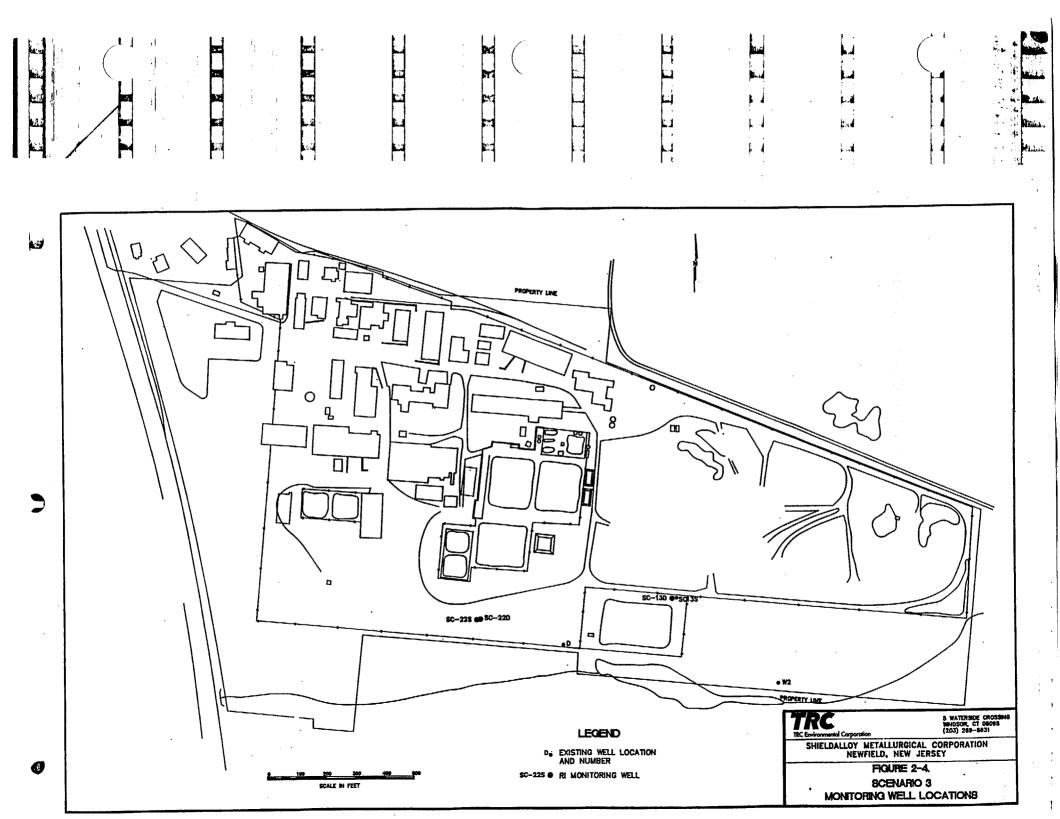


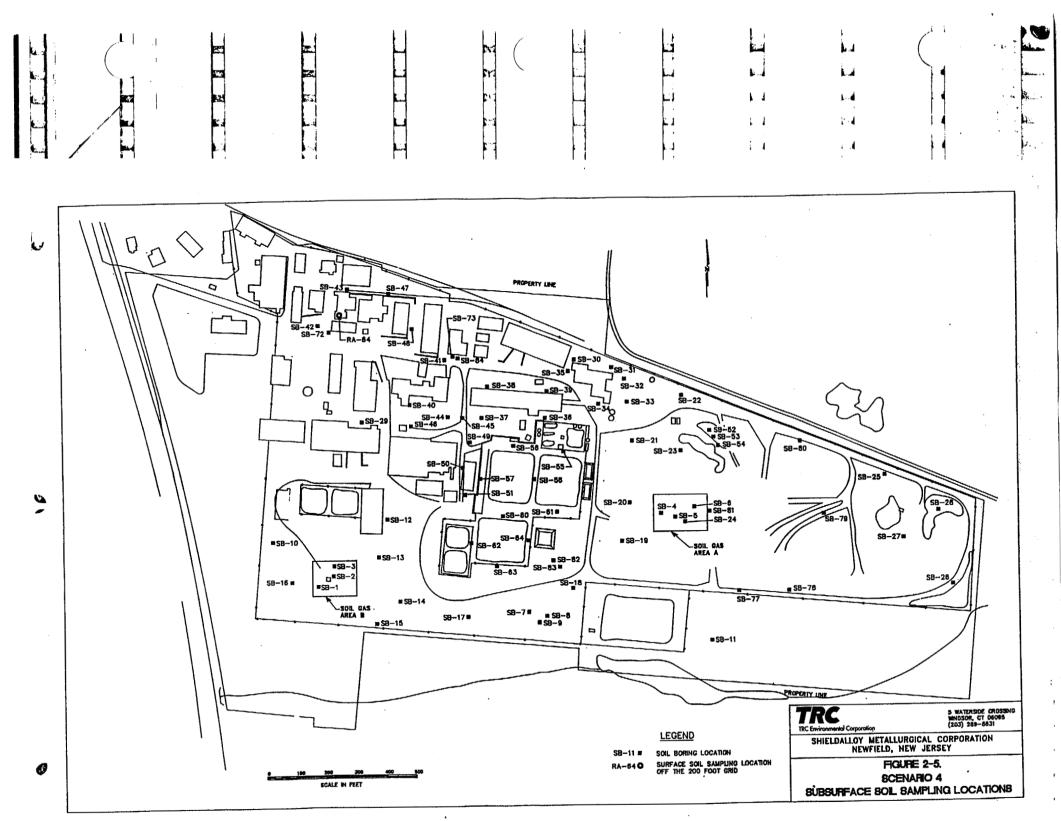
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APPENDIX A

RISK ASSESSMENT METHODS

APPENDIX A

RISK ASSESSMENT METHODS

Five exposure scenarios will be included in the risk assessment for the Shieldalloy Metallurgical Corp. (SMC) Site. 1) A current use trespasser scenario will involve exposures to the site outside the restricted industrial area as it currently exists, 2) a current industrial use scenario will involve exposures to the site within the restricted industrial area and specifically addressing the undeveloped portion of the site due to the unvegetated and unpaved nature of this area, 3) a current residential use scenario involving exposure due to use of private wells outside the well restriction area, 4) future development of the site (construction scenario) and 5) a future residential use of the site property. The scenarios are briefly described below. Model equations and parameter values for each exposure pathway are detailed on the following pages.

Children may trespass on the unrestricted portion of the site as it currently exists, and thereby play with contaminated soils and stream water and/or sediments from the Hudson Branch. As a result, they may receive dermal and ingestion exposures to contaminants in soil and water. Based on information during the field investigation it is assumed that children trespass onto the site on an infrequent basis (30 days/year), that children are unlikely to enter this area of the site on a regular basis before the age of 9 due to its distance from residences, and regular exposures are not expected beyond the age of 18 due to changes in the use of recreational time.

SMC is currently an active industrial facility. The active industrial portion of the property is covered with buildings and pavement. Piles of material are stored on an undeveloped portion of the site. This area is devoid of any type of ground cover (e.g. vegetation, pavement). As a result, SMC employees who load/unload material in this area may be exposed to site

contaminants following inhalation of fugitive dusts, dermal contact with soil or incidental ingestion of soil.

Current plume migration has resulted in restriction of ground water as a potable source with the exception of homes to the south of the site. Thus, a current residential use scenario will be addressed to evaluate exposure to contaminants in ground water (i.e., ingestion, inhalation of airborne volatiles and dermal exposure).

In the future, construction workers may be involved in developing the site (e.g. building homes). Through excavation and site preparation activities, they could receive extensive inhalation exposure to contaminants in dust, as well as dermal and ingestion exposures to contaminants in subsurface soil. It is assumed that excavation and site preparation activities would last for a 6 month period, and that no remediation of contaminants prior to the construction or residential scenarios would occur.

Also in the future, children and adults may occupy residences on the site. The relevant exposure pathways are indoor and outdoor ingestion of dust/soil (this will be addressed for 0-6 year old children, and for adults), outdoor dermal exposure to soil contaminants (adults) and outdoor inhalation of contaminants in dust (adults). For children, parameter values for 0-6 year old children were selected, and exposure was assumed to take place over 6 years. For adults, exposure is assumed to occur for 30 years.

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SCENARIO 1 - TRESPASSING (CURRENT)

DERMAL CONTACT WITH CHEMICALS IN SOIL

Equation:

Absorbed Dose
$$(mg/kg-day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical of Concentration in Soil (mg/kg)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)
SA	=	Skin Surface Area Available for Contact (cm ² /event)
AF	=	Soil to Skin Adherence Factor (mg/cm ²)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

CS	=	Concentration of chemicals in soil
SA	=	8,600 cm ² , based upon exposed arms, hands and legs.
AF	=	1.45 mg/cm ² , based upon commercial potting soil adherence to hands
ABS	=	0.01 for cadmium; 0.06 for PCBs (EPA, 1992b)
EF	=	30 days/year (NJDEPE, 1994)
ED	=	9 years
BW	=	49 kg
AT	=	3,285 days for non-cancer risks
		25,550 days for cancer risks

INGESTION OF CHEMICALS IN SOIL

Equation:

Intake
$$(mg/kg-day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg soil/day)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)

FI	=	Fraction	Ingested	from	Contaminated	Source	(unitless)

- Exposure Frequency (days/years) Exposure Duration (years) EF =
- ED =
- Body Weight (kg) BW =
- AT Averaging Time (period over which exposure is averaged - days) =

Specific Parameter Values:

CS	_	Chemical concentration in soil
IR	=	100 mg/day, which is typical for this age group
FI	=	1.0, assuming 100% of soil ingestion occurs on-site on days in which
		children enter the site
EF	=	30 days/year (NJDEPE, 1994)
ED	=	9 years
BW	=	49 kg
AT	=	3,285 days for non-cancer risks
		25,550 days for cancer risks

DERMAL CONTACT WITH CHEMICALS IN SURFACE WATER

Equation:

Absorbed Dose
$$(mg/kg-day) = \frac{CW \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

where:

CW	=	Chemical Concentration in Water (mg/liter)
SA	=	Skin Surface Area Available for Contact (cm ²)
PC	=	Chemical-specific Dermal Permeability Constant (cm/hr)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/years)
ED	=	Exposure Duration (years)
CF	=	Volumetric Conversion Factor for Water (1 liter/1000 cm ³)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

SA	==	8,600 cm ² based upon exposed arms, hands and legs
PC		8.4 E-4 cm/hour based upon penetration of water across skin (EPA, 1989)
ET	=	4 hr/day; assumes clothing remains wet for this time period
EF		30 days/year (NJDEPE, 1994)
ED	=	9 years

BW = 49 kg for children 9-18 years old AT = 3,285 and 25,550 days for non-cancer and cancer risks, respectively

INGESTION OF CHEMICALS IN SURFACE WATER

Equation:

Intake
$$(mg/kg-day) = \frac{CW \times CR \times ET \times EF \times ED}{BW \times AT}$$

where:

CW	=	Chemical Concentration in Water (mg/litter)
CR	=	Contact Rate (liters/hour)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

CR =	50 ml/hour (H	EPA 1989)
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- ET = 1 hour/day
- EF = 30 days/year (NJDEPE, 1994)
- ED = 9 years
- BW = 49 kg for children 9-18 years old
- AT = 3,285 and 25,550 days for non-cancer and cancer risks, respectively

SCENARIO 2 - INDUSTRIAL (CURRENT)

DERMAL CONTACT WITH CHEMICALS IN SOIL

Equation:

Absorbed Dose
$$(mg/kg-day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)
SA	=	Skin Surface Area Available for Contact (cm ² /event)
AF	=	Soil to Skin Adherence Factor (mg/cm ²)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

SA		$6,300 \text{ cm}^2$ for hands, forearms, upper arms, head, neck and a portion of the trunk
AF	=	1.45 mg/cm^2
ABS	=	0.01 for cadmium; 0.06 for PCBs (EPA, 1992b)
EF	=	250 days/year
ED	=	25 years
BW	=	70 kg
AT	=	9,125 days for non-cancer risks
		25,550 days for cancer risks

• INGESTION OF CHEMICALS IN SOIL

Equation:

Intake
$$(mg/kg-day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg soil/day)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)

SCENARIO 3 - RESIDENTIAL (CURRENT)

DERMAL CONTACT WITH CHEMICALS IN WATER

Equation:

Absorbed Dose
$$(mg/kg-day) = \frac{CW \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

where:

CW	=	Chemical Concentration in Water (mg/liter)
SA	=	Skin Surface Area Available for Contact (cm ²)
PC	=	Chemical-specific Dermal Permeability Constant (cm/hr)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
CF	=	Volumetric Conversion Factor for Water (1 liter/1000 cm ³)
BW	=	Body Weight (kg)
AT	==	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

SA	=	18,150 cm ² (EPA, 1990) for total body exposure
PC	=	8.4 E-4 cm/hour, based upon penetration of water across skin (EPA,
		1989)
ET	=	12 minutes/day, bathing and showering time
EF	=	350 days/year
ED	=	30 years
CF	=	1 liter/1000 cm ³
BW	. <u></u>	70 kg
AT	=	10,950 and 25,550 days for non-cancer and cancer risks, respectively

INGESTION OF CHEMICALS IN DRINKING WATER

Equation:

Intake
$$(mg/kg-day) = \frac{CW \times IR \times EF \times ED}{BW \times AT}$$

where:

CW	=	Chemical Concentration in Water (mg/liter)
IR	=	Ingestion Rate (liters/day)
EF	=	Exposure Frequency (days/years)

ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

IR	=	2.0 liters/day (EPA, 1990)
EF	=	350 days/year
ED	=	30 years
BW	=	70 kg
AT	=	10,950 and 25,550 days for non-cancer and cancer risks, respectively

INHALATION OF AIRBORNE (VAPOR PHASE) CHEMICALS

Equation:

Intake
$$(mg/kg-day) = \frac{CR \times IR \times ET \times EF \times ED}{BW \times AT}$$

where:

CA	=	Contaminant Concentration in Air (mg/m ³) - derived from volatilization
		during showering (Andelman, 1985)
IR	==	Inhalation Rate (m ³ /hour)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/years)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

IR	= .	0.83 m ³ /hour (light activity assumed) (EPA, 1990)
ET	=	24 hours/day
EF	=	350 days/year
ED	=	30 years
BW	=	70 kg
AT	=	10,950 and 25,550 days for non-cancer and cancer risks, respectively

SCENARIO 4 - CONSTRUCTION (FUTURE)

DERMAL CONTACT WITH CHEMICALS IN SOIL

Equation:

Absorbed Dose
$$(mg/kg-day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS	_	Chemical Concentration in Soil (mg/kg)
CF	= .	Conversion Factor (10 ⁻⁶ kg/mg)
SA	=	Skin Surface Area Available for Contact (cm ² /event)
AF	=	Soil to Skin Adherence Factor (mg/cm ²)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

SA	=	$6,300 \text{ cm}^2$ for hands, forearms, upper arms, head, neck and a portion of the trunk
AF	=	1.45 mg/cm^2
ABS	=	0.01 for cadmium; 0.06 for PCBs (EPA, 1992b)
EF	=	180 days/year
ED	=	1 year
BW	=	70 kg
AT	=	180 days for non-cancer risks
		25,550 days for cancer risks

INGESTION OF CHEMICALS IN SOIL

Equation:

Intake
$$(mg/kg-day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg soil/day)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)

FI = Fraction	Ingested from	Contaminated	Source ((unitless)
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- EF = Exposure Frequency (days/years)
- ED = Exposure Duration (years)
- BW = Body Weight (kg)
- AT = Averaging Time (period over which exposure is averaged days)

Specific Parameter Values:

IR	=	480 mg/day, based upon extensive contact with soil
FI	=	1.0; all soil ingested comes from on-site sources
EF	=	180 days/year
ED	. =	1 year
BW	=	70 kg
AT	=	180 days for non-cancer risks
		25,550 days for cancer risks

INHALATION OF AIRBORNE CHEMICALS ADSORBED TO DUST

Equation:

Intake $(mg/kg-day) = \frac{CD \times CS \times IR \times ET \times EF \times ED}{BW \times AT}$

where:

CD	=	Ambient Dust Concentration
CS	=	Contaminant Concentration in Soil (mg/kg)
IR	=	Inhalation Rate (m ³ /hour)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BŴ	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

IR	=	2 m^3 /hour for adults under moderate exertion
ET	æ	8 hour/day
EF	=	180 days/year
ED	=	1 year
BW	=	70 kg
AT	=	180 days for non-cancer risks
		25,550 days for cancer risks

SCENARIO 5 - RESIDENTIAL (FUTURE)

DERMAL CONTACT WITH CHEMICALS IN SOIL

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Equation:

Absorbed Dose $(mg/kg-day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$

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where:

CS	=	Chemical Concentration in Soil (mg/kg)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)
SA	=	Skin Surface Area Available for Contact (cm ² /event)
AF		Soil to Skin Adherence Factor (mg/cm ²)
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

SA	=	9,440 cm ² for adults based upon exposure to the arms, hands and legs
AF	=	1.45 mg/cm ² based upon commercial potting soil adherence to hands
ABS	=	0.01 for cadmium; 0.06 for PCBs (EPA, 1992b)
EF	Ξ.	350 days/year
ED	=	30 years for adults
BW	=	70 kg for adults
AT	=	10,950 and 25,550 days for non-cancer and cancer risks, respectively

INGESTION OF CHEMICALS IN SOIL AND HOUSE DUST

Equation:

Intake
$$(mg/kg-day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg soil/day)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)
FI	=	Fraction Ingested from Contaminated Source (unitless)
EF	=	Exposure Frequency (days/years)

ED =	Exposure Duration	on (years)
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BW = Body Weight (kg)

AT = Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

IR	=	100 mg/day for adults; 200 mg/day for children ages 1-6 years		
FI	=	1.0, all ingested soil and dust is contaminated		
EF	=	350 days/year		
ED	=	30 years for adults, 6 years for children		
BW	=	70 kg for adults, 14.5 kg for children 0-6 years old		
AT	=	2,190 and 25,550 days for children non-cancer and cancer risks, respectively 10,950 and 25,550 days for adult non-cancer and cancer risks, respectively		

OUTDOOR INHALATION OF AIRBORNE CHEMICALS ADSORBED TO DUST

Equation:

Intake $(mg/kg-day) = \frac{CD \times CS \times IR \times ET \times EF \times ED}{BW \times AT}$

where:

CD	=	Ambient Dust Concentration
CS	=	Contaminant Concentration in Soil (mg/kg)
IR	=	Inhalation Rate (m ³ /hour)
ET	=	Exposure Time (hours/day)
EF	=	Exposure Frequency (days/year)
ED	=	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

Specific Parameter Values:

IR	=	0.83 m ³ /hour for adults
ET	=	4 hours/day, time spent outdoors
EF		350 days/year
ED	=	30 years for adults
BW	=	70 kg for adults
AT	=	10,950 and 25,550 days for non-cancer and cancer risks, respectively

EXPOSURE POINT MODELS

Model Estimates of Fugitive Dust Generation

Emissions estimates were calculated for activities resulting in soil disturbance, such as heavy equipment operation and wind erosion which may occur over the site during the construction scenario, or simple wind erosion which may occur in the future residential use scenario if areas are left unvegetated.

The potentially significant components of fugitive dust at this site are:

- 1) wind erosion of dust from surfaces without vegetative cover, and
- 2) dust from loading/unloading of excavated soil.

Fugitive dust from wind erosion over exposed soil and from loading/unloading activities was calculated using (EPA, AP-42, 1988). Fugitive dust generation tables showing all model inputs, are presented in Table A-2. The data are summarized in Table A-1. The models are described below.

$$CE = a \cdot I \cdot K \cdot C \cdot L \cdot V \cdot A \cdot T$$

where:

E	=	Emission rate (kg/day)
a	=	Fraction of total wind losses (wind erosion of soil) that remain suspended
I	=	Soil erodibility
С	=	Climatic factor
Κ	=	Soil roughness factor
L	=	Field length factor
\mathbf{V}^{*}	=	Vegetative cover factor
Α	=	Area of the site
Т	=	Time conversion factor

Most of these values are specified in USEPA (1988) for worst-case treatments. The climatic factor is read from a map and multiplied by .01 as specified. The variables a and I are determined based on-site soil characteristics. The following values were used:

a	=	0.01
Ι	=	134 tons acre ⁻¹ yr ⁻¹
Κ	=	1 (worst-case for flat terrain)
v	=	1 (no vegetative cover-worst case)
L	=	.7
С	=	0.06
А	=	30 acres (Scenario 2), 60 acres (Scenario 4), 2 acres (Scenario 5)
Т	=	1 yr/365 days

The wind erosion emission rate is presented in Table A-1.

The second component is due to loading/unloading of soils due to excavation activities and can be accounted for by:

$$E = \frac{K \cdot (.0016) \cdot (U/2.2)^{1.3}}{(M/S)^{1.4}}$$

and

$$E_{ed} = V \cdot D \cdot E/T$$

where:

Ε	=	Emission factor due to loading/dumping (kg/Mg)
k	=	Particle size multiplier
U	=	Mean wind speed (m/s)
Μ		Soil moisture (%)
\mathbf{E}_{ed}	`• =	Emission rate due to loading/dumping (kg/day)
V	=	Volume of soil excavated (m ³)
D	=	Density of soil (Mg/m ³)
Т	=	Time conversion factor (days of excavation)

Using conservative assumptions and appropriate guidelines (EPA, AP-42, 1988):

k	Ξ	.74
U	=	4.56 m/s
Μ	=	5%
V	=	3,900 m ³
D	=	1.5 Mg/m ³
Т	= .	365 days

The emissions due to loading/dumping are presented in Table A-1.

Total fugitive emissions (from wind activity and loading/dumping) are also presented in Table A-1.

The dust concentration on-site is calculated by:

$$Cs = \frac{E}{w \cdot W \cdot H} \cdot C_f$$

where:

Cs = Dust concentration on-site (mg/m³)

Ε	=	Total emission rate (kg/day)
w	=	Wind speed = 4.56 m/s
W	=	Width (entire site) = 304.8 m (Scenarios 2 and 4), 89.9 m (Scenario 5)
H	÷	Breathing height $= 2 \text{ m}$
C _f	=	Factors for converting from days to seconds and from kg to mg

The third component is emissions due to vehicular traffic and are estimated by (EPA, 1988):

$$E = [1.7K (\frac{S}{12}) (\frac{S_p}{48}) (\frac{W}{2.7})^{0.7} (\frac{W}{4})^{0.5} (\frac{(365-P)}{365})] D_{y_1}$$

where:

Ε	=	emissions due to vehicular traffic (kg/yr)
Κ	=	particle size multiplier
S	=	silt content of soil (%)
S	=	vehicle speed (km/hr)
w	=	mean number of wheels
р	=	day with > 0.254 mm of precipitation
Ŵ	=	vehicle weight (Mg)
D _v t	==	vehicle miles (km/yr)

Using conservative assumptions and suggested values (EPA, 1988):

K	=	1.0
S	=	28%
S	=	7 km/hr
w	=	6 Mg
p	=	140 km/yr

Total fugitive dust concentrations on-site are shown in Table A-1.

The concentration of contaminant suspended in air is estimated by a simple ratio of contaminant concentration in soil to fugitive dust emissions:

 $A_c = CC \cdot C_s \cdot C_f$

where:

$A_c = Concentration of suspended contaminant (i$	mg/m^3)
CC = Contaminant concentration in soil (mg/kg)	
C_s = Dust concentration on-site (mg/m ³)	
C_f = Conversion factor (kg/mg)	

TABLE A-1

FUGITIVE DUST EMISSION RATES AND AMBIENT CONCENTRATION ESTIMATES

······································	······································	<u></u>	
······	Scenario 2	Scenario 4	Scenario 5
Wind Erosion	4.14 E +00	8.27E+00	2.76E-01
Loading/Unloading	NA	1.36E-02	NA
Unpaved Road	<u>1.02E-02</u>	NA	NA
Total Dust Emission Rate	4.15E+00	8.28E+00	2.76E-01
Dust Concentration (kg/m ³)	1.73E-08	3.46E- 08	3.90E-09
	the second second second second second second second second second second second second second second second s		

DUST EMISSION RATE (kg/day)

TABLE A.1–1 DERMAL CONTACT WITH CHEMICALS IN SOIL SCENARIO 1 – Trespassing (Current)

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		ABSORBED DOSE	CONC.		SKIN SURFACE					BODY		AVG. TIME
CHEMICAL	(NONCANCER)	(CANCER)	IN SOIL	FACTOR	AREA	FACTOR	FACTOR	FREQUENCY	DURATION	WEIGHT	(NONCANCER)	(CANCER)
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(1E-6 kg/mg)	(cm2/event)	(mg/sm2)	(unitiess)	(eventa/year)	(years)	(kg)	(days)	(days)
INORGANICS							1			i		
LUMINUM	NA NA	I NA	4651.87	1E-06	8600	1.45	I NA	30	9	49	3285	2555
NTIMONY	NA NA	Í NA Í	6.12	1E-06	8600	1.45	Í NA	30	9	Í 49	3285	2555
ARSENIC	NA	NA	2.13	1E-06	8600	1.45	I NA	30	9	49	3285	2555
BARIUM	NA	NA	40.92	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
BERYLLIUM	NA	NA	1.66	1E-06	8600	1.45	I NA	30	9	49	3285	2555
CADMIUM	2.3E-07	2.9E-08	1.09	1E-06	8600	1.45	0.01	30	, a	49	3285	2555
CHROMIUM III	NA	NA NA	70.10	1E06	8600	1.45	NA NA	30	9	49	3285	2555
CHROMIUM VI	NA	NA	10.01	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
COBALT	NA	NA	3.82	1E-08	8600	1.45	NA	30	9	49	3285	2555
COPPER	NA	I NA	17.38	1E-08	8600	1.45	NA NA	30	9	49	3285	2555
28AD	NA NA	NA NA	73.80	1E-06	8600	1.45	NA	30	9	49	3285	2555
			209.06				NA	30	9	•	3285	2555
MANGANESE	NA	NA NA		1E-06	8600	1.45				49	• • • • • • • •	
MERCURY	NA	NA NA	0.21	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
NICKEL	NA	NA NA	53.48	1E-06	8600	1.45	I NA	30	9	49	3285	2555
SELENIUM	NA	NA NA	0.53	1E-08	8600	1.45	NA	30	9	49	3285	2555
SILVER	NA	NA NA	1.11	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
VANADIUM	NA	NA NA	361.69	1E-06	8600	1.45	I NA	30	9	49	3285	2555
ZINC	NA NA	I NA I	77.65	1E-06	8600	1.45	I NA	30	9	49	3285	2555
BORON	NA	I NA	27.67	1E06	8600	1.45	NA NA	30	9	49	3285	2555
NIOBIUM	NA	I NA	61.14	1E-06	8600	1.45	NA	30	9	49	3285	2555
STRONTIUM	NA	NA	27.86	1E-06	8600	1.45	NA	30	9	49	3285	2555
TITANIUM	NA	NA I	137.38	1E-08	8600	1.45	I NA	30	9	j 49	3285	2555
ZIRCONIUM	NA	NA	NA	1E-08	8600	1.45	NA	30	9	49	3285	2555
		!					1			!	!	
VOLATILE ORGANICS	NA		NA	45 00			I NA			49	1 3285	2555
ACETONE	NA	NA I	NA	1E-06	8600	1.45		30	9			
CAR BON DISULFIDE	NA	NA I	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
2-DICHLORETHENE (total)	NA	NA	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
-BUTANONE	NA	NA NA	NA	1E-08	8800	1.45	NA	30	9		3285	2555
TRICHLOROETHENE	NA	NA	0.0055	1E06	8600	1.45	NA NA	30	9	49	3285	2555
BENZENE	NA	I NA I	NA	1E-08	8600	1.45	. NA	30	9	49	3285	2555
TETRACHLOROETHENE	NA	NA	0.0040	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
TOLUENE	NA	NA	0.0045	1E-06	8600	1.45	I NA	30	9	49	3285	2555
ETHYLBENZENE	NA	NA I	NA	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
XYLENE (total)	NA	Í NA	NA	1E-06	8600	1.45	NA	30	9	j 49	3285	2555
		!					!			!	!	
BASE NEUTRAL / ACIDS									_			
PHENOL	NA	NA I	NA	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
BENZOIC ACID	NA	NA	NA	1E-06	8600	1.45	NA NA	30	9		3285	2555
NAPHTHALENE	NA	NA I	NA	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
-NITROPHENOL	NA	NA NA	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
2,4-DINITROTOLUENE	NA	NA	NA	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
PENTACHLOROPHENOL	NA	I NA	0.0740	1E-06	8600	1.45	I NA	30	9	49	3285	2555
PHENANTHRENE	NA	NA NA	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
ANTHRACENE	NA NA	Í NA Í	NA	1E-06	8800	1.45	NA	30	9	49	3285	2555
DI-a-BUTYLPHALATE	NA	I NA	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
LUORANTHENE	NA	NA I	NA	1E-08	8600	1.45	NA	30	9	49	3285	2555
YRENE	NA	NA	0.0550	1E-06	8600	1.45	NA	30	9	49	3285	2555
BUTYLBENZYLPHTHALATE	NA	NA	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
ENZO(a)ANTHRACENE	NA	NA	NA	1E-08	8600	1,45	NA	30	9	49	3285	2555
CHR YSENE	NA	NA NA	0.3383	1E-08	8600	1.45	NA NA	30	9	49	3285	2555
	NA	NA NA		1E-06	8600		NA	30	9	1 49		
isQ-ETHYLHEXYL)PHTHALATE			NA			1.45					3285	2555
BENZO(b)FLUORANTHENE	NA	NA NA	0,2200	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
ENZO(k)FLUORANTHENE	NA	I NA I	NA	1E-06	8600	1.45	NA	30	9	49	3285	2555
BENZO(*)PYRENE	NA	NA NA	NA	1E-06	8600	1.45	I NA	30	9	49	3285	2555
NDENO(1,2,3-cd)PYRENE	NA	NA	NA	1E-06	8600	1,45	NA NA	30	9		3285	2555
ENZO(g,h,i)PERYLENE	NA	NA NA	NA	1E-06	8600	1.45	NA NA	30	9	49	3285	2555
PCB'S												
AROCLOR -1248	0.0E+00	0.0E+00	NA	1E-06	8600	1.45	0.06	30	9	49	3285	2555
		0.0E+00							_			
AROCLOR -1254	0.0E+00		NA	1E-08	8600	1.45	0.06	30	9	49	3285	2555
ROCLOR 1260	0.0E+00	0.0E+00	NA	1E-06	8600	1.45	0.08	30	9	1 49	3285	2555
		***********************************	111111111111111111111111111111111111111				111165111163111111111111	CT 43 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			111111111111111111111111111111111111111	

TABLE A.1-2 DERMAL CONTACT WITH CHEMICALS IN SURFACE WATER SCENARIO 1 - Trespassing (Current)

		ABSORBED DOSE	CONC.		SKIN SURFACE		EXPOSURE	EXPOSURE	EXPOSURE	BODY	AVG. TIME	AVG.TIME
II CHEMICAL	ABSORBED DOSE (NONCANCER)	(CANCER)	IN WATER	FACTOR	AREA	CONSTANT	TIME	FREQUENCY			(NONCANCER)	
II CHEMICAL		(CANCER) (mg/kg/day)		(1liter/1000cm3)	(cm2)	(cm/br)	(hr/day)	(days/years)	(years)	(kg)	(days)	(days)
	(mg/kg/day)	(mg/kg/day)	(mg/l)	(1000003)	(¢±±2)	(cm/m)	(12/0ay)	(uays/years)	Gentsj		(0893)	
INORGANICS							1					
ALUMINUM	1.7E-03	2.2E-04	44.80	1E-03	6800	8.4E-04	j 4	30	9	49	3285	25550
ANTIMONY	1.4E-06	1.9E-07	0.15	1E-03	6800	8.4E04	4	30	9	49	3285	25550
ARSENIC	3.3E-07	4.3E08	0.035	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
BARIUM	2.8E-06	3.6E-07	0.29	1E-03	6800	8.4E04	4	j 30	9	49	3285	25550
BERYLLIUM	2.4E-07	3.1E08	0.025	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
CADMIUM	7.3E-08	9.4E-09	0.0076	1E03	6800	8.4E-04	4	30	9	49	3285	25550
CHROMIUM III	8.2E-05	1.0E05	8.52	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
CHROMIUM VI	5.2E-10	6.7E-11	0.000054	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
COBALT	6.0E-07	7.7E-08	0.062	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
COPPER	4.1E06	5.3E-07	0.43	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
LEAD	6.2E-07	8.0E-08	0.065	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
MANGANESE	2.5E-05	3.2E-06	2.59	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
MERCURY	2.1E07	2.6E-08	0.021	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
NICKEL	5.9E06	7.6E-07	0.62	1E03	6800	8.4E-04	4	30	9	49	3285	25550
VANADIUM	5.5E05	7.0E-06	5.70	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
ZINC	1.0E05	1.3E-06	1.07	1E03	6800	8.4E-04	4	30	9	49	3285	25550
CYANIDE	1.0E-07	1.3E-08	0.011	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
BORON	7.9E06	1.0E-06	0.83	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
FLUORIDE	9.9E09	1.3E-09	0.0010	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
	ĺ	1				1			1	1	l	1 1
VOLATILE ORGANICS		1 1							1	1		I I
CHLOROMETHANE	7.3E-08	9.4E-09	0.0077	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
1,2-DICHLORETHENE (total)	2.4E-08	3.1E-09	0.0025	1E-03	6800	8.4E04	4	30	9	49	3285	25550
TRICHLOROETHENE	2.7E-08	3.4E-09	0.0028	1E-03	6800	8.4E-04	4	30	9	49	3285	25550
ii I				1			1	l		1	ŧ	
BASE NEUTRAL / ACIDS	ŧ				l	1			1	1	ł	1
DI-s-BUT YLPHALATE	9.6E-09	1.2E-09	0.0010	1E03	6800	8.4E-04	4	30	9	49	3285	25550
bis(2-ETHYLHEXYL)PHTHALATE	1.9E-08	2.5E-09	0.0020	1E-03	6800	8.4E-04	4	30	9	1	3285	25550
											80.000000000000000000000000000000000000	IN THE REAL PROPERTY OF T
NA: Not Applicable												

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TABLE A.1-3 INGESTION OF CHEMICALS IN SOIL SCENARIO 1 - Trespassing (Current)

	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	INTAKE	CONC IN	CONVERSION	INGESTION	EXPOSURE	EXPOSURE	BODY	. AVO. TIME	AVG. TIMB
CHEMICAL	(NONCANCER)	(CANCER)	SOL	FACTOR	RATE		DURATION		(NONCANCER)	
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(kg/mg)	(mg soil/day)	(days/year)	(years)	(ig)	(days)	(days)
INORGANICS									 	
ALUMINUM	7.8E-04	1.0E-04	4651.87	1E-06	100	30	9	49	3285	25550
ANTIMONY	1.0E-06	1.3E-07	6.12	1E-06	100	30	9	49	3285	25550
ARSENIC	3.6E-07	4.6E-08	2.13	1E-06	100	30	. Š	49	3285	25550
BARIUM	6.9E-06	8.8E07	40.92	1E-06	100	30	ี้ 9	49	3285	25550
BERYLLIUM	2.8E07	3.6E-08	1.68	1E-08	100	30	9	49	3285	25550
CADMIUM	1.8E-07	2.4E-08	1.09	1E06	100	30	9	49	3285	25550
CHROMIUM III	1.2E-05	1.5E-06	70.10	1E-08	100	30	9	49	3285	25550
CHROMIUM VI	1.7E06	2.2E-07	10.01	1E-06	100	30	9	49	3285	25550
COBALT	6.4E07	8.2E-08	3.82	1E-06	100	30	9	49	3285	25550
COPPER	2.9E-06	3.7E-07	17.38	1E08	100	30	9	49	3285	25550
LEAD	1.2E-05	1.6E-08	j 73.80	1E-08	100	30	9	49	3265	25550
MANGANESE	3.5E-05	4.5E-08	209.06	1E-06	100	30	9	49	3285	25550
MERCURY	3.5E-08	4.5E09	0.21	1E-06	100	30	9	49	3285	25550
NICKEL	9.0E-06	1.2E06	53.48	1E06	100	30	9	49	3285	25550
SELENIUM	8.9E-08	1.1E-08	0.53	1E-06	100	30	9	49	3285	25550
SILVER	1.9E-07	2.4E-08	1.11	1E-06	100	30	9	49	3285	25550
VANADIUM	6.1E05	7.8E-06	361.69	1E-06	100	30	9	49	3285	25550
ZINC	1.3E05	1.7E-06	77.65	1E-06	100	30	9	49	3285	25550
BORON	4.6E-06	6.0E07	27.67	1E-06	100	30	9	49	3285	25550
NIOBIUM	1.0E-05	1.3E-06	61.14	1E06	100	30	9	49	3285	25550
STRONTIUM	4.7E-06	6.0E07	27.86	1E06	100	30	9	49	3285	25550
TITANIUM	2.3E-05	3.0E-06	137.38	1E-08	100	30	9	49	3285	25550
ZIRCONIUM	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
VOLATILE ORGANICS	0.05.00	0.05.00		45.00						
ACETONE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
CARBON DISULFIDE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
1,2-DICHLORETHENE (total)	0.0E+00 0.0E+00	0.0E+00 0.0E+00		1E-08 1E-08	100	30 30	9 9	49 49	3285	25550 25550
2-BUTANONE	9.2E-10		0.0055			30			3285	
TRICHLOROETHENE BENZENE	0.0E+00	1.2E-10 0.0E+00		1E-06 1E-06	100 100	30	9 9	49 49	3265	25550 25550
TETRACHLOROBTHENE	6.7E-10	8.6E-11	0.0040	1E-06	100	30	9	49	3285	25550
TOLUENE	7.5E-10	9.6E-11	0.0045	1E-06	100	30	9	49	3285	25550
ETHYLBENZENE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
XYLENE (total)	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
BASE NEUTRAL / ACIDS										
PHENOL	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
BENZOIC ACID	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
NAPHTHALENE	0.0E+00	0.0E+00		1E-08	100	30	9	49	3285	25550
4-NITROPHENOL	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
24-DINITROTOLUENE	0.0E+00	0.0E+00		1E06	100	30	9	49	3285	25550
PENTACHLOROPHENOL	1.2E-08	1.6E-09	0.0740	1E06	100	30	9	49	3285	25550
PHENANTHRENE	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
ANTHRACENE	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
DI-a-BUTYLPHALATE	0.0E+00		NA	1E-06	100	30	9	49	3285	25550
FLUORANTHENE	0.0E+00	0.0E+00	NA	1E-06	100	30	9	49	3285	25550
PYRENE	9.2E09	1.2E09	0.0550	1E06	100	. 30	9	49	3285	25550
BUTYLBENZYLPHTHALATE	0.0E+00	0.0E+00		1E06	100	30	9	49	3285	25550
BENZO(a)ANTHRACENE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
CHRYSENE	5.7E-08	7.3E-09	0.3383	1E-08	100	30	9	49	3265	25550
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
BENZO(6)FLUORANTHENE	3.7E-08	4.7E09	0.2200	1E-06	100	30	9	49	3285	25550
BENZO(L)FLUORANTHENB	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
BENZO(a)PYRENE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
INDENO(1,2,3-cd)PYRENE	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
BENZO(g, h, i)PER YLENE	0.0E+00	0.0E+00	NA	1E06	100	30	9	49	3285	25550
PCB'S										
AROCLOR-1248	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
								40	0000	
AROCLOR-1254	0.0E+00	0.0E+00		1E-06	100	30	9	49	3285	25550
AROCLOR - 1254 AROCLOR - 1260	0.0E+00	0.0E+00	NA	1E-08	100	30		49	3295	i 25550 i

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TABLE A.1-4 INGESTION OF CHEMICALS IN SURFACE WATER SCENARIO 1 - Trespassing (Current)

INTAKEINTAKEINTAKECONC. INCONTACTEXPOSUREEXPOSUREEXPOSUREBODYAVG. TIMEAVG.CHEMICAL(NONCANCER)(CANCER)WATERRATETIMEFREQUENCYDURATIONWEIGHT(NONCANCER)(CAN(mg/kg/day)(mg/kg/day)(mg/L)(ml/hr)(hr/day)(days/year)(years)(kg)(days)(days)INORGANICSALUMINUM3.8E-034.8E-0444.800.0513094932852ANTIMONY1.3E-051.6E-060.150.0513094932852	(NONCANCER)	
(mg/kg/day) (mg/kg/day) (mg/L) (ml/hr) (hr/day) (days/year) (years) (kg) (days) (days) INORGANICS		
INORGANICS		CHEMICAL
ALUMINUM 3.8E-03 4.8E-04 44.80 0.05 1 30 9 49 3285 2 ANTIMONY 1.3E-05 1.6E-06 0.15 0.05 1 30 9 49 3285 2	(mg/kg/day)	
ANTIMONY 1.3E-05 1.6E-06 0.15 0.05 1 30 9 49 3285 2		INORGANICS
	3.8E-03	UMINUM
	1.3E-05	TIMONY
ARSENIC 2.9E-06 3.7E-07 0.035 0.05 1 30 9 49 3285 2	2.9E-06 j	SENIC
BARIUM 2.4E-05 3.1E-06 0.29 0.05 1 30 9 49 3285 2	2.4E-05	RIUM
3285 2 3285 2 3285 3285 3285 3285 3285 3	2.1E-06	RYLLIUM
CADMIUM 6.4E-07 8.2E-08 0.0076 0.05 1 30 9 49 3285 2	6.4E-07	DMIUM
CHROMIUMIII 7.1E-04 9.2E-05 8.52 0.05 1 30 9 49 3285 2	j 7.1E–04 j	ROMIUM III
CHROMIUM VI 4.5E-09 5.8E-10 0.000054 0.05 1 30 9 49 3285 2	4.5E-09	ROMIUM VI
COBALT 5.2E-06 6.7E-07 0.062 0.05 1 30 9 49 3285 2	j 5.2E06 j	BALT
COPPER 3.6E-05 4.7E-06 0.43 0.05 1 30 9 49 3285 2	3.6E05	PPER
EAD 5.5E-06 7.0E-07 0.065 0.05 1 30 9 49 3285 2	j 5.5E-06 j	AD
MANGANESE 2.2E-04 2.8E-05 2.59 0.05 1 30 9 49 3285 2	2.2E-04	NGANESE
viercury 1.8E-06 2.3E-07 0.021 0.05 1 30 9 49 3285 2	1.8E-06	RCURY
VICKEL 5.2E-05 6.7E-06 0.62 0.05 1 30 9 49 3285 2	5.2E-05	KEL
/ANADIUM 4.8E-04 6.1E-05 5.70 0.05 1 30 9 49 3285 2	4.8E-04	NADIUM
ZINC 9.0E-05 1.2E-05 1.07 0.05 1 30 9 49 3285 2	9.0E-05	C
YANIDE 8.9E-07 1.1E-07 0.011 0.05 1 30 9 49 3285 2	j 8.9E–07 j	ANIDE
BORON 6.9E-05 8.9E-06 0.83 0.05 1 30 9 49 3285 2	6.9E→05	RON
7LUORIDE 8.7E-08 1.1E-08 0.0010 0.05 1 30 9 49 3285 2	8.7E-08	JORIDE
VOLATILE ORGANICS	lics	VOLATILE ORGANICS
CHLOROMETHANE 6.4E-07 8.3E-08 0.0077 0.05 1 30 9 49 3285 2	6.4E-07	LOROMETHANE
,2-DICHLORETHENE (total) 2.1E-07 2.7E-08 0.0025 0.05 1 30 9 49 3285 2	total) 2.1E-07	DICHLORETHENE (total)
rrichloroethene 2:3E-07 3.0E-08 0.0028 0.05 1 30 9 49 3285 2	2:3E-07	CHLOROETHENE
	1 1	
BASE NEUTRAL/ACIDS	CIDS	BASE NEUTRAL / ACIDS
DI-n-BUTYLPHALATE 8.4E-08 1.1E-08 0.0010 0.05 1 30 9 49 3285 2	8.4E-08	n-BUTYLPHALATE
ris(2-ETHYLHEXYL)PHTHALATE 1.7E-07 2.2E-08 0.0020 0.05 1 30 9 49 3285 2	THALATE 1.7E-07	2-ETHYLHEXYL)PHTHALATE
	DATA MANANA ANA ANA ANA ANA ANA ANA ANA ANA	

TABLE A.1-5 CANCER RISK ESTIMATES SCENARIO 1 - Trespassing (Current)

11	CHRONIC DAILY	CDI		l			CHEMICAL	TOTAL	
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY	TOTAL
11	(mg/kg/day)		(mg/kg/day) - 1	EVIDENCE	CANCER	SOURCE	RISK	RISK	RISK
									,
EXPOSURE PATHWAY: DERMA								0E+00	2E-06
						EL CLANNING BERLEVEN AND AND AND AND AND AND AND AND AND AN			ANKENGEN DIKENDE ÖÖ
PCB'S	1						l i	1	
AROCLOR-1248	0.0E+00	No	7.70E+00				I NA	11	
AROCLOR-1254	0.0E+00	No	7.70E+00				NA		
AROCLOR-1260	0.0E+00	No	7.70E+00	82	Liver	Diet/IRIS	Í NA	li	
							iann1111001100000	li	
NA: Not Applicable									

.

TABLE A.1-6 CANCER RISK ESTIMATES SCENARIO 1 - Trespassing (Current)

CHEMICAL	CHRONIC DAII		I SF	WEIGHT OF	TYPE OF	SF BASIS/	CHEMICAL SPECIFIC	TOTAL
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
JJ II EFERNIARIECONTRADUCIANTI CONTINUTION								
IEXPOSURE PATHWAY: IN	CIDENTAL INGESTIC	N OF CHEMICALS	IN SOIL		***************************************		113311111311114444444	4E07
		LIE MERINAN MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA MENINA M	E DE DE DE DE MERIE EN EL DE DE DE DE DE DE DE DE DE DE DE DE DE			ARATA ARATA CATALON ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA ARATA A	99 EUXIAANUUUUUUUUUUUU	KANNINNNN Ü
INORGANICS		1	1	1		1	1	1
ARSENIC	j 4.6E-0	8 No	1.75E+00	Í A	Skin	IRIS	8E-08	ii .
BERYLLIUM	j 3.6E-0	8 No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	2E-07	ii
LEAD	1.6E-0	6 No	I NA	B2	Renal tumors	Oral/IRIS	NA	ii
I	Ì		1	1		l	l	li
VOLATILE ORGANICS		1	1	1	1	1	1	8
TRICHLOROETHENE	1.2E-1		1.10E-02	•	Liver	Gavage/HEAST	1E-12	11
BENZENE	0.0E+0	- -	2.90E-02		Leukemia	Occupational/IRIS	I NA	
TETRACHLOROETHENE	8.6E-1	1 No	5.10E-02	B2	Liver	Gavage/HEAST	4E-12	
			[ł .	11
BASE NEUTRAL / ACID								[]
2,4-DINITROTOLUENE	0.0E+0		6.80E-01		Liver, mammary gland	Diet/IRIS	I NA	[]
PENTACHLOROPHENOL	1.6E-C		1.20E-01	B2	Hepatocellular adenoma, carcinomas, pheochromocytoma	Oral/IRIS	2E-10	<u> </u>
BUTYLBENZYLPHTHALATE			NA	C	Leukemia	Diet/IRIS	NA NA]]
BENZO(a)ANTHRACENE	0.0E+0		1.15E+01	B2	Liver, lung, skin	IRIS	NA NA	.
CHRYSENE	7.3E-0		1.15E+01	B2 B2	Malignant lymphoma	IRIS	8E-08	1
bis(2-ETHYLHEXYL)PHTHA	LATE 0.0E+0		1.40E-02	B2	Liver	IRIS IRIS	NA 5E-08	
BENZO(b)FLUORANTHENE	0.0E+0		1.15E+01	1 B2	Lung, thorax, skin Lung, thorax, skin	IRIS	NA	1) 11
BENZO(a)PYRENE	0.0E+0		1.15E+01	B2	Stomach, lung	IRIS	I NA	
INDENO(1,2,3-cd)PYRENE	0.0E+0		1.15E+01	B2	Lung, skin	IRIS	NA NA	
	0.0210		1. IOL I OI		i Living, skin	1		
II PCB'S			i				1	// 11
IAROCLOR-1248	0.0E+0	0 No	7.70E+00	i			NA	li
AROCLOR-1254	0.0E+0		7.70E+00	i			I NA	1
AROCLOR-1260	0.0E+0		7.70E+00	B2	Liver	Diet/IRIS	I NA	ii
							· · · · · · · · · · · · · · · · · · ·	íí .
NA: Not Applicable							£1 11113\$\$10000000000000	II ·

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TABLE A.1–7 CANCER RISK ESTIMATES SCENARIO 1 – Trespassing (Current)

1 :

n na hara kana kana kana kana kana kana kana k			h nu nu nu nu nu nu nu nu nu nu nu nu nu					
	CHRONIC DAILY						CHEMICAL	TOTAL []
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC P	PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
			I I I I I I I I I I I I I I I I I I I			191411441111111111144144444444444444	IN REPORT OF THE OWNER OF T	NHAMMANNIN İİ
 EXPOSURE PATHWAY: DERMAI								7E-08
						******************************	EL TERRETERE DE LE CARACTERE P	
II INORGANICS					E E TA DE DE LE FORTE DE LE FERENCE DE LE FERENCE DE LE FERENCE I DE TA DE DE LE FERENCE DE LE FERENCE DE LE FE I			
	4.3E-08	No	1.75E+00		Skin	IRIS	7E-08	
ARSENIC	4.30-00		1.752+00	A	Skin		/E-08 []	
						1	1 11	
VOLATILES							i 11	
CHLOROMETHANE	9.4E-09		1.30E-02	C	Kidney	Inhalation/HEAST	1E-10	
ITRICHLOROETHENE	3.4E09	No	1.10E-02	B2	Liver	Gavage/HEAST	i 4E−11 ii	
						1		
BASE NEUTRAL / ACIDS						ł	1	
	0.55 00	NI-	1 405 00	D 0	T Income			
bis(2-ETHYLHEXYL)PHTHALATE		No	1.40E-02		Liver	IRIS	3E−11	
NA: Not Applicable								

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TABLE A.1-8 CANCER RISK ESTIMATES SCENARIO 1 - Trespassing (Current)

							CHEMICAL	TOTAL
CHEMICAL	CHRONIC DAILY INTAKE(CDI)	CDI ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY
ii ii	(me/ke/dau)	ABSOR PTION	(me/ke/dav) = 1	EVIDENCE	CANCER	SOURCE	RISK	RISK
								2E-06
EXPOSURE PATHWAY: INCIDEN								
II INORGANICS							•	
ARSENIC	3.7E-07 2.7E-07	No No	1.75E+00 4.30E+00	A B2	Skin gross tumors, all sites com bined	IRIS Water/IRIS	7E-07	
BERYLLIUM LEAD	7.0E-07	No	NA	B2	Renal tumors	Oral/IRIS	NA	
			ļ					
VOLATILE ORGANICS CHLOROMETHANE	8.3E-08	No	1.30E-02	с	Kidney	Inhalation/HEAST	1E-09	
TRICHLOROETHENE	3.0E-08	No	1.10E-02	B2	Liver	Gavage/HEAST	3E-10	
			[
BASE NEUTRAL / ACIDS	2.2E-08	No	1.40E-02	B2	Liver	IRIS	3E-10	
NAME AND A DESCRIPTION OF				İMMULTUMULU				ll
NA: Not Applicable								

TABLE A.1-9 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 1 - Trespassing (Current)

		A FARTA FALLAND A FART FALLAND				A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A CARACTER A			TUNUTUNUNUNUNU	ANALAN MANALANA ANALANA
11	CHRONIC DAILY	CDI				RFD	RFD			PATHWAY TOTAL
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD	HAZARD HAZARD
1	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS	FACTORS	QUOTIENT	INDEX(HI) INDEX(HI)
IEXPOSURE PATHWAY: DERMA	CONTACT WITH	ISOII								2E-04 1E-01
	A A A A A A A A A A A A A A A A A A A	NI MANANANANANANA MANANA ETARI KANGANAN KAN	II. MARKAN MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARK		LE COLLECTION CLUCKER COLLECTIONS &	INTERNET STATE AND A STATE AND		EN BUUURNE		
INORGANICS					· ·					
CADMIUM	2.28E-07	No	1.00E-03	High	Proteinuria	Diet/IRIS	10	1.00	2E-04	1
1						1	1			
PCB'S	1									
AROCLOR-1248	0.0E+00	No	NA			NA/IRIS			NA	
AROCLOR-1254	0.0E+00	No	NA			NA/IRIS	!		NA	•
AROCLOR-1260	0.0E+00	No	NA	1 1		NA/IRIS	1		NA	di se se se se se se se se se se se se se
TELEVISION CONTRACTOR CONT	İLEYDIYETINI MAADATINA		I THE FREE TRANSPORT			CALIFORNIA CALENDARY CALENDARY CALENDARY	£15(())))))))))))))))))			, I
NA: Not Applicable										

TABLE A.1-- 10 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 1 - Trespassing (Current)

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	CHRONIC DAILY		N TROMANDI I I I I I I I I I I I I I I I I I I				IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			PATHWAY
CHEMICAL		ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD	HAZARD
i	(me/ke/dav)	ABSORPTION	(me/ke/dav)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS	FACTORS	QUOTIENT	INDEX (HI)
					. In the second s					I BREALIN I BARANNA I
EXPOSUBE PATHWAY: INCIDENT	TAL INGESTION	OF SOIL								1E02
1911)), 1911), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914), 1914		INNE MAINTAIN AND	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII				H I I I I RABI I I I I I I I I I I I I I I I I I I		iunnum i	LINN THUR AND I
INORGANICS		!	!	[ļ			
ALUMINUM	7.8E-04	No			· · · · · · · · · · · · · · · · · · ·	NAARIS Water/IRIS	1000	1 1	NA 3E⊶03	
ANTIMONY	1.0E-06	No No	4.0E-04	Low	Longevity,blood glucose and cholesterol	Diet/HEAST		1	4E-04	
ARSENIC	3.6E-07	No	1.0E-03		Keratosis and hyperpigmentation	Water/IRIS			1E-04	
3ARIUM	6.9E-06 2.8E-07	No No	7.0E-02 5.0E-03	i Medium i Low	None observed None observed	Water/IRIS	100		6E-05	
BERYLLIUM CADMIUM	1.85-07	No	1.0E-03	High	Proteinuria	Diet/IRIS	10		2E-04	
CHROMIUM III	1.2E-05	No No	1.0E+00	Low	Hepatotoxicity	IRIS	1000		1E-05	
CHROMIUM VI	1.75-08	No	5.0E-03	Low	No effects observed	Water/IRIS	500	1	3E-04	
COBALT	6.4E-07	No	NA NA	2011		NAIRIS		i ·	NA	
COPPER	2.9E-06	No	4.0E-02		Local GI irritation	NAHEAST	i	i i	7E-05	i
LEAD	1.2E-05	No	NA NA		Neurobehavioral effects	NAARIS	i	i	NA I	ii ii
MANGANESE	3.5E-05	No	1.0E-01	Medium	CNS effects	DietARIS	j 1	j 1	4E04	1
MERCURY	3.5E-08	No	3.0E-04	1	Kidney effects	Oral/HEAST	1000	İ	1E04	
NCKEL	9.0E-06	No	2.0E-02	İ	Reduced body and organ weight	Diet/HEAST	1	1	4E-04	1
ELENIUM	8.9E-08	No	5.0E-03	Medium	Clinical selenosis	DietARIS	3	1	2E05	
SILVER	1.9E-07	No	3.0E-03	Medium	Argyria	Oral/IRIS	2	1	6E-05	
VANADIUM	6.1E-05	No	7.0E-03	Į.	None observed	Water/HEAST	100	!	9E-03	1
LINC	1.3E-05	No	2.0E-01	I	Anemia	Therap./HEAST	10		7E-05	!!
BORON	4.6E-06	No	9.0E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1 1	5E-05	ļļ
NIOBIUM	1.0E-05	No	NA			NAARIS	1	!	NA	1
TRONTIUM	4.7E-08	No	NA	1		NAARIS	ļ	1	NA	1
TITANIUM	2.3E-05	No	NA NA	l		NAARIS	1	1	NA	
LIRCONIUM	0.0E+00	No	I NA			NAARIS	!	1	NA	
]	Į						1
VOLATILE ORGANICS				· · · ·			1 1000	1	NA	11
ACETONE	0.0E+00 0.0E+00	No No	1.0E-01 1.0E-01	Low Medium	Increased liver and kidney weight Fetal toxicity	Gavage/IRIS Inhal./IRIS	1000		NA	
CAR BON DISULFIDE	0.0E+00	I No	1 1.0E-02		Decreased hematocrit and hemoglobin	Gavage/HEAST	3000		NA	
2-BUTANONE	0.02+00	No No	5.0E-02	i Medium	Fetotoxicity	Inhal./IRIS	1000		NA	li
TRICHLOROETHENE	9.2E-10		NA NA		recocondry	NAARIS	1000	i	NA	
BENZENE	0.0E+00	No	NA	ł		NAARIS	1	1	NA I	li
TETRACHLOROETHENE	6.7E-10	No	1.0E-02	Medium	Hepatotoxicity,weight gain	Gavage/IRIS	100	i 1	7E-08	li
TOLUENE	7.5E-10	No	2.0E-01	Medium	Changes in liver and kidney weights	GavageARIS	1000	i i	4E-09	İİ
ETHYLBENZENE	0.0E+00	No	1.0E-01	Low	Liver and kidney toxicity	Oral/IRIS	1000	İ 1	I NA İ	ii 🛛 👘
XYLENE (total)	0.0E+00	No	2.0E+00	Medium	Hyperactivity, decreased body weight increased	GavageARIS	j 100	j 1	NA	ii .
		i	İ	i		i -	i	1	i 1	11
BASE NEUTRAL / ACIDS		1	1	l		1	1	1	1	
PHENOL	0.0E+00	No	6.0E-01	Low	Reduced fetal body weight	Gavage/IRIS	100	1,1	NA	
SENZOIC ACID	0.0E+00	No	4.0E+00	Medium		Oral/IRIS	1 1	1 1	NA	!!
NAPHTHALENE	0.0E+00	No	4.0E-03	!	Decreased body weight gain	Gavage/HEAST	10000	1	NA	!!
-NITROPHENOL	0.0E+00	No	I NA	!		NAIRIS	!	1	NA	li
4-DINITROTOLUENE	0.0E+00	No	NA			NAARIS	1	1	NA	<u>[</u>]
ENTACHLOROPHENOL	1.2E-08	No No	3.0E-02	Medium	Liver and kidney pathology	Diet/IRIS	100	1 1	4E-07	h
PHENANTHRENE	0.0E+00	No	NA NA			NAIRIS		1	NA	11
ANTHRACENE	0.0E+00	No No	3.0E-01	Low	No observed effects	Gavage/RIS	3000	1	NA	1
DI-s-BUTYLPHALATE	0.0E+00	No No	1.0E-01	Low	Increased mortality	Diet/IRIS	1000 3000		NA NA	#1 11
LUORANTHENE	0.0E+00	I No	4.0E-02 3.0E-02	Low	Nephropathy, changes in liver weight, he matology	Gavage/RIS	3000		NA 3E-07	H 11
YRENE	9.2E-09 0.0E+00	No No	2.0E-02	Low Low	Kidney effects Bffects on body weight gain, testes, liver, kidney	Gavage/IRIS Diet/IRIS	1000		NA	11
BUTYLBENZYLPHTHALATE BENZO(1)ANTHRACENE	0.0E+00	No No	2.0E-01 NA	1 200	I Direction and A meridin Said' (caret'inter'rigaea	NA/RIS	,	1	NA	11
	0.06400	No No	I NA	1		NAARIS NAARIS	1	i	I NA	li
UD VERME	575-09				Increased relative liver weight	Diet/IRIS	1000	1 1	NA	li
	5.7E-08 0.0E+00		2.0F-02					1 1		
142-ETHYLHEXYL)PHTHALATE	0.0E+00	No	2.0E-02	Medium 		NARIS	1		I NA	
514Q-ETHYLHEXYL)PHTHALATE BENZO(6)FLUORANTHENE	0.0E+00 3.7E-08		2.0E-02	Meciumi 		NAARIS NAARIS			I NA I NA	
DiaQ-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE BENZO(b)FLUORANTHENE	0.0E+00 3.7E-08 0.0E+00	No No	NA	Medium 		NAARIS				
bil@-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE BENZO(k)FLUORANTHENE BENZO(a)PYRENE	0.0E+00 3.7E-08 0.0E+00 0.0E+00	No No No	NA NA	Mecilum 		NAARIS NAARIS			NA	
bitQ-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENB BENZO(k)FLUORANTHENE BENZO(a)PYRENE BINZO(a)PYRENE INDENO(1,2,3-cd)PYRENE	0.0E+00 3.7E-08 0.0E+00	No No No No	NA NA NA	Mecilum 		NAARIS			NA NA	
big-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENB BENZO(k)FLUORANTHENB BENZO(a)PYRENE INDENO(1,2,3-cd)PYRENE	0.0E+00 3.7E-08 0.0E+00 0.0E+00 0.0E+00	No No No No No	NA NA NA NA	Medium 		NAARIS NAARIS NAARIS			NA NA NA	
big-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENB BENZO(k)FLUORANTHENB BENZO(a)PYRENE INDENO(1,2,3-cd)PYRENE	0.0E+00 3.7E-08 0.0E+00 0.0E+00 0.0E+00	No No No No No	NA NA NA NA	Medium 		NAARIS NAARIS NAARIS			NA NA NA	N N N N N N N
bing-ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE BENZO(b)FLUORANTHENE BENZO(b)FLUORANTHENE INDENO(1,2,3-cd)PYRENE BENZO(g,b,i)PERYLENE PCB'S	0.0E+00 3.7E-08 0.0E+00 0.0E+00 0.0E+00	No No No No No	NA NA NA NA	Meaium 		NAARIS NAARIS NAARIS NAARIS NAARIS			NA NA NA NA	
big_ETHYLHEXYL)PHTHALATE BENZO(b)FLUORANTHENE BENZO(b)FLUORANTHENE BENZO(*)PYRENE BENZO(*)PYRENE BENZO(*)PRENE BENZO(*,b,i)PERYLENE PCB'S AROCLOR -1248	0.0E+00 3.7E-08 0.0E+00 0.0E+00 0.0E+00 0.0E+00	No No No No No No	NA NA NA NA NA NA	Miscikam 		NAARIS NAARIS NAARIS NAARIS NAARIS NAARIS			NA NA NA NA NA	
AROCLOR -1248 AROCLOR -1254 AROCLOR -1260	0.0E+00 3.7E-08 0.0E+00 0.0E+00 0.0E+00 0.0E+00 0.0E+00 0.0E+00 0.0E+00	No No No No No No No No No No	NA NA NA NA NA NA NA			NAARIS NAARIS NAARIS NAARIS NAARIS NAARIS NAARIS			NA NA NA NA NA NA	

TABLE A.1–11 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 1 – Trespassing (Cuttent)

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Bits: Bits: <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>NIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII</th></t<>										NIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
In-t-PhILTRENTYUE 3:6E-00 NO 1:0E-01 CM Intervent Interve										
ВУЕВ ИЗ LLOV TVCIDE NO <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>										
List(HICKORELLIBER 5.4E-08 NO NV NV/HIGZ	1 20-31		0001	Sidvitic	utiletera beseerenT		10-301		00~39.0	
10:-DICHIDERERIARE (6*7) S:3=08 NO 10:=-05 Pactesed frematorit and hermologian Owner/Life No S:2=08 No NEUTORIDE 9:8E-06 NO NO S:8=08 NO NO NO S:8=08 NO BELORIDE 9:8E-06 NO 9:8E-06 NO NO S:8=08 NO S:8=08 NO NO S:8=08 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO S:8=00 NO S:8=00 NO NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00										201241.148THEM 9248
10:-DICHIDERERIARE (6*7) S:3=08 NO 10:=-05 Pactesed frematorit and hermologian Owner/Life No S:2=08 No NEUTORIDE 9:8E-06 NO NO S:8=08 NO NO NO S:8=08 NO BELORIDE 9:8E-06 NO 9:8E-06 NO NO S:8=08 NO S:8=08 NO NO S:8=08 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO NO S:8=00 NO S:8=00 NO S:8=00 NO NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00 NO S:8=00		! !								
ВЕПОКОНСЕНТИКЕ 2-30-08 ИО ИО ИО ИО ИО ОСССАВА										
АСГУПТЕ ОВОЧИСХ ОСЧЕПСЕ ОВ ИС 6 (CE-O) H(B) Description Material Materia Material Materia <td></td> <td></td> <td>3000</td> <td></td> <td>Decreased hematocrit and hemoglobin</td> <td></td> <td></td> <td></td> <td></td> <td></td>			3000		Decreased hematocrit and hemoglobin					
Сенеміслі или кесорі кр.	II VN			SIAIVAN			AN	ON	80-36.7	
ВОКОИ 23E-00 NO 30E-05 Mean Intervent Sec.08 Sec.08 ISUNC 10E-01 NO 50E-02 Mean Mean Developed and second program Developed and second pro										I VOLATILE ORGANICS
ВОКОИ 23E-00 NO 30E-05 Mean Intervent Sec.08 Sec.08 ISUNC 10E-01 NO 50E-02 Mean Mean Developed and second program Developed and second pro										
EXMLDE 1.0_{10} 2.0_{10}	SE-02		L 1			μβiμ	S0-30.8	ON	60-36.6	FLUORIDE
ZINC 106-05 NO 2.00-01 SE-06 SE-06 MINKRL 5.5E-01 Match/HEXZI 100 8E-03 8E-03 MINKRL 5.5E-05 NO 1.00-04 and again with RAT 71 3E-04 MINKRL 5.5E-05 NO 1.00-03 1.00 8E-03 MARANDINA 5.5E-05 NO 1.00-03 1.000 1 1.000 MARANDINA 5.5E-06 NO 1.00-03 1.000 1 1.000 1.000 MARANDINA 5.5E-01 NO 1.000	<u> </u> 90−36		100	Cicupational/IRIS		muibeM	SO-30.6	ON	90 <u>3</u> 6.7	вокои
МУМАЛИМ 55.6=05 No 706-03 Кайска Кай	2E-09	S	100	Diet/IBIS	Weight loss, thyroid effects, myelin degeneration	muibeM	2.0E-02	ON ON	70-30.1	САУИГДЕ
МУМАЛИМ 55.6=05 No 706-03 Кайска Кай	II 90-39		01	TEABH/.qeroff	Ancmia		10-30.5	ON	50-30.1	DNIZ
МИСКЕТ 5.9E-07 NO 2.0E-07 NO 3.0E-04 3.E-04 МИСКЕТ 5.9E-07 NO 3.0E-04 2.E-07 NO 3.E-04 2.E-04 NO МИСКЕТ 5.9E-07 NO 3.0E-04 No 3.0E-04 No 2.E-04 No КИЛИМИ 1.0E-07 NO 3.0E-03 NO 1.0E-04 No 1.0E-04	II €0−38	i i	100	Water/HEAST	None observed		CO-30.7			MUIDANAV
МЕВСЛЯХ STE-01 ИО 30E-04 Карсика Карсика Облуктем 1000 12-04 КРИМОЧИВЕВ STE-02 ИО 10E-04 Карсика Салунтера 1 1 3 1 3 1 5 5 04 NA Конскир STE-02 ИО 10E-04 NA NA NA/HB/2 1 1 3 1 5 5 04 NA NA/HB/2 NA	36-04	i i			Keduced body and organ weight					Илсквг
МАНОВЛЕЕ СНЕМICAL ИЛАКЕСПІ АЛОГРАНИЛЯ СОП МАТИЧАТ САП МАСТОК КРД <t< td=""><td></td><td>i i</td><td>0001</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		i i	0001							
СНЕМICAL СИЕМICAL СИЕМICAL СИЕМICAL КР. <td></td> <td>İι</td> <td>L</td> <td></td> <td></td> <td>шпірамі</td> <td></td> <td></td> <td></td> <td></td>		İι	L			шпірамі				
Соррев 4.1E-06 NO 4.0E-02 No 4.0E-02 No 1E-02 1 Соррев 1.0626015 Ализтроих 1.062-03 Low Lowed Chick Stand Validitie 1.5E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05 No 1.6E-05										
ССВАЛТ СНЕМГСАL (пр. К.К.С.D) А.D.USTED POR К.P.D. N.A. КСНИОМИИ И С.С.В.К.И.С. ОО А.С.С. ОО А.С.С. ОО А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С. А.С.С.С.С. А.С.С.С.С.С.С. А.С.С.С.С.С.С. А.С.С.С.С.С. А.С.С.С.С.С.С.С.С. А.С.С.С.С.С.С.С.С. А.С.С.С.С.С.С.С.С.С.С. А.С.С.С.С.С.С.С.С.С.С. А.С.С.С.С.С.С.С.С.С.С.С.С.С.С. А.С.С.С.С.С.С.С.С.С.С.С.С.С.С.С.С.С.С.С		1				•				
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СНЕМІСАІ. СИНОЛІСРАЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СПОЛОГОРІЦУ СОПОЛОГОРІЦУ СОПОЛОГОРІЦУ СОПОЛОГОРІЦУ ПОЛОГОРІЦУ ОЛОГОРІС ПОЛОГОРІС ПОЛОГОРІС ПОЛОГОРІС </td <td></td> <td>i , </td> <td>000</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		i ,	000							
Ссромним 7.3E-08 Ио 1.0E-03 Нідій Раскітскі Поклінскі 10 1 7E-05 Вакусция СНЕМІСАL Імтакв(сол) Х.3E-03 Low Моле обветсей Water/RUS 10 1 7E-03 A Вакусция 2.3E-07 No 5.0E-03 Low None observed Water/RUS 100 1 7E-03 A Актимик 2.4E-07 No 1.0E-03 Low None observed Water/RUS 1000 1 6E-05 A Конзиники 1.4E-03 No 1.0E-03 Low None observed Water/RUS 1 AE-03 A AE-03 A Конзиники 1.7E-03 No 1.0E-03 No 1.0E-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03 A AE-03										
ВЕВYLLIUM СНЕМICAL INTARECT CRITICA CDI Low None observed Water/RUX AD A A INTROVIC DALLY CDI Voi 5.6E-03 Low Voice observed Water/RUX 3 1 5E-05 NA INTROVIC CHEMICAL INTRACE MAIN 2.6E-03 Low Voice observed Water/RUX 3 1 5E-05 NA INTROVIC A CONTROVIC No 4.0E-03 Low NA 1 5E-05 NA INCOMBANIE NATION NATION NATION NATION 1 5E-05 NA INCOMBANC NACTORS CONTROL NATION NATION 1 5E-05 NA INCOMBANC NACTORS NACTORS NACTORS AD 4E-05 NA INCOMBANC NO A CON 1.000 1.000 1 5E-04 NA INCOMBANC NO A CON A CON<										
ВАRIUM 2.6E-06 Vo 7.0E-03 Medium Variation Mater/RLS APD APD APD APD INVERSENC 3 1.0E-03 Montostep restriction Mater/RLS 1.0E-03 A 4E-03 MA INVERSENC 3.0E-06 No 7.0E-03 Montostep restriction District RLS 1.0E-03 A 4E-03 A 4E-03 A A 4E-03 A A 4E-03 A <td></td> <td>1 1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		1 1								
CHEMICAL INTAKE(CD) AD105TED FOR RPD CONFIDENCE CONTODALY (CD) AD105TED FOR RPD (CHEMICAL INTAKE(CD) AD105TED FOR RPD (CONTIGNAT INTAKE(CD) AD105TED FOR RPD (CONTIGNAT INTAKE(CD) AD105TEM (AD105TEM AD1										
СНЕМІСАL СИРАЛСАL ПИТАКВ(СD) CDI РАЛТИАХ АLUMINONY 1.4E-03 No 4.0E-04 Low Longevity,blood glucose and cholesterol Water/RLS 1000 1 4E-03 IN ANTIMONY 1.7E-03 No 4.0E-04 Low Longevity,blood glucose and cholesterol Water/RLS 1000 1 4E-03 IN						muibel/				
VTDAVIND H 1'LE-03 NO NO EXPOSURE PRIMARY: INTRACTORIA NATRACTORIA NATRACTORIA NATRACTORIA INORGANICS (mg/kg4x) Absorbation (mg/kg4x) LE-02 I ICCHEMICY INTRACTORIA NONBERTINTY CONFIGN NOTERATION NATRACTORIA ICCHEMICAL INTRACTORIA MSONGDATION RPD RPD NATRACTORIA ICCHEMICAL INTRACTORIA RPD RPD NATRACTORIA NATRACTORIA ICCHEMICAL INTRACTORIA RPD RPD NATRACTORIA NATRACTORIA			-							
INORGANICS EXPOSUBE PATHWAY: DEPML CONTACT WITH CHEMICALS IN SUPPRISE ((m///////////////////////////////////			0001		loveteelode brie escorrite boold stiveeno T	wol	0 00-30 0			
EXPOSURE PATHWAY: CDI RPD RPD RPD RPD RPD INTRACON EXPOSURE PATHWAY: CONTRACT INTRACON INTRACON INTRACON INTRACON INTRACON INTRACON Image: State in the s	II AN			SIAVAN				UN UN	E0-37.1	
EXPOSURE PATHWAY: DEFINAL CONTACT WITH CHEMICAL INTARE(CD) ABJORFTORY (MODIFYING (MAZARD INCONTACT)) RPD CONTACT (MADAY: DEFINALTY (MODIFYING (MAZARD INCONTACT))) EXPOSURE PATHWAY: DEFINAL CONTACT WITH (MODIFYING (MAZARD)) RPD CONTACT (MADAY: DEFINALTY (MODIFYING (MAZARD)))	 					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
CHEWICY INTERECT OF CONFIDENCE OF REPORT OF CONFIDENCE ADDRESS FOR CONFIDENCE INTERVENT OF CONFIDENCE INTERVENT OF CONFIDENCE INTERVENT OF CONFIDENCE OF CON										
CHEMICAL INTERECTOR OF RED FOR RED CONFIDENCE EFFECT SCHTCAL INTERECTOR (mg/rg41) LEVEL (MDT/rg41) LEVEL EFFECT SCHTCAL (MDT/rg41) LEVEL (MDF/rg41) LEVEL (MDF/rg41) LEVEL (MDF/rg41) LEVEL (MDF/rg41)										
CHEWICYC INLYKE(CDI) VDI02LED BOK KED CONEIDENCE CULICYC BV212/ NODELAING HYZYKD HYZYKD HYZYKD KED KED KED KED KED KED KED KED KED K										ATTACTOR ATTACTOR AND AND AND AND AND AND AND AND AND AND
CHBONIC DVITA CDI LULA CDI LULA CDI LULA CDI LULA KED KED LULANVA										
		MODIFYING			CRITICAL	CONFIDENCE	1 03.8			CHEMICAL
		!	RFD					CDI	CHRONIC DAILY	

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TABLE A.1-12 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 1 ~ Trespassing (Current)

Image: Note of the i
Implex/day ABSORPTION (mplxg/day) LEVEL EFFECT SOURCE ADJUSTMENTS FACTORS QUOTIENT INDEX (HI) Implex/day ABSORPTION (mplxg/day) LEVEL EFFECT SOURCE ADJUSTMENTS FACTORS QUOTIENT INDEX (HI) Implex/day Index (HI) Implex/day Implex/
IEXPOSURE PATHWAY: INCIDENTAL INGESTION OF SURFACE WATER 1 E-01 INDEGANICS 1 INORGANICS 1 INORGANICS 1 INORGANICS 1 INORGANICS 1 INORGANICS 1
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
INORGANICS
ANTIMONY 1.3E-05 No 4.0E-04 Low Longevity, blood glucose and cholesterol Water/IRIS 1000 1 3E-02
ARSENIC 2.9E-06 No 1.0E-03 Keratosis and hyperpigmentation Diet/HEAST 1 3E-03
BARIUM 2.4E-05 No 7.0E-02 Medium None observed Water/IRIS 3 1 3E-04
BERYLLIUM 2.1E-06 No 5.0E-03 Low None observed Water/IRIS 100 1 4E-04
CADMIUM 6.4E-07 No 1.0E-03 High Proteinuria Diet/IRIS 10 1 6E-04
CHROMIUMIII 7.1E-04 No 1.0E+00 Low Hepatotoxicity IRIS 1000 7E-04
CHROMIUM VI 4.5E-09 No 5.0E-03 Low No effects observed Water/IRIS 500 1 9E-07
COBALT 5.2E-06 No NA NA NA NA NA/IRIS NA NA/IRIS NA NA/IRIS
COPPER 3.6E-05 No 4.0E-02 Local Glirritation NA/HEAST 9E-04
LEAD 5.5E-06 No NA Neurobehavioral effects NA/IRIS NA NA
MANGANESE 2.2E-04 No 1.0E-01 Medium CNS effects Diet/IRIS 1 1 2E-03
MERCURY 1.8E-06 No 3.0E-04 Kidney effects Ora //HEAST 1000 6E-03
NICKEL 5.2E-05 No 2.0E-02 Reduced body and organ weight HEAST 300 3E-03
VANADIUM 4.8E-04 No 7.0E-03 None observed Water/HEAST 100 7E-02
ZINC 9.0E-05 No 2.0E-01 Anemia Therap./HEAST 10 4E-04
CYANIDE 8.9E-07 No 2.0E-02 Medium Weight loss, thyroid effects, myelin degeneration Diet/IRIS 100 5 4E-05
BORON 6.9E-05 No 9.0E-02 Medium Pulmonary edems and bemorrhage in the alveolus Occupational/IRIS 100 1 8E-04
FLUORIDE 8.7E-08 No 8.0E-02 High Dental and skeletal fluorosis Water/IRIS 1 1 1E-06
VOLATILE ORGANICS
CHLOROMETHANE 6.4E-07 No NA NA/IRIS NA
12-DICHLORETHENE (total) 2.1E-07 No 1.0E-02 Decreased hematocrit and hemoglobin Gavage/HEAST 3000 2E-05
ITRICHLOROETHENE 2.3E-07 No NA NA NA NA NA NA NA NA NA NA NA NA NA
BASE NEUTRAL/ACIDS
DI-a-BUTYLPHALATE 8.4E-08 No 1.0E-01 Low Increased mortality Diet/IRIS 1000 1 8E-07
bis/2-ETHYLHEXYL)PHTHALATE 1.7E-07 No 2.0E-02 Low Nephropathy, changes in liver weight, bematology Gavage/IRIS 3000 1 NA

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TABLE A.2-1 DERMALCONTACT WITH CHEMICALS IN SOIL SCENARIO 2 - Industrial (Current)

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	ABSORBED DOSE	ABSORBED DOSE	SOILCONC	CON VERSION	SKIN SURFACE	ADHERENCE	ABSORPTION	EXPOSURE	EXPOSURE	BODY	AVERAGING TIME	AVERAGING TIM
CHEMICAL	(NONCANCER)	(CANCER)		FACTOR	AREA	FACTOR	FACTOR	FREQUENCY			(NONCANCER)	(CANCER)
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(1E-6kg/mg)	(cm2/event)	(mg/cm2)	(unžiess)	(events/year)	(years)	(kg)	(days)	(days)
INORGANICS						و کو پی پی پی کہ ان کا بنی بنی						
JMINUM	NA	NA	26159.5	1E06	6300	1.45	NA	250	25	70	9125	255
TIMONY	NA	NA	5.1	1E06	6300	1.45	NA	250	25	70	9125	255
ENIC	NA	NA	2.4	1E-06	6300	1.45	NA	250	25	70	9125	255
MUM	NA	NA	257.6	1E-06	6300	1.45	NA	250	25	70	9125	255
RYLLIUM	NA	NA	15.4	1E-06	6300	1.45	NA	250	25	70	9125	255
MIUM	8.52E-07	3.04E-07	0.95273	1E08	6300	1.45	0.01	250	25	70	9125	255
ROMIUM III	NA	NA	252.3	1E-06	6300	1.45	NA	250	25	70	9125	255
ROMIUM VI	NA	NA	2.5	1E-06	6300	1.45	NA	250	25	70	9125	255
ALT	NA	NA	6.9	1E-06	6300	1.45	NA	250	25	70	9125	255
PER	NA	NA	32.7	1E-06	6300	1.45	NA	250	25	70	9125	255
D D	NA	NA	118.9	1E-06	6300	1.45	NA	250	25	70	9125	255
NGANESE	NA	NA	1156.7	1E06	6300	1.45	NA	250	25	70	9125	255
RCURY	NA I	NA	0.10	1E06	6300	1.45	NA	250	25	70	9125	255
KEL	NA	NA	837.0	1E-06	6300	1.45	NA	250	25	70	9125	255
	NA	NA		1E-06	6300		NA	250		70		255
ENIUM			1.5			1.45			25		9125	
VER	NA	NA	1.6	1E06	6300	1.45	NA	250	25	70	9125	255
ADIUM	NA	NA	3383.1	1E-08	6300	1.45	NA	250	25	70	9125	255
	NA	NA	168.8	1E-06	6300	1.45	NA	250	25 25	70	9125	255
ION	NA	NA	108.1	1E-06	6300	1.45	NA NA	250		70	9125	255
BIUM	NA	NA	184.0	1E-06	6300	1.45	NA	250	25	70	9125	255
ONTIUM	NA	NA	160.3	1E-06	6300	1.45	NA	250	25	70	9125	255
ANIUM	NA	NA	285.0	1E06	6300	1.45	NA	250	25	70	9125	255
CONIUM	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
VOLATILE ORGANICS									1 1	' i		
TONE	NA	NA j	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
BON DISULFIDE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
DICHLORETHENE (total)	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
BUTANONE	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
CHLOROBTHENE	NA	NA Į	0.0040	1E06	6300	1,45	NA	250	25	70	9125	255
ZENE	NA I	NA	NA	1E06	6300	1.45	NA NA	250	25	70	9125	255
RACHLOROETHENE	NA	NA	NA	1E-06	6300 j	1.45	NA I	250	25	70	9125	255
UENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
IYLBENZENE	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
ENE (total)	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
	Í	i				i			i i			
BASE NEUTRAL / ACIDS									i i			
INOL	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
ZOIC ACID	NA I	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
HTHALENE	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
TTROPHENOL	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
DINITROTOLUENE	NA	NA	NA	1E06	6300	1.45	NA	250	25	70	9125	255
TACHLOROPHENOL	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
NANTHRENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
HRACENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
-BUTYLPHALATE	NA	NA	0.21	1E-06	6300	1.45	NA	250	25	70	9125	255
ORANTHENE	NA	NA	NA	1E-06	6300	1,45	NA	250	25	70	9125	255
ENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
YLBENZYLPHTHALATE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
ZO(a)ANTHRACENB	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	25
	NA	NA	NA	1E-06	6300		NA	250	25			255
YSENE	NA	NA	0.085	1E-08		1.45				70	9125	
-ETHYLHEXYL)PHTHALATE					6300	1.45	NA	250	25	70	9125	255
ZO(b)FLUORANTHENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
ZO(k)FLUORANTHENE	NA	NA I	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
ZO(a)PYRENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
ENO(1,2,3-cd)PYRENE	NA	NA	NA	1E-06	6300	1.45	NA	250	25	70	9125	255
ZO(g.b.i)PERYLENE	NA	' NA I	NA	1E-06	6300	1.45	NA	250	25	70	. 9125	25
		1	ļ			(ļ		
PCB'S								_	1 !	_ [
OCLOR-1248	1.02E~05	3.64E-06	1.9	1E-08	6300	1.45	0.06	250	25	70	9125	255
XLOR-1254	8.04E-08	2.87E-06	1.5	1E08	6300	1.45	0.06	250	25	70	9125	255
CLOR-1260	0.00E+00 j	0.00E+00	NA I	1E-06	6300	1.45	0.06	250	25	70 1	9125	255

TABLE A.2-2 INGESTION OF CHEMICALS IN SOIL SCENARIO 2 - Industrial (Current)

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				INCRETION	CONVERSION			EXPOSITE			
CHEMICAL	INTAKE (NONCANCER)	INTAKE (CANCER)	SOILCONC	INGESTION RATE	FACTOR		FREQUENCY	EXPOSURE DURATION		AVERAGING TIME (NONCANCER)	(CANCER)
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(mg/day)	(1B-6kg/mg)	(unitless)	(days/year)	(years)	(kg)	(days)	(days)
INORGANICS ALUMINUM	2.56E-02	9.14E-03	26159.5	100	1E-06	1	250	25	70	9125	25550
ANTIMONY	4.97E-06	1.77E-06	26159.5	100	1E-06	i i	250	25	70	9125	25550
ARSENIC	2.38E-06	8.51E-07	2.4	100	1E-06	1		25	70	9125	25550
BARIUM	2.52E-04	9.00E-05	257.6	100	1E-06	i		25	70	9125	25550
BERYLLIUM	1.51E-05	5.38E-06	15.4	100	1E-06	1		25	70	9125	25550
CADMIUM	9.32E-07	3.33E-07	1.0	100	1E-06	1 1		25	70	9125	25550
CHROMIUM III	2.47E-04	8.62E-05	252.3	100	1E-06	1		25	70	9125	25550
CHROMIUM VI	2.45E-06	8.73E-07	2.5	100	1E-06	1	250	25	70	9125	25550
COBALT	6.75E-06	2.41E-06	6.9	100	1E-06	1	250	25	70	9125	25550
COPPER	3.20E-05	1.14E-05	32.7	100	1E-06	1	250	25	70	9125	25550
LEAD	1.16E-04 1.13E-03	4.16E-05 4.04E-04	118.9 1156.7	100	1E-06 1E-06		250	25 25	70 70	9125	25550 25550
MANGANESE MERCURY	1.02E-07	3.65E-08	0.10	100	1E-06		250	25	70	9125	25550
NICKEL	8.19E-04	2.93E-04	837.0	100	1E-06	i i		25	70	9125	25550
SELENIUM	1.46E-06	5.22E-07	1.5	100	1E-08			25	70	9125	25550
SILVER	1.59E-06	5.68E-07	1.6	100	1E-06	1	250	25	70	9125	25550
VANADIUM	3.31E-03	1.18E-03	3383.1	100	1E-06	1	250	25	70	9125	25550
ZINC	1.65E-04	5.90E-05	168.8	100	1E-06	1	250	25	70	9125	25550
BORON	1.06E-04	3.78E-05	108.1	100	1E-06	1	250	25	70	9125	25550
NIOBIUM	1.80E-04	6.43E05	184.0	100	1E-06	1		25	70	9125	25550
STRONTIUM	1.57E04	5.60E-05	160.3	100	1E-06	1	250	25	70	9125	25550
TTTANIUM	2.79E-04	9.96E05	285.0	100	1E-06	1	250	25	70	9125	. 25550
ZIRCONIUM	0.00E+00	0.00E+00	NA	100	1E-06	1	250	25	70	9125	25550
VOLATILE ORGANICS											
ACETONE	0.00E+00	0.00E+00	NA	100	1E-06	1	250	25	70	9125	25550
CARBON DISULFIDE	0.00E+00	0.00E+00		100	1E-06	i	250	25	70	9125	25550
1,2-DICHLORETHENE (total)	0.00E+00	0.00E+00		100	1E-06	i i	250	25	70	9125	25550
2-BUTANONE	0.00E+00	0.00E+00	NA İ	100	1E-06	1	250	25	70	9125	25550
TRICHLOROETHENE	3.91E-09	1.40E-09	0.0040	100	1E-06	1	250	25	70	9125	25550
BENZENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
TETRACHLOROETHENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
TOLUENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
ETHYLBENZENE	0.00E+00	0.00E+00		100 100	1E-06 1E-06	1	250	25	70	9125	25550
XYLENE (total)	0.00E+00	0.00E+00	NA	100	12-00	1	250	25		9125	20000
BASE NEUTRAL / ACIDS										1	
PHENOL	0.00E+00	0.00E+00	NA	100	1E06	· 1	250	25	70	9125	25550
BENZOIC ACID	0.00E+00	0.00E+00		100	1E06	1	250	25	70	9125	25550
NAPHTHALENE	0.00E+00	0.00E+00		100	1E06	1	250	25	70	9125	25550
4-NITROPHENOL	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
2,4 - DINITROTOLUENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
PENTACHLOROPHENOL	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
PHENANTHRENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
ANTHRACENE DI-n-BUTYLPHALATE	0.00E+00 2.05E-07	0.00E+00 7.34E-08	NA 0.21	100 100	1E-06		250 250	25 25	70	9125	25550
FLUORANTHENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
PYRENE	0.00E+00	0.00E+00		100	1E-06			25	70	9125	25550
BUTYLBENZYLPHTHALATE	0.00E+00	0.00E+00		100	1E-08	1 1		25	70	9125	25550
BENZO(a)ANTHRACENE	0.00E+00	0.00E+00		100	1E06	i i		25	70	9125	25550
CHRYSENE	0.00E+00	0.00E+00	NA	100	1E-06	1		25	70	9125	25550
bis(2-ETHYLHEXYL)PHTHALATE	8.32E-08	2.97E~08	0.085	100	1E-06	1	250	25	j 70	9125	25550
BENZO(b)FLUORANTHENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	j 70	9125	25550
BENZO(k)FLUORANTHENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
BENZO(a)PYRENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
INDENO(1,2,3-cd)PYRENE	0.00E+00	0.00E+00		100	1E-06	1	250	25	70	9125	25550
BENZO(g,h,i)PERYLENE	0.00E+00	0.00E+00	NA	100	1E-06	1	250	25	70	9125	25550
PCB'S							1			1	
AROCLOR-1248	1.86E-06	6.64E-07	1.9	100	1E-06	1	250	25	70	9125	25550
AROCLOR-1254	1.47E-06	5.24E-07	1.5	100	1E-06	i i	250	25	70	9125	25550
AROCLOR-1260	0.00E+00	0.00E+00		100	1E-06	i i	250	25	70	9125	25550
										LE SU LA LA LA LA LA LA LA LA LA LA LA LA LA	

TABLE A.2-3 INHALATION OF AIRBORNE CHEMICALS ADSORBED TO DUST SCENARIO 2 - Industrial (Current)

	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SOL CONC	INHALATION	DUST	EXPOSURE	EXPOSURE	EXPOSURE		AVERAGING TIME	
CHEMICAL	(NONCANCER)	(CANCER)		RATE	CONC	TIME	FREQUENCY	DURATION		(NONCANCER)	(CANCER)
i	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(m3/hr)	(hg/m.3)	(hr/day)	(days/year)	(years)	(lg)	(days)	(days)

INORGANICS		0.40T 00	00/50 5	-	4 707 00		000			0105	OFF
ALUMINUM	8.86E-06	3.16E06	26159.5	2	1.73E-08	1	250	25	70	9125	2555
ANTIMONY	1.72E-09	6.14E-10	5.1	2	1.73E-08	1 1	250	25	70	9125	2555
ARSENIC	8.24E-10	2.94E-10	2.4	2	1.73E-08	1	250	25	70	9125	2555
BARIUM	8.72E-08	3.11E08	257.6	2	1.73E-08	1	250	25	70	9125	2555
BERYLLIUM	5.21E-09	1.86E-09	15.4	2	1.73E-08	1	250	25	70	9125	2555
CADMIUM	3.23E-10	1.15E-10	1.0	2	1.73E-08	!	250	25	70	9125	2555
CHROMIUM III	8.54E-08	3.05E08	252.3	2	1.73E-08	!!	250	25	70	9125	2555
CHROMIUM VI	8.46E-10	3.02E-10	2.5	2	1.73E-08	1	250	25	70	9125	2555
COBALT	2.33E-09	8.34E-10	6.9	2	1.73E-08	!!	250	25	70	9125	2555
COPPER	1.11E-08	3.95Ë-09	32.7	2	1.73E-08	1	250	25	70	9125	2555
LEAD	4.03E08	1.44E-08	118.9	2	1.73E-08	!	250	25	70	9125	2555
MANGANESE	3.92E-07	1.40E-07	1156.7	2	1.73E-08	1	250	25	70	9125	2555
MERCURY	3.54E11	1.26E-11	0,10	2	1.73E-08	1	250	25	70	9125	2555
NICKEL	2.83E-07	1.01E-07	837.0	2	1.73E-08	1	250	25	70	9125	2555
SELENIUM	5.06E-10	1.81E-10	1.5	2	1.73E08	!	250	25	70	9125	2555
SILVER	5.51E-10	1.97E-10	1.6	2	1.73E-08	1	250	25	70	9125	2555
VANADIUM	1.15E-06	4.09E07	3383.1	2	1.73E-08	1	250	25	70	9125	2555
ZINC	5.71E08	2.04E-08	168.8	2	1.73E08	1	250	25	70	9125	2555
BORON	3.66E-08	1.31E-08	108.1	2	1.73E-08	1	250	25	70	9125	2555
NIOBIUM	6.23E-08	2.22E-08	184.0	2	1.73E-08	1	250	25	70	9125	2555
STRONTIUM	5.43E-08	1.94E08	160.3	2 2	1.73E-08	1	250	25	70	9125	2555
TITANIUM	9.65E-08	3.45E-08	285.0		1.73E08	1	250	25	70	9125	2555
ZIRCONIUM	0.00E+00	0.00E+00	NA	2	1.73E08	1	250	. 25	70	9125	2555
VOLATILE ORGANICS		0.075 . 00			4 707 00	l .	050	05	70	0.105	2555
ACETONE	0.00E+00	0.00E+00		2	1.73E-08	1	250	25	70	9125	
CARBON DISULFIDE	0.00E+00	0.00E+00		2	1.73E-08	1	250	25	70	9125	2555
1,2-DICHLORETHENE (total)	0.00E+00	0.00E+00		2	1.73E-08	1	250	25	70	9125	2555
2-BUTANONE	0.00E+00	0.00E+00		2	1.73E-08	1	250	25	70	9125	2555
TRICHLOROETHENE	1.35E-12	4.84E-13	0.0040	2	1.73E-08	1	250	25	70	9125	2555
BENZENE	0.00E+00	0.00E+00		2	1.73E-08	1 1	250	25	70	9125	2555
TETRACHLOROETHENE	0.00E+00	0.00E+00		2	1.73E08	1	250	25	70	9125	2555
TOLUENE	0.00E+00	0.00E+00		2	1.73E08	!!	250	25	70	9125	2555
ETHYLBENZENE	0.00E+00	0.00E+00		2	1.73E-08	!!	250	25	70	9125	2555
XYLENE (total)	0.00E+00	0.00E+00	NA	2	1.73E−08	1 1	250	25	. 70	9125	2555
BASE NEUTRAL / ACIDS	0.00E+00	0.00E+00	NA	2	1.73€–08	1	250	25	70	9125	2555
PHENOL	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
BENZOIC ACID	0.00E+00	0.00E+00		2	1.73E-08	i	250	25	70	9125	2555
NAPHTHALENË 4-NITROPHENOL	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
2,4-DINITROTOLUENE	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
PENTACHLOROPHENOL	0.00E+00	0.00E+00		2	1.73E⊸08	1	250	25	70	9125	255
PHENANTHRENE	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
ANTHRACENE	7.11E-11	2.54E-11	0.21	2	1.73E-08	1	250	25	70	9125	255
DI-1-BUTYLPHALATE	0.00E+00	0.00E+00		2	1.73E-08		250	25	70	9125	255
FLUORANTHENE	0.00E+00	0.00E+00		2	1.73E-08]	250	25	70	9125	255
PYRENE	0.002+001	0.00E+00		2	1.73E-08		250	25	70	9125	255
BUTYLBENZYLPHTHALATE		0.00E+00		2	1.73E-08		250	25	70	9125	255
BENZO()ANTHRACENE	0.00E+00					!					255
CHRYSENE	0.00E+00	0.00E+00	NA 0.085	2	1.73E-08	!!	250	25	70 70	9125	
bis(2-ETHYLHEXYL)PHTHALATE	2.88E-11	1.03E11			1.73E-08	1 1	250	25		9125	255
BENZO(b)FLUORANTHENE	0.00E+00	0.00E+00		2	1.73E-08	!!	250	25	70	9125	255
BENZO(L)FLUORANTHENE	0.00E+00	0.00E+00			1.73E-08	!!	250	25	70		
BENZO(a)PYRENE	0.00E+00	0.00E+00		2	1.73E-08	1 1	250	25	70	9125	255
INDENO(1,2,3-od)PYRENE	0.00E+00	0.00E+00		2	1.73E-08	1 1	250	25	70	9125	255
BENZO(g, h, i)PER YLENE	0.00E+00	0.00E+00	NA	2	1.73E-08	1	250	25	70	9125	255
PCB'S											
AROCLOR-1248	6.43E10	2.30E-10	1.9	2	1.73E-08	1 1	250	25	70	9125	255
AROCLOR-1254	5.08E-10	1.81E-10	1.5	2	1.73E08	i i	250	25	70	9125	255
AROCLOR-1260	0.00E+00	0.00E+00		2	1.73E-08	i . i	250	25	70	9125	255
NEAL CONTRACTOR OF A											

TABLE A.2–4 CANCER RISK ESTIMATES SCENARIO 2 – Industrial (Current)

	CHRONIC DAILY	CDI					CHEMICAL	TOTAL	1 11
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY	TOTAL
	(mg/kg/day)	ABSORPTION	(mg/kg/day)—1	EVIDENCE	CANCER	SOURCE	RISK	RISK	RISK
									///////////////////////////////////////
EXPOSURE PATHWAY: DERMA								5E-05	
									AUUMAUUNI
PCB'S		1 1					1	11	
AROCLOR-1248	3.6E-06	No	7.70E+00				3E-05	l	
AROCLOR-1254	2.9E-06	No	7.70E+00				2E05	l	•
AROCLOR-1260	0.0E+00	No	7.70E+00		Liver	Diet/IRIS	NA		
							İNNINTANINI	İİ	
NA: Not Applicable									

TABLE A.2--5 CANCER RISK ESTIMATES SCENARIO 2 - Industrial (Current)

	CHRONIC DAILY						CHEMICAL	TOTAL
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
								3E05
INORGANICS								
ARSENIC	8.5E-07	No	1.75E+00	A	Skin	IRIS	1E-06	
BERYLLIUM	5.4E06	No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	2E-05	
LEAD	4.2E05	No	NA	B2	Renal tumors	Oral/IRIS	NA	
VOLATILE ORGANICS TRICHLOROETHENE	1.4E-09	No	1.10E-02	B2	Liver	Gavage/HEAST	2E-11	
BENZENE	0.0E+00	No No	2.90E-02	A	Leukemia	Occupational/IRIS	NA I	
TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	NA I	
	0.02100		U.TUL UL	02		Oavagoriunos		
BASE NEUTRAL / ACIDS								
2.4-DINITROTOLUENE	0.0E+00	No	6.80E-01	B2	Liver, mammary gland	Diet/IRIS	I NA I	
PENTACHLOROPHENOL	0.0E+00	No	1.20E-01	B2	Hepatocellular adenoma, carcinomas, pheochrom		NA	
BENZO(a)ANTHRACENE	0.0E+00	No	1.15E+01	B2	Liver, lung, skin	IRIS	NA	
CHRYSENE	0.0E+00	No	1.15E+01	B2	Malignant lymphoma	IRIS	NA	
bis(2-ETHYLHEXYL)PHTHALATE	3.0E08	No	1.40E-02	B2	Liver	IRIS	4E-10	
BENZO(b)FLUORANTHENE	0.0E+00	No	1.15E+01	B2 ·	Lung, thorax, skin	IRIS	NA	
BENZO(k)FLUORANTHENE	0.0E+00	No	1.15E+01	B2	Lung, thorax, skin	IRIS	NA	
BENZO(a)PYRENE	0.0E+00	No	1.15E+01	B2	Stomach, lung	IRIS	NA	
INDENO(1,2,3-cd)PYRENE	0.0E+00	No	1.15E+01	B2	Lung, skin	IRIS	NA	
PCB'S		NI-					EF m	
AROCLOR-1248	6.6E-07 5.2E-07	No No	7.70E+00 7.70E+00				5E-06 4E-06	
AROCLOR-1254 AROCLOR-1260	5.2E-07 0.0E+00		7.70E+00	B2	Liver	Diet/IRIS	4E-06 NA	1
NA: Not Applicable								I

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NA: Not Applicable

TABLE A.2–6 CANCER RISK ESTIMATES SCENARIO.2 --- Industrial (Current)

	CHRONIC DAILY						CHEMICAL TOTAL
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	CHEMICAL TOTAL
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK RISK
			<u>hanna an an an an an an an an an an an an</u>				
EXPOSURE PATHWAY: INHALA	TION OF AIRBORN	E CHEMICALS AB	Sorbed to Du	IST			1E07
INORGANICS	2.9E10	No No	5.00E+01		Been instant Tuest		1E-08
BERYLLIUM	1.9E-09	I No	8.40E+00	A B2	Respiratory Tract Lung	Occupational/IRIS	2E-08
CADMUM	1.3E-03	No No	6.3	B1	Respiratory Tract	Occupational/IRIS	NA
CHROMUMIII	3.1E-08	No	NA		Respiratory mace	NA/IRIS	NA
CHROMIUM VI	3.0E-10	No	4.20E+01	A	Lung	Occupational/IRIS	1E-08
LEAD	1.4E-08	No	NA	B2	8	NA/IRIS	NA
NICKEL	1.0E-07	No	8.40E-01	Í A	Lung and nasal tumors	Occupational/IRIS	9E08
VOLATILE ORGANICS							
IRICHLOROETHENE	4.8E-13	No No	1.70E-02	B2	Lung	HEAST	8E-15
BENZENE TETRACHLOROETHENE	0.0E+00	No No	2.90E-02	A B2	Leukemia	Occupational/IRIS HEAST	NA NA
III			1.00E-03	02	Leukemia, liver	HEASI	
BASE NEUTRAL/ACIDS							
2,4-DINITROTOLUENE	0.0E+00	No	NA	B2	Liver, mammary	IRIS	NA II
PENTACHLOROPHENOL	0.0E+00	No	NA	B2		NA/IRIS	NA II
BENZO(a)ANTHRACENE	0.0E+00	No	6.10E+00	B2	Liver, lung, skin	IRIS	NA
CHRYSENE	0.0E+00	No	6.10E+00	B2	Malignant lymphoma	IRIS	NA
bis(2-ETHYLHEXYL)PHTHALATE	1.0E-11	No	NA	B2		NA/IRIS	NA ·
BENZO(b)FLUORANTHENE	0.0E+00	No	6.10E+00	B2	Lung, thorax, skin	IRIS	NA
BENZO(k)FLUORANTHENE	0.0E+00	No	6.10E+00	B2	Lung, thorax, skin	IRIS	NA
BENZO(a)PYRENE INDENO(1,2,3-cd)PYRENE	0.0E+00	No No	6.10E+00 6.10E+00	B2 B2	Respiratory tract, stomach	Inhalation/HEAST IRIS	NA NA
 		140	0.102700	D4 .	Lung, skin		
PCB'S							
AROCLOR-1248	2.3E-10	No	NA			NA/IRIS	NA
AROCLOR-1254	1.8E-10	No	NA			NA/IRIS	NA II
AROCLOR-1260	0.0E+00	No	NA	ĺ		NA/IRIS	I NA II
NA: Not Applicable							

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TABLE A.2-7 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 2 - Industrial (Current)

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			I I I I I I I I I I I I I I I I I I I					İ OLEH DINIMAN MANANAN MA	Manan Burni	
CHEMICAL	CHRONIC DAILY INTAKE(CDI)	CDI ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	RFD BASIS/	RFD	MODIFYING	HAZARD	PATHWAY TOTAL HAZARD HAZARD
ii .	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	BFFBCT	BASIS	ADJUSTMENTS	FACTORS	QUOTIENT	INDEX (HI) INDEX (HI)
						İ XI YARA DA BARADA KARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA YARADA		<u>i (611) 1930 64666666666</u>	i ti dhe ka ka ka sa i na i na i	
EXPOSURE PATHWAY: DERMAL CO						*******	*13:14444444444444444444			9E-04 7E-01
INORGANICS	 			18188111111111111111111111111111111111	I () I DAADAA LI I I DI AAAAAAAAAAAAAAAAAAAA	1910-0010-0010-0010-0010-0010-0010-0010				
ALUMINUM	NA NA	No	NA	1		NA/IRIS		1	NA I	i i
ANTIMONY	NA	No	4.00E-04	Low	Longevity, blood glucose and cholesterol	Water/IRIS	1000	1	NA	
ARSENIC	NA NA	No	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST			NA	
BARIUM BERYLLIUM	NA NA	No No	7.00E-02 5.00E-03	Medium Low	None observed	Water/IRIS Water/IRIS	3 100		NA NA	
CADMIUM	8.5E-07	No	1.00E-03	High	Proteinuria	Diet/IRIS	10	1 1	9E-04	
CHROMIUMIII	NA	No	1.00E+00	Low	Hepatotoxicity	IRIS	1000		NA	
CHROMIUM VI	NA NA	No	5.00E-03	Low	No effects observed	Water/IRIS	500	1	NA	
COBALT	NA NA	No	NA	[NA/IRIS	1		NA	1
COPPER.	NA NA	No No	4.00E-02		Local GI irritation Neurobehavioral effects	NA/HEAST		ł	NA NA	
MANGANESE	I NA	No No	1.00E-01	Medium	CNS effects	Diet/IRIS	•	1	NA NA	
MERCURY	NA	No	3.00E-04		Kidney effects	Oral/HEAST	1000		NA	
NICKEL	NA NA	No	2.00E-02	Ì	Reduced body and organ weight	Diet/HEAST	300	i	I NA	
SELENIUM	NA NA	No	5.00E-03	Medium	Clinical scienosis	Diet/IRIS	3	1 1	NA	
SILVER VANADIUM	NA NA	No No	3.00E - 03 7.00E - 03	Medium	Argyria	OraVIRIS Water/HEAST	2 100	1	NA NA	
IZINC	I NA	No	2.00E-03	1	None observed Anemia	Therap,/HEAST	100	1	NA NA	
BORON	NA	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1	NA	
NOBIUM	NA	No	NA	i		NA/IRIS	i iii	i .	NA	
STRONTIUM	NA	No	NA	ļ		NA/IRIS	!		NA	ľ
TITANIUM	I NA	No No	NA NA			NA/IRIS NA/IRIS			NA	[
ZIRCONIUM		NO	NA NA	1		NAVIRIS			NA	
VOLATILE ORGANICS		1	i	i		i	i		1 1	
ACETONE	NA	No	1.00E-01	Low	Increased liver and kidney weight	Gavage/IRIS	1000	1 1	NA	i i i i i i i i i i i i i i i i i i i
CARBON DISULFIDE	NA	No	1.00E-01	Medium	Fetal toxicity	Inhal/IRIS	100	1	NA	
1,2-DICHLORETHENE (total)	NA NA	l No No	1.00E-02 5.00E-02	hteetuma	Decreased hematocrit and hemoglobin	Gavage/HEAST Inhal./IRIS	3000 1000	Į	NA I	
TRICHLOROETHENE	NA NA	No	NA	Medium	Fetotoxicity	NA/IRIS	1000		NA	
BENZENE	NA	No	NA		•	NA/IRIS	i		NA	
TETRACHLOROETHENE	Í NA	No	1.00E-02	Medium	Hepatotoxicity, weight gain	Gavage/IRIS	100	1 1	NA	
TOLUENE	. NA	No	2.00E-01	Medium	Changes in liver and kidney weights	Gavage/IRIS	1000	1	NA	
ETHYLBENZENE XYLENE (total)	NA NA	No No	1.00E-01 2.00E+00	Low Medium	Liver and kidney toxicity Hyperactivity,decreased body weight,increased	Oral/IRIS Gavage/IRIS	1000		NA NA	
			2.000 +00		Typeracuvity, accreased body weight, her cased	Uavago IKIS			, " <u>~</u>	
BASE NEUTRAL / ACI DS			1	ĺ				i i	1	
PHENOL	NA	No	6.00E-01	Low	Reduced fetal body weight	Gavage/IRIS	100	1	NA	
BENZOIC ACID	NA NA	No	4.00E+00	Medium	The second states of the secon	OraVIRIS	1	1	NA	
NAPHIHALENE	NA NA	No No	4.00E-03		Decreased body weight gain	Gavage/HEAST NA/IRIS	10000		NA NA	
24-DINITROTOLUENE	NA NA	No	NA NA	i		NAJIRIS		1	NA	
PENTACHLOROPHENOL	NA NA	No	3.00E-02	Medium	Liver and kidney pathology	DievIRIS	100	i 1	NA	i i
PHENANTHRENE	NA	No	NA			NA/IRIS	Į	l	NA	l.
ANTHRACENE	NA NA	No No	3.00E-01	Low	No observed effects	Gavage/IRIS	3000	1	NA NA	
DI-1-BUTYLPHALATE	I NA NA	l No I No	1.00E-01 4.00E-02	Low Low	Increased mortality Nephropathy, changes in liver weight, hematology	Diet/IRIS Gavage/IRIS	1000		NA I	
PYRENE	NA	No	3.00E-02	Low	Kidney effects	Gavage/IRIS	3000	i i	NA	
BUTYLBENZYLPHTHALATE	NA	No	2.00E-01	Low	Effects on body weight gain, testes, liver, kidney	Diet/IRIS	1000	i i	NA	
BENZO(1)ANTHRACENE	NA	No	NA	1		NA/IRIS		1	NA	
CHRYSENE	NA NA	No	NA accelutor	144.00	The second state of the second state	NA/IRIS	40		NA	
bi+(2-ETHYLHEXYL)PHTHALATE BEN2O(b)FLUORANTHENE	NA NA	No No	2.00E ~ 02	Medium	Increased relative liver weight	Diet/IRIS NA/IRIS	1000	1	NA NA	
BENZO(b)FLUORANTHENE	NA NA	l No	NA			NA/IRIS	1	1	NA NA	
BENZO(1)PYRENE	NA	No	NA	1		NA/IRIS	i	i	NA	
NDENO(1,2,3-cd)PYRENE	NA	No	NA	1		NA/IRIS	1	İ	I NA I	
BENZO(8, 1, i)PERYLENE	NA NA	No	NA	1		NA/IRIS	1]	NA	
PCB'S			1	ł		1	1			
AROCLOR-1248	1.0E-05	No	NA	i		NAIRIS	1		NA	
AROCLOR - 1254	8.0E06	No	NA NA	I		NA/IRIS	i	1	NA	
AROCLOR - 1260	0.0E+00	No No	Í NA			NA/IRIS	 	l	NA	
[[/]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]	91911111111111111111111111111111111111			IN THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OF THE						

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TABLE A.2-8 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 2 – Industrial (Current)

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CHEMICAL	CHRONIC DAILY INTAKE(CDI)	CDI ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD HA
			1	1 0000	PREBOT	SOURCE	ADJUSTMENTS	FACTORS	QUOTIBNT INC
TITI TATA MATANA ANA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AMIN'NA AM		İN MANAMAN MANAMAN MANA	in na hAin Ain Ain Ain Ain Ain Ain Ain Ain Ain	100000000000000000000000000000000000000			LA BARANSI NA SINA KANA MATA		AN THE REPORT AND A DESCRIPTION OF A DES
	I TEREFOLDEN HAN TANKER IN	TI I I I I I I I I I I I I I I I I I I	H I I I I I I I I I I I I I I I I I I I		, MANANANAN MANANANANANANANANANANANANANAN		1 minumunum minu	hummun	
INORGANICS		1	1	ļ		NAARIS	1		
LUMINUM	2.6E-02	No	NA	! .	the second state of the se	Water/IRIS	1000	1 1	1E-02
NTIMONY	5.0E-06	No	4.00E-04	Low	Longevity,blood glucose and cholesterol	Diet/HEAST	1 1		2E-03
RSENIC	2.4E-06	No	1.00E-03	h ht a diama	Keratosis and hyperpigmentation None observed	Water/IRIS	3	i .	4E-03
ARIUM	2.5E-04	No	7.00E-02	Medium	None observed	Water/IRIS	1 100	1	3E-03
ERYLLIUM	1.5E-05	l No	5.00E-03	Low	Proteinuria	Diet/IRIS	10	1	9E04
ADMIUM	9.3E-07	No	1.00E-03 1.00E+00	High Low	Hcp atotoxicity	IRIS	1000		2E-04
HROMIUM III	2.5E-04	No No	5.00E-03	Low	No effects observed	Water/IRIS	500	1 1	5E-04
HROMIUM VI	2.4E-08 6.7E-06	I No	1 5.00E=03	LOW		NAARIS		i	NA I
OBALT		No No	4.00E-02	{	Local GI irritation	NAMEAST	i	i	8E-04
OPPER	3.2E-05 1.2E-04	I No	1 4.00E-02	}	Neurobehavioral effects	NAARIS	i	i	i na ii
EAD	1.1E-03	I No	1.00E-01	Medium	CNS effects	DietARIS	i 1	i 1	16-02
IANGANESE	1.0E-07	No No	3.00E-04	1 mount	Kidney effects	Oral/HEAST	1000	i	3E-04
IERCURY	8.2E-04	No No	2.00E-02	1	Reduced body and organ weight	Diet/HEAST	300	1 I	4E-02
ICKEL	1.5E-06	No	5.00E-02		Clinical selenosis	Diet/IRIS	3	į 1	3E-04
	1.6E-06	No	3.00E-03		Argyria	Oral/IRIS	2	į 1	5E-04
ANADIUM	3.3E-03	No	7.00E-03		None observed	Water/HEAST	100	1	5E-01
INC	1.7E-04	i No	2.00E-01	i	Anemia	Therap./HEAST	10	1	8E-04
ORON	1.1E-04	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	j 1	1E-03
IOBIUM	1.8E-04	No	NA	1	· · · · · · · · · · · · · · · · · · ·	NAARIS	1	l	NA I
TRONTIUM	1.6E-04	No	NA	i ·	· · · · · · · · · · · · · · · · · · ·) NAARIS	1	1	NA
ITANIUM	2.8E-04	No	NA	i		NA/I RIS	Î	1	NA
IRCONIUM	0.0E+00	No	NA NA	i		NAARIS	1	1	NA
IRCOMOM	0.02100		1	1		l	1	1	1 1
VOLATILE ORGANICS		1	1	i	i	1	1	1	1
CETONE	0.0E+00	Í No	1.00E-01	Low	Increased liver and kidney weight	Gavage/IRIS	1000	1 1	NA I
ARBONDISULFIDE	0.0E+00	No	1.00E-01	Medium	Fetal toxicity	Inhal./IRIS	100	1	NA II
2-DICHLORETHENE (total)	0.0E+00	No	1.00E-02		Decreased hematocrit and hemoglobin	Gavage/HEAST	3000	I .	I NA II
-BUTANONE	0.0E+00	No	5.00E-02	Medium	Fetotoxicity	Inhal./IRIS	1000	1	I NA II
RICHLOROETHENE	3.9E-09		NA	1		NAIRIS	1	1	NA
ENZENE	0.0E+00	No	NA	i		NAIRIS	1		NA II
STRACHLOROETHENE	0.0E+00	No	1.00E-02	Medium	Hep atotoxicity, weight gain	Gavage/IRIS	100	1	NA II
OLUENB	0.0E+00	No	2.00E-01	Medium	Changes in liver and kidney weights	Gavage/IRIS	1000	1	NA II
THYLBENZENE	0.0E+00	No	1.00E-01	j Low	Liver and kidney toxicity	Oral/IRIS	1000	1 1	NA II
YLENE (total)	0.0E+00	No	2.00E+00	Medium	Hyperactivity, decreased body weight, increased	Gavage/IRIS	100	1 1	NA I
		i	1	i		1	1	1	1 []
BASE NEUTRAL / ACIDS		i	1	1	l	· ·		! .	1
HENOL	0.0E+00	No	6.00E-01		Reduced fetal body weight	Gavage/IRIS	100	1	NA I
ENZOIC ACID	0.0E+00		4.00E+00		I	Oral/IRIS	1	1	NA I
IAPHTHALENE	0.0E+00	No	4.00E-03	1	Decreased body weight gain	Gavage/HEAST	10000	1	NA
-NITROPHENOL	0.0E+00		NA NA	1	1	NAARIS	1	1	NA II
4-DINITR OTOLUENE	0.0E+00		I NA	1	1	NAIRIS	1		<u>NA</u> []
ENTACHLOROPHENOL	0.0E+00		3.00E-02	Medium	Liver and kidney pathology	Diet/IRIS	100	1	NA I
HENANTHRENE	0.0E+00		I NA	1		NAARIS	1	1	NA I
NTHRACENE	0.0E+00		3.00E-01		No observed effects	Gavage/IRIS	3000	1 1	NA II
I-R-BUTYLPHALATE	2.1E-07	No	1.00E-01		Increased mortality	Diet/IRIS	1000	1	2E-06
LUORANTHENE	0.0E+00		4.00E-02		Nephropathy, changes in liver weight, hematology	Gavage/IRIS	3000	1 1	
YRENE	0.0E+00	No	3.00E-02		Kidney effects	Gavage/IRIS	3000	1 1	
UTYLBENZYLPHTHALATE	0.0E+00	No	2.00E-01	Low	Effects on body weight gain, testes, liver, kidney	DietARIS	1000	1 1	NA II
ENZO(1)ANTHRACENE	0.0E+00		NA NA	1		NAIRIS	1	!	NA [
HRYSENE	0.0E+00		. NA			NAIRIS	1	1 .	NA 4E-06
is (2 - ETHYLHEXYL)PHTHALATE	8.3E-08		2.00E-02	Medium	Increased relative liver weight	Diet/IRIS	1000	1 1	
ENZO(b)FLUORANTHENE	0.0E+00		NA	1		NAARIS	1	1	NA II
ENZO(k)FLUORANTHENE	0.0E+00		NA NA	1		NAIRIS	1	1	
ENZO()PYRENE	0.0E+00		NA	1		NAARIS	1	1	NA II NA II
NDENO(1,2,3-ed)PYRENE	0.0E+00		NA	1		NAIRIS	I	1	
ENZO(s, h, i)PERYLENE	0.0E+00	No	NA NA	· ·	Į –	NAARIS	1	1	NA I
		1	I	ļ	1	1	1	1	· ·
PCB'S		1	I		1		1	1	
AROCLOR -1248	1.9E~06		NA NA	1	1	NA/IRIS			NA II
AROCLOR -1254	1.5E-06		NA NA	ļ.		NA/IRIS	1	1	
ROCLOR -1260	0.0E+00	No	I NA	1		NA/IRIS		·	NA I

TABLE A.2-9 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 2 – Industrial (Current).

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CARRICCA Interactions Output part of			I INTERNATIONALISATION								
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Number of the second											
Barton Barton<				(=g/tg/aty)	LEVEL		SOURCE	ADJUSTMENTS	FACTORS	QUOTIENT	INDBX (HI)
Instruction Instruction	EXPOSURE PATHWAY: INHALATION	OF AIRBORNE CH	IEMICALS ABSO	RRED TO DUST	RITECTICIALANEREREFEREN						ESTERATION CONTRACTOR OF
International Internatinterenational International International Internationa					DEPENDENT						2E-01
ILLMANNA 8.80-00 NA NA Determine 5.80-00 1.00 4.00-00 1.000 <	INORGANICS	1		1					NULLIN CONTRACTOR		I FUTUTITITITI I I I I I I I I I I I I I I
Instructions Instructions<		8.9E-06	No	NA	1				ļ		!
Instance 0 42 - 50 No. 1 502 - 50 No.					1		NAIRIS	!	!		ļ
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Instruction 6.82-00 No. 6.50-0 Instruction Name No. 0.000 0.42-00 Lencon 6.82-00 No. 6.50-00 No. 6.5-00 No. 1.50-00 Lencon 6.82-00 No. 5.71-07 No.					1	Retotoriaity					
Incontrol 3.84-00 Mode 1.000-05 Nate	BERYLLIUM				ł	reconducty	HEAST	1000	ļ		
Instruction 8.8-00 No. 5.71-07 Natal accoss strophy Second T NARRS 0.00 1.1-07 Construction 1.1-06 No. N.					1			1			
Instruction State	CHROMIUM III					Need					
Instant 2 at - 00 No NA Na National National National National Discourse 3 at - 01 No 90 National Nati	CHROMIUM VI				ł				!		
Incores 1.16-08 No NA NA NA NA NA NA NA NA Locan 3.56-11 No AA No NA <td>COBALT</td> <td></td> <td></td> <td></td> <td>1</td> <td>тазат шисоза апорцу</td> <td></td> <td>300</td> <td></td> <td></td> <td></td>	COBALT				1	тазат шисоза апорцу		300			
LEAD Add.Cost No	COPPER				1			!	!		
Invariant 3 35-07 No 1,00-04 Madue Instruction of transported distributions of provinition of transported distributions of transported distribution of transported distribution of transported distrib	LEAD				i	CNS offects			ļ		
MERCENY 3 52-11 No 9 000-00 NA Meanstanding for the standard barry Operational (REAT) 30 0 3 4z-000 NAAR 15 8 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NAAR 15 NA NA NA NA NA NA NAAR 15 NA NA NA NA NA NA NAAR 15 NA NA NA NA NA NA NA NAAR 15 NA NA NA NA NA NA NA NAAR 15 NA NA NA NA NA NA NA NAAR 15 NA NA NA NA <td>MANGANESE</td> <td></td> <td></td> <td></td> <td>Medium</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	MANGANESE				Medium						
INCRED: 2 BE-07 No NA INCREMENT Owners of the second se	MERCURY								3		
BLEUNIM 5.6E-10 No NA NA BUTA 5.2E-10 No NA NA BUTA 5.2E-10 No AA NA BUTA 1.7E-00 No 7.2E-00 NA 22-00 BORON 3.7E-00 No AA 22-00 22-00 BORON 3.7E-00 No AA 22-00 22-00 BORON 6.2E-00 No AA NA 22-00 BORON 6.2E-00 No AA NA NA BORON 6.2E-00 No AA NA NA BORON 0.2E-00 NO NA NA NA BORON 0.2E-00 NO NA NA NA BORON 0.2E-00 NO NA NA NA BORON 0.2E-00 NA NA NA NA BORON 0.2E-00 NA NA NA NA BOR					i	Transionicity		30	1		
Intrast 5.52-10 No. NA	FELENIUM										
IMAGD10M 115-09 No 7.00E-09 NA NA DRC 5.7E-08 No MA SE					i			1	!		
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Ibelazo(h)FLUORANTHENE 0.0E+00 No NA NA Ibelazo(h)FLUORANTHENE 0.0E+00 No NA Ite-09 Ibelazo(h)FLUORANTHENE 0.0E+00 No NA NA/RIS NA Ibelazo(h)FLUORANTHENE 0.0E+00 No NA NA/RIS NA Ibelazo(h)FLUORANTHENE 0.0E+00 No NA NA/RIS NA InvoEnvo(1,3)-cdyPyReNE 0.0E+00 No NA NA NA/RIS NA Ibelazo(cybright)PRENE 0.0E+00 No NA NA NA/RIS NA Ibelazo(cybright)PRENE 0.0E+00 No NA NA/RIS NA Ibelazo(cybright)PRENE 0.0E+00 No NA NA/RIS NA Ibelazo(cybright)PRENE 0.0E+00 No NA NA/RIS NA Ibelazo(cybright)PRENE 0.0E+00 No NA NA NA/RIS NA Ibelazo(cybright)Prene V No NA NA/RIS NA NA <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>NAARIS</td> <td></td> <td></td> <td></td> <td></td>							NAARIS				
BENZO(k)FLUORANTHENE 0.0E+00 No NA 1E-09 BENZO(k)FLUORANTHENE 0.0E+00 No NA NAARIS NA BENZO(k)FLUORANTHENE 0.0E+00 No NA NAARIS NA BENZO(k)FURDE 0.0E+00 No NA NA NA NA INDENO(1,2,3)-c49*YRENE 0.0E+00 No NA NA NA NA INDENO(1,2,3)-c49*YRENE 0.0E+00 No NA NA NA NA IBENZO(2,4,1)PERYLENE 0.0E+00 No NA NA NA NA IBENZO(2,4,1)PERYLENE 0.0E+00 No NA NA NA NA IAROCLOR -1248 6.4E-10 No NA NA NA NA IAROCLOR -1234 5.1E-10 No NA NA NA NA IAROCLOR -1240 0.0E+00 No NA NA NA NA											
IBENZO(1)P YRENE 0.0E+00 No NA NA INDENO(1,3,3-c4)PYRENE 0.0E+00 No NA NA INDENO(1,3,3-c4)PYRENE 0.0E+00 No NA NA INDENO(1,3,3-c4)PYRENE 0.0E+00 No NA NA INDENO(1,3,3-c4)PYRENE 0.0E+00 No NA NA INDENO(1,3,3-c4)PYRENE 0.0E+00 No NA NA ISENZO(4,6,1)PREYLENE 0.0E+00 No NA NA IROCLOR-1248 6.4E-10 No NA NA IAROCLOR -1254 5.1E-10 No NA NA IAROCLOR -1260 0.0E+00 No NA NA											
INDENO(1,2,3-cd)PYRENE 0.0E+00 No NA NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NAARIS NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NA NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NA NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NA NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NA NA IBENZO(1,4,1)PERYLENE 0.0E+00 No NA NA NA IBENZO(2,4,1)PERYLENE 0.0E+00 No NA NA NA IAROCLOR -1248 6.4E-10 No NA NA NA IAROCLOR -1254 5.1E-10 No NA NA NA IAROCLOR -1269 0.0E+00 No NA NA NA											
BENZO(2,k.)PERYLENE 0.0E+00 No NA NA I PCB'S I NA NA IAROCLOR -1248 6.4E-10 No NA I IAROCLOR -1248 5.1E-10 No NA I IAROCLOR -1249 0.0E+00 No NA I IAROCLOR -1249 0.0E+00 No NA I IAROCLOR -1249 0.0E+00 No NA I IAROCLOR -1249 0.0E+00 No NA I IAROCLOR -1249 0.0E+00 No NA I IAROCLOR -1249 0.0E+00 No NA I											
PCB'S NA AROCLOR -1248 6.4E-10 No NA AROCLOR -1244 5.1E-10 No NA AROCLOR -1246 0.0E+00 NA NA AROCLOR -1249 NA NA NA						· · · · · · · · · · · · · · · · · · ·					
AROCLOR -1248 6.4E-10 No NA NA AROCLOR -1254 5.1E-10 No NA NA AROCLOR -1254 5.1E-10 No NA NA AROCLOR -1254 0.0E+00 No NA NA AROCLOR -1269 0.0E+00 No NA NA		3.02100					NAARIS			NA	
AROCLOR -1248 6.4E-10 No NA NA AROCLOR -1254 5.1E-10 No NA NA AROCLOR -1254 5.1E-10 No NA NA AROCLOR -1254 0.0E+00 No NA NA AROCLOR -1269 0.0E+00 No NA NA	PCB'S										
IAROCLOR -1234 5.1E-10 No NA NA IAROCLOR -1260 0.0E+00 No NA NA IAROCLOR -1260 NATRIS NA NA		6.4E-10	No	NA							
	AROCLOR -1260	0.0E+00	No	NA			11.0000				
NA: Not Applicable				100000000000000000000000000000000000000			NAARIS			NA I	
	NA: Not Applicable			***************************************			A A MARAKAN MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA M	C FE C F F F F F F F F F F F F F F F F F	TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT		

TABLE A.3-1D INGESTION OF CHEMICALS IN DEEP GROUND WATER SCENARIO 3-Residential (Current)

CHEMICAL	INTAKE	INTAKE CANCER	CONC. IN	INGESTION	EXPOSURE	ED	BODY	AVG. TIME	AVG. TIME
II CHEMICAL	NONCANCER		WATER	RATE	FREQUENCY	· · · · · · · · · · · · · · · · · · ·	WEIGHT	NONCANCER	CANCER
	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(liter/day)	(days/yr)	(years)	(kg)	ADULT (days)	(days)
INORGANICS									
ALUMINUM	2.72E+00	1.17E±00	99.40	2.0	350	30 .	70	10950	25550
ANTIMONY	5.86E-02	2.51E-02	2.14	2.0	350	30	70	10950	25550
ARSENIC	9.64E-03	4.13E-03	0.35	2.0	350	30	70	10950	25550
BARIUM	1.39E-02	5.95E-03	0.51	2.0	350	30	70	10950	25550
BERYLLIUM	3.10E-04	1.33E-04	0.011	2.0	350	30	70	10950	25550
CADMIUM	0.00E+00	0.00E+00	NA	2.0	350	30	70	10950	25550
CHROMIUM III	2.76E+00	1.18E+00	100.60	2.0	350	30	70	10950	25550
CHROMIUM VI	3.84E~02	1.64E-02	1.40	2.0	350	30	70	10950	25550
COBALT	1.20E-03	5.14E04	0.044	2.0	350	30	70	10950	25550
COPPER	1.03E03	4.43E-04	0.038	2.0	350	30	70	10950	25550
LEAD	6.68E-04	2.86E-04	0.024	2.0	350	30	70	10950	25550
MANGANESE	4.82E-03	2.07E-03	0.18	2.0	350	30	70	10950	25550
MERCURY	2.68E05	1.15E05	0.0010	2.0	350	· 30	70	10950	25550
NICKEL	2.38E04	1.02E-04	0.0087	2.0	350	30	70	10950	25550
SELENIUM	3.56E-03	1.53E-03	0.13	2.0	350	. 30	70	10950	25550
SILVER	1.40E-04	5.99E-05	0.0051	2.0	350	30	70	10950	25550
VANADIUM	5.48E-02	2.35E-02	2.00	2.0	350	30	70	10950	25550
ZINC	1.78E-03	7.64E-04	0.065	2.0	350	30	. 70	10950	25550
CYANIDE	1.70E-03	7.30E-04	0.062	2.0	-350	30	- 70	10950	25550
BORON	4.33E-03	1.86E-03	0.16	2.0	350	30	- 70	10950	25550
STRONTIUM	8.71E-03	3.73E-03	0.32	2.0	350	30	70	10950	25550
TITANIUM	8.90E-03	3.82E-03	0.33	2.0	350	30	70	10950	25550
ii ii									i ii
VOLATILE ORGANICS)
TRICHLOROETHENE	1.92E~03	8.22E-04	0.070	2.0	350	30	70	10950	25550
TETRACHLOROETHENE	2.74E~05	1.17E-05	0.0010	2.0	350	30	70	10950	25550
BASE NEUTRAL / ACIDS					a			100	
bis(2-ETHYLHEXYL)PHTHALATE		4.70E-05	0.0040	2.0	350	30	70	10950	25550
NA: Not Applicable									

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TABLE A.3-2D INHALATION OF AIRBORNE (VAPOR PHASE) CHEMICALS FROM DEEP GROUNDWATER SCENARIO 3-Residential (Current)

		IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	CONC. IN	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	EXPOSURE	EXPOSURE		BODY	AVG. TIME	AVG. TIME	
CHEMICAL	NONCANCER	CANCER	AIR	RATE	TIME	FREQUENCY	ED	WEIGHT	NONCANCER	CANCER	
	(mg/kg/day)	(mg/kg/day)	(mg/m3)	(m3/hour)	(hours/day)	(days/yr)	(years)	(kg)	(days)	(days)	
VOLATILE ORGANICS TRICHLOROETHENE TETRACHLOROETHENE	5.73E-02 8.19E-04	2.46E-02 3.51E-04	0.210 0.0030	0.830 0.830	24.0 24.0	350 350	30 30	70 70	10950 10950	25550 25550	
BASE NEUTRAL / ACIDS	 3.27E–03 	1.40E-03 	0.012	0.830	24.0	350	30	70	10950 	25550	

TABLE A.3–3D COMPOUNDS CONCENTRATIONS EMITTED FROM DEEP GROUNDWATER SCENARIO 3–Residential (Current)

	Concentration tap water (mg/L)	Flow Rate Of Shower Water (I/hr)	Fraction Of Contaminant Volatilized	One Half The Duration Of Shower (hr)	liiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	Mean Conc In Bathroom (mg/m3)
VOLATILE ORGANICS TRICHLOROETHENE TETRACHLOROETHENE	0.0700 0.0010	400.0 400.0	0.9 0.9	0.1 0.1	12.0 12.0	2.1E-01 3.0E-03
BASE NEUTRAL / ACIDS bis(2-ETHYLHEXYL)PHTHALATE 	0.0040	400.0	0.9	0.1	12.0	1.2E–02

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TABLE A.3-4D DERMAL CONTACT WITH CHEMICALS IN DEEP GROUNDWATER SCENARIO 3-Residential (Current)

	ABSORBED DOSE	ABSORBED DOSE	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		DERMAL	EXPOSURE	EXPOSURE		CONVERSION	BODY	AVG TIME	AVG. TIME
CHEMICAL	NONCANCER	CANCER	WATER	AREA	PERMEABILITY		FREQUENCY		FACTOR	WEIGHT	NONCANCER	CANCER
	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(cm2/event)	(cm/hr)	(hrs/day)	(days/year)	(years)	(L/cm3)	(kg)	(days)	(days)
INORGANICS			i									i
ALUMINUM	4.15E-03	1.78E-03	99.40	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
ANTIMONY	8.94E-05	3.83E-05	2.14	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
ARSENIC	1.47E-05	6.30E-06	0.35	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
BARIUM	2.12E-05	9.08E-06	0.51	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
BERYLLIUM	4.72E07	2.02E-07	0.011	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
CADMIUM	0.00E+00	0.00E+00) NA	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
CHROMIUM III	4.20E-03	1.80E-03	100.60	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
CHROMIUM VI	5.85E05	2.51E-05	1.40	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
COBALT	1.83E06	7.84E-07	0.044	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
COPPER	1.57E-06	6.75E-07	0.038	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
LEAD	1.02E06	4.37E-07	0.024	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
MANGANESE	7.35E-06	3.15E-06	0.18	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
MERCURY	4.09E-08	1.75E-08	0.0010	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
NICKEL	3.63E07	1.56E-07	0.0087	18150	8,4E04	0.20	350	30	0.001	70	10950	25550
SELENIUM	5.43E06	2.33E-06	0.13	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
SILVER	2.13E-07	9.13E08	0.0051	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
VANADIUM	8.35E05	3.58E-05	2.00	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
ZINC	2.72E-06	1.17E-06	0.065	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
CYANIDE	2.60E-06	1.11E-06	0.062	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
BORON	6.60E-06	2.83E-06	0.16	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
STRONTIUM	1.33E-05	5.69E-06	0.32	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
TITANIUM	1.36E05	5.82E-06	0.33	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
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VOLATILE ORGANICS												
TRICHLOROETHENE	2.92E-06	1.25E-06	0.070	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
TETRACHLOROETHENE	4.18E08	1.79E-08	0.0010	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
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BASE NEUTRAL / ACIDS	4.075.07			40450	A 15 A 1						10070	0.555.0
bis(2-ETHYLHEXYL)PHTHA		7.16E08	0.0040	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
NA: Not Applicable												

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TABLE A.3–5D CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

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	CHRONIC DAILY							TOTAL TOTAL
CHEMICAL	INTAKE	ADJUSTEDFOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	CHEM. SPEC.	PATHWAY EXPOSURE
	(mg/kg/day)	ABSORPTION	(mg/kg/day)– 1	EVIDENCE	CANCER	SOURCE	RISK	RISK RISK
EXPOSURE PATHWAY: INGESTION	OF CHEMICALS IN	N DEEP GROUND W	VATER				ADULT	8E-03 8E-03
INORGANICS						1		
ARSENIC	4.1E-03	No	1.75E+00	A	Skin	IRIS	7E-03	
BERYLLIUM	1.3E-04	No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	6E-04	
LEAD	2.9E-04	No	NA	B2	Renal tumors	Oral/IRIS	I NA	
				i i		1		· ·
VOLATILE ORGANICS				1		İ		I
TRICHLOROETHENE	8.2E-04	No	1.10E-02	B2	Liver	Gavage/HEAST	9E06	
ITETRACHLOROETHENE	1.2E05	No	5.10E-02	B2	Liver	Gavage/HEAST	6E07	
							İ	
BASE NEUTRAL / ACIDS								
bis(2-ETHYLHEXYL)PHTHALATE	4.7E05	No	1.40E-02	B2	Liver	IRIS	7E-07	
							inenanunununun	
NA: Not Applicable		******				112111111111111111111111111111111111111		••
ivA. Not Applicable								

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TABLE A.3–6D CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

1111111									
1		CDI-ADULT	CDI	1				CHEM. SPEC.	TOTAL
Ĥ	CHEMICAL	MEAN	ADJUSTED FOR	SF	WEIGHTOF	TYPE OF	SF BASIS/	RISK-ADULT	PATHWAY
ii		(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	MEAN	RISK
iinn									
EXP	OSURE PATHWAY: INHALA	TION OF AIRBOR	NE (VAPOR PHAS	SE) CHEMICALS	FROM DEEP	GROUNDWATER			4E-04
İIIIII									
				1	 			ļ	
11	VOLATILE ORGANICS	1							
TRIC	HLOROETHENE	2.5E-02	No	1.70E-02	B2	Lung	HEAST	4.2E-04	11
	RACHLOROETHENE	3.5E-04		1.80E-03	B2	Leukemia, liver	HEAST	6.3E-07	• •
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NIA · N	lot Applicable								

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TABLE A.3–7D CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

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11	CHRONIC DAILY	CDI			·			TOTAL
CHEMICAL	INTAKE	ADJUSTED FOR	SF	WEIGHTOF	TYPE OF	SF BASIS/	CHEM. SPEC.	PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
IEXPOSURE PATHWAY: DERMA								1E05
INORGANICS	1				· ·			
ARSENIC	6.3E-06	No	1.75E+00		Skin	IRIS	1E-05	
ii		1						11
VOLATILE ORGANICS	i	Ì						11
TRICHLOROETHENE	1.3E-06	Í No	1.10E-02	B2	Liver	Gavage/HEAST	1E-08	ł
TETRACHLOROETHENE	1.8E-08	i No	5.10E-02	B2	Liver	Gavage/HEAST	9E-10	ŧI
	i	İ		Ì				11
BASE NEUTRAL / ACIDS	i i	İ	İ	İ				11
bis(2-ETHYLHEXYL)PHTHALATE	7.2E-08	No	1.40E-02	B2	Liver	IRIS	1E-09	11
								ll i
NA: Not Applicable								

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NA: Not Applicable

TABLE A.3-8 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII							, na sa sa sa sa sa sa sa sa sa sa sa sa sa		
CHEMICAL	INTAKE	CDI ADJUSTED FOR	l RFD	I CONFIDENCE	CRITICAL	RFD BASIS/	UNCERTAINTY			HAZARD EXPOSURE
	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		QUOTIENT	
IEXPOSURE PATHWAY: INGEST		ALS IN DEEP GBO		*****						2E+02 2E+02
							1011918620000111060000			
II INORGANICS	1		1		(1111)11111111111111111111111111111111					
ALUMINUM	2.7E+00	No	Í NA	Í		NA/IRIS	1	1	I NA İ	
ANTIMONY	5.9E-02	No	4.00E-04	Low	Longevity,blood glucose and cholesterol	Water/IRIS	1000	i 1	1E+02	
ARSENIC	9.6E-03	No	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST	1		1E+01	
BARIUM	1.4E-02	No	7.00E-02	Medium	None observed	Water/IRIS	j 3 -	i 1	2E-01	
BERYLLIUM	3.1E04	No	5.00E-03	Low	None observed	Water/IRIS	100	j 1	6E-02	
CADMIUM	0.0E+00	No	1.00E-03	i High	Proteinuria	Diet/IRIS	10	j 1	NA	
CHROMIUM III	2.8E+00	No	1.00E+00	Low	Hepatotoxicity	j IRIS	1000	İ	3E+00	ĺ
CHROMIUM VI	3.8E-02	No	5.00E-03	Low	No effects observed	Water/IRIS	500	j 1	8E+00	
COBALT	1.2E-03	No No	I NA	ĺ		NA/IRIS	i	Í	NA I	
COPPER	1.0E-03) No	4.00E-02		Local GI irritation	NA/HEAST	i	Í	3E-02	
LEAD	6.7E-04	No No	NA		Neurobehavioral effects	NA/IRIS	1	1	NA	
MANGANESE	4.8E-03	l No	1.00E-01	Medium	CNS effects	Diet/IRIS	1	1	5E-02	
MERCURY	2.7E-05	No	3.00E-04		Kidney effects	Oral/HEAST	1000	1	9E-02	
NICKEL	2.4E-04	No	2.00E-02	1	Reduced body and organ weight	Diet/HEAST	1	1	1E-02	1
SELENIUM	3.6E-03	No	5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	1	7E-01	
SILVER	1.4E04) No	3.00E-03	Medium	Argyria	Oral/IRIS	2	1	5E-02	
VANADIUM	5.5E-02	No	7.00E-03		None observed	Water/HEAST	100	1	8E+00	
ZINC	1.8E-03	No	2.00E-01		Anemia	Therap./HEAST	10	1	9E-03	l .
CYANIDE	1.7E-03	No	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5	9E-02	
BORON	4.3E-03	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1	5E-02	
STRONTIUM	8.7E-03	No	NA			NA/IRIS			NA	
TTTANIUM	8.9E-03	No	NA			NA/IRIS		ļ	NA	
			•							
VOLATILE ORGANICS		!	!				l			
TRICHLOROETHENE	1.9E-03	l No	I NA		1 · · · · · · · · · · · · · · · · · · ·	NA/IRIS	100		NA	
TETRACHLOROETHENE	2.7E-05	No	1.00E-02	Medium	Hepatotoxicity,weight gain	Gavage/IRIS	100	ļ 1	3E-03	
			[ſ			!	1		
BASE NEUTRAL / ACIDS	1.1E-04	No	2.00E-02	l Medium	To many dial to the time matched	Diet/IRIS	1000		FF 00	
bis(2-ETHYLHEXYL)PHTHALATE					Increased relative liver weight			1 1	5E-03	

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TABLE A.3-9 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

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	144 - 144 - 144		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						
11	CHRONIC DALLY	CDI	1			RFC	RFD	HAZARD PA	THWAY 🔢
CHEMICAL	INTAKE ADULT	ADJUSTED FOR	RFC	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING QUOTIENT H.	azard
	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		SEX (HI)
EXPOSURE PATHWAY: INHA									0E+00
									ANNI IN IN IN IN
ll				1				1 1	
VOLATILE ORGANICS	1	1	!	1			1	1 1	
TRICHLOROETHENE	5.7E-02	No	I NA			NA/IRIS	1		
TETRACHLOROETHENE	8.2E-04		I NA	i i		NA/IRIS	1		
		UUUUUUNA HILLINNI HILLI	İNNIMINININININ)1111111111111111111111111111111111111	
NA: Not Applicable									

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TABLE A.3-10 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3- Residential (Current)

.

CHEMICAL	CHRONIC DALLY	CDI ADJUSTED FOR	i RFD	CONFIDENCE	CRITICAL	RFD BASIS/	RFD UNCERTAINTY			PATHWAY
II CHEMICAL	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS			
IEXPOSURE PATHWAY: DERMA	I CONTACT WITH	CHEMICALS IN	DEEP GROUND	WATER			111111111111111111111111111111111111111	1111111111111111111111	******	3E-01 It
							351541111111144444411111		RIELENDREITENEN IN	0.0000000000000000000000000000000000000
INORGANICS]	**************************************					1			
IALUMINUM	4.2E-03	No	NA :	i		NA/IRIS	i .	i .	i na ii	
ANTIMONY	8.9E-05	No	4.00E-04	Low	Longevity,blood glucose and cholesterol	Water/IRIS	1000	i 1 '	2E-01	
ARSENIC	1.5E05	No	1.00E-03	i	Keratosis and hyperpigmentation	Diet/HEAST	i 1	i .	1E-02	
BARIUM	2.1E-05	No	7.00E-02	Medium	None observed	Water/IRIS	j 3	j 1 '	i 3E−04 ji	
BERYLLIUM	4.7E07	No	5.00E-03	Low	None observed	Water/IRIS	100	j - 1	9E-05	
CADMIUM	j 0.0E+00	No	1.00E-03	Hlgh	Proteinuria	Diet/IRIS	10	j 1	NA ji	ĺ
CHROMIUMIII	4.2E-03	No	1.00E+00	Low	Hepatotoxicity	IRIS	1000	i .	4E-03	i
CHROMIUM VI	5.8E-05	No	5.00E-03	Low	No effects observed	Water/IRIS	500	į 1	1E-02	
COBALT	1.8E-06	No	NA			NA/IRIS	1.	1	I NA ji	
COPPER	1.6E-06	No	4.00E-02		Local GI irritation	NA/HEAST	1	1	4E-05	
LEAD	1.0E-06	No	NA		Neurobehavioral effects	NA/IRIS	ĺ	ĺ	Í NA Í	
MANGANESE	7.4E-06	No	1.00E-01	Medium	CNS effects	Diet/IRIS	1 1	1	7E-05	
MERCURY	4.1E08	No	3.00E-04		Kidney effects	Oral/HEAST	1000	1	1E-04	
NICKEL	3.6E-07	No	2.00E-02		Reduced body and organ weight	Diet/HEAST	1	1	2E05	
SELENIUM	5.4E-06	No	5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	1	1E-03	
SILVER	2.1E-07	l No	3.00E-03	Medium	Argyria	Oral/IRIS	2	1	7E-05	
VANADIUM	8.4E-05	No	7.00E-03		None observed	Water/HEAST	100	1	1E-02	
ZINC	2.7E-06	No	2.00E-01		Anemia	Therap./HEAST	10		1E-05	
CYANIDE	2.6E-06	No	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5	1E-04	
BORON	6.6E-06	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1	7E05	
STRONTIUM	1.3E-05	No	NA			NA/IRIS	1		I NA II	
ITTTANIUM	1.4E-05	No	NA			NA/IRIS	ļ	1	NA	
<u> </u>							[Į –	[[]	
VOLATILE ORGANICS						N	1	<u> </u>	·]	
TRICHLOROETHENE	2.9E-06	No	NA		TT	NA/IRIS	1			
TETRACHLOROETHENE	4.2E→08	No	1.00E-02	Medium	Hepatotoxicity,weight gain	Gavage/IRIS	100	1 1	4E06	
	Į									
BASE NEUTRAL / ACIDS	1.7E-07	No	2.00E-02	Medium	Increased relative liver weight	Diet/IRIS	1000		8E-06	
bis(2-ETHYLHEXYL)PHTHALATE	1.76-07	011	2.00E-02	wedtaw				1 1		
								İNTININININI	ionoonoon ii	

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TABLE A.3-1S INGESTION OF CHEMICALS IN SHALLOW GROUNDWATER SCENARIO 3-Residential (Current)

$\begin{array}{c c c c c c c c c c c c c c c c c c c $	INTAKE CANCER (mg/kg/day) 4.60E-01 0.00E+00 8.78E-03 1.02E-03 6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06 2.49E-03	CONC. IN WATER (mg/liter) 	INGESTION RATE (liter/day) 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	EXPOSURE FREQUENCY (days/yr) 350 350 350 350 350 350 350 350 350 350	ED (years) 30 30 30 30 30 30 30 30 30 30 30 30 30	BODY WEIGHT (kg) 70 70 70 70 70 70 70 70 70 70 70 70 70	AVG. TIME NONCANCER ADULT (days) 	AVG. TIME CANCER (days) 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	(mg/kg/day) 4.60E-01 0.00E+00 8.78E-03 1.02E-03 6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	(mg/liter) 	(liter/day) 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	(days/yr) 	30 30 30 30 30 30 30 30 30 30 30 30 30 3	(kg) 70 70 70 70 70 70 70 70 70 70 70 70	ADULT (days) 	(days) 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
DE+00 DE-02 DE-03 DE-04 DE-04 DE-07 DE-07 DE-03 DE-03 DE-03 DE-03 DE-02 DE-05	0.00E+00 8.78E-03 1.02E-03 6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	NA 0.75 0.09 0.57 0.0077 0.08 0.00008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30 30 30 30	70 70 70 70 70 70 70 70 70 70	10950 10950 10950 10950 10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
DE+00 DE-02 DE-03 DE-04 DE-04 DE-07 DE-07 DE-03 DE-03 DE-03 DE-03 DE-02 DE-05	0.00E+00 8.78E-03 1.02E-03 6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	NA 0.75 0.09 0.57 0.0077 0.08 0.00008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30 30 30 30	70 70 70 70 70 70 70 70 70 70	10950 10950 10950 10950 10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
5E-02 5E-03 5E-02 1E-04 2E-03 5E-04 5E-03 5E-03 5E-03 5E-03 5E-03 5E-02 5E-05	0.00E+00 8.78E-03 1.02E-03 6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	NA 0.75 0.09 0.57 0.0077 0.08 0.00008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30 30 30 30	70 70 70 70 70 70 70 70 70 70	10950 10950 10950 10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
8E-03 6E-02 1E-04 2E-03 6E-07 6E-03 6E-03 8E-03 8E-02 6E-05	1.02E-03 6.69E-03 9.04E-05 9.39E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.09 0.57 0.0077 0.08 0.00008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30 30	70 70 70 70 70 70 70 70	10950 10950 10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550 25550 25550 25550
5E-02 E-04 2E-03 5E-07 5E-04 5E-03 5E-03 5E-02 5E-05	6.69E-03 9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.57 0.0077 0.08 0.000008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30	70 70 70 70 70 70 70	10950 10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550 25550
E-04 E-03 E-07 E-04 E-03 E-03 E-03 E-02 E-05	9.04E-05 9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.0077 0.08 0.000008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350 350	30 30 30 30 30 30 30 30	70 70 70 70 70 70	10950 10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550
2E-03 DE-07 DE-04 DE-03 DE-03 DE-02 DE-05	9.93E-04 9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.08 0.000008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350 350	30 30 30 30 30 30	70 70 70 70 70	10950 10950 10950 10950 10950	25550 25550 25550 25550 25550 25550 25550
9E-07 5E-04 5E-03 5E-03 5E-02 5E-05	9.39E-08 8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.000008 0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0 2.0	350 350 350 350 350 350	30 30 30 30 30	70 70 70 70	10950 10950 10950 10950	25550 25550 25550 25550
5E-04 5E-03 5E-03 5E-02 5E-05	8.81E-05 1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.008 0.130 0.069 0.6 0.00068	2.0 2.0 2.0 2.0	350 350 350 350	30 30 30 30	70 70 70	10950 10950 10950	25550 25550 25550
6E-03 6E-03 6E-02 6E-05	1.53E-03 8.08E-04 7.02E-03 7.98E-06	0.130 0.069 0.6 0.00068	2.0 2.0 2.0	350 350 350	30 30 30	70 70	10950 10950	25550 25550
8E-03 IE-02 IE-05	8.08E-04 7.02E-03 7.98E-06	0.069 0.6 0.00068	2.0 2.0	350 350	30 30	70	10950	25550
E-02 E-05	7.02E-03 7.98E-06	0.6 0.00068	2.0	350	30 -			
E-05	7.98E-06	0.00068	2.0			70	10950	
			2.0	050				
r oo i	0 10E 00 1			350	30	70	10950	25550
E-03	2.495-03	0.21	2.0	350	30	70	10950	25550
)E+00 j	0.00E+00	NA	2.0	350	30	70	10950	25550
)E+00	0.00E+00	NA	2.0	-350	30	70	10950	25550
E+00	1.50E+00	128.0	2.0	350	30	70	10950	25550
6E-02	1.27E-02	1.1	2.0	350	30	70	10950	25550
8E-01	3.10E-01	26.4	2.0	350	30	70	10950	25550
8E-01 İ	1.73E-01	14.7	2.0	350	30	70	10950	25550
)E+00	0.00E+00	NA	2.0	350	30	70	10950	25550
E-03	1.75E-03	0.15	2.0	350	30	70	10950	25550
E+00	0.00E+00	NA	2.0	350	30	70	10950	25550
	0.00E+00	NA	2.0	350	30	70	10950	25550
		ΝΔ	20	350	30	70	10950	25550
							ſ .	
3	8E-03 	BE-03 1.75E-03 DE+00 0.00E+00 DE+00 0.00E+00 DE+00 0.00E+00 DE+00 0.00E+00	BE-03 1.75E-03 0.15 DE+00 0.00E+00 NA DE+00 0.00E+00 NA DE+00 0.00E+00 NA	BE-03 1.75E-03 0.15 2.0 DE+00 0.00E+00 NA 2.0 DE+00 0.00E+00 NA 2.0 DE+00 0.00E+00 NA 2.0 DE+00 0.00E+00 NA 2.0	BE-03 1.75E-03 0.15 2.0 350 DE+00 0.00E+00 NA 2.0 350 DE+00 0.00E+00 NA 2.0 350 DE+00 0.00E+00 NA 2.0 350 DE+00 0.00E+00 NA 2.0 350	3E-03 1.75E-03 0.15 2.0 350 30 0E+00 0.00E+00 NA 2.0 350 30 0E+00 0.00E+00 NA 2.0 350 30 0E+00 0.00E+00 NA 2.0 350 30 0E+00 0.00E+00 NA 2.0 350 30	BE-03 1.75E-03 0.15 2.0 350 30 70 DE+00 0.00E+00 NA 2.0 350 30 70 DE+00 0.00E+00 NA 2.0 350 30 70 DE+00 0.00E+00 NA 2.0 350 30 70 DE+00 0.00E+00 NA 2.0 350 30 70	BE-03 1.75E-03 0.15 2.0 350 30 70 10950 DE+00 0.00E+00 NA 2.0 350 30 70 10950 DE+00 0.00E+00 NA 2.0 350 30 70 10950 DE+00 0.00E+00 NA 2.0 350 30 70 10950

TABLE A.3–2S
INHALATION OF AIRBORNE (VAPOR PHASE) CHEMICALS FROM SHALLOW GROUNDWATER
SCENARIO 3 – Residential (Current)

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	I INTAKE ADULT			IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	I EXPOSURE	EXPOSURE	HEIDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDELEFTUUDEL	BODY	1 AVG. TIME	AVG. 1
CHEMICAL	NONCANCER	CANCER	WATER	RATE	TIME	FREQUENCY	ED	WEIGHT	NONCANCER	CANC
U	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(m3/hour)	(hours/day)	(days/yr)	(years)	(kg)	(days)	(day
VOLATILE ORGANICS TRICHLOROETHENE TETRACHLOROETHENE	0.00E+00 0.00E+00	0.00E+00 0.00E+00		0.830	24.0 24.0	350 350	30 30	70	10950 10950	2
BASE NEUTRAL / ACIDS	i i		•						1	
bis(2-ETHYLHEXYL)PHTHALATE	0.00E+00	0.00E+00	NA	0.830	24.0	350	30	j 70	10950	2

TABLE A.3-3S COMPOUND CONCENTRATIONS EMITTED FROM SHALLOW GROUNDWATER SCENARIO 3-Residential (Current)

	Concentration	Flow Rate Of	Fraction Of	One Half The	Bathroom	Mean Conc
CHEMICAL	tap water	Shower Water	Contaminant	Duration Of	Volume	In Bathroom
	(mg/L)	(l/hr)	Volatilized	Shower (hr)	(m3)	(mg/m3)
VOLATILE ORGANICS	ĺ					I II
TRICHLOROETHENE	NA	400.0	0.9	0.1	12.0	0.0E+00
TETRACHLOROETHENE	NA	400.0	0.9	0.1	12.0	0.0E+00
11	1					
BASE NEUTRAL / ACIDS	1					
bis(2-ETHYLHEXYL)PHTHALATE	NA	400.0	0.9	0.1	12.0	0.0E+00
NA: Not Applicable						

TABLE A.3-4S DERMAL CONTACT WITH CHEMICALS IN SHALLOW GROUNDWATER SCENARIO 3- Residential (Current)

			CONC. IN		DERMAL	EXPOSURE		EXPOSIBE	CONVERSION	BODY	AVG TIME	AVG. TIME
II CHEMICAL	ABSORBED DOSE NONCANCER	CANCER	WATER	AREA	PERMEABILITY	TIME	FREQUENCY		FACTOR	WEIGHT	NONCANCER	CANCER
II CHEMICAL				(cm2/event)	(cm/br)	(hra/day)	(days/year)	(years)	(L/cm3)	(kg)	(days)	(days)
	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(cm2/event)	(cm/m)	(Dravday)	(uaysvycar)	(years)	(L/CIII)	(~9)	(01,3)	
IIII INORGANICS	 						1					
ALUMINUM	1.64E-03	7.02E-04	39.20	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
IANTIMONY	0.00E+00	0.00E+00		18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
ARSENIC	3.12E-05	1.34E-05	0.75	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
BARIUM	3.62E-06	f	0.09	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
BERYLLIUM	2.38E-05	1.02E-05	0.57	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
KADMIUM	3.22E-07	1.38E-07	0.0077	•	8.4E-04	0.20	350	30	0.001	70	10950	25550
CHROMIUM III	3.53E-06	1.51E-06	0.08	•	8.4E-04	0.20	350	30	0.001	70	10950	25550
CHROMIUM VI	3.34E-10	1.43E-10	0.000008	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
COBALT	3.13E-07	1.34E-07	0.008	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
COPPER	5.43E-06	2.33E-06	0.13	•	8.4E-04	0.20	350	30	0.001	70	10950	25550
LEAD	2.87E-06	1.23E-06	0.069	18150	8.4E-04	0.20	350	30	0.001	i 70	10950	25550
MANGANESE	2.50E-05	1.07E-05	0.60	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
MERCURY	2.84E-08	1.22E-08	0.00068	18150	8.4E04	0.20	350	30	0.001	j 70	10950	25550
NICKEL	8.86E-06	3.80E-06	0.21	18150	8.4E-04	0.20	j 350	30	0.001	j 70	10950	25550
SELENIUM	0.00E+00	0.00E+00	NA 👘	18150	8.4E-04	0.20	350	30	0.001	j 70	10950	25550
SILVER	0.00E+00	0.00E+00		18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
VANADIUM	5.35E-03	2.29E-03	128.00	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
ZINC	4.51E-05	1.93E05	1,1	18150	8.4E04	0.20	350	30	0.001	j 70	10950	25550
CYANIDE	1.10E-03	4.73E-04	26.40	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
BORON	6.14E-04	2.63E-04	14.70	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
STRONTIUM	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
TITANIUM	6.22E-06	2.67E-06	0.15	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
		l	l	l	1		İ	ĺ	ł	1	1	1 1
VOLATILE ORGANICS	ĺ	1	ĺ	1	• · ·		1		1	1	1	
TRICHLOROETHENE	0.00E+00	0.00E+00	NA	18150	8.4E04	0.20	350	30	0.001	70	10950	25550
TETRACHLOROETHENE	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.20	350	30	0.001	70	10950	25550
ii			1	1	1		1		1		1	
BASE NEUTRAL / ACIDS		1		1	· ·		1	l	1	I .	1	
bis(2-ETHYLHEXYL)PHTHALATE		0.00E+00		18150	8.4E-04	0.20	350	30	0.001	70		25550
NA: Not Applicable												

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TABLE A.3–5S CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

	CHRONIC DAILY	CDI		[1		TOTAL TOTAL
CHEMICAL	INTAKE	ADJUSTEDFOR	SF	WEIGHT OF	type of	SF BASIS/	CHEM. SPEC.	PATHWAY EXPOSURE
₩	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK RISK
EXPOSURE PATHWAY: INGEST	ION OF CHEMICA	LS IN SHALLOW	GROUNDWATE	R			ADULT	4E-02 4E-02
INORGANICS	l					1	1 1	1
ARSENIC	8.8E-03	No	1.75E+00	A	Skin	IRIS	2E02	1
BERYLLIUM	6.7E-03	No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	3E02	
LEAD	8.1E-04	No	NA	B2	Renal tumors	Oral/IRIS	NA	1
ll	1	i		1		· ·		
VOLATILE ORGANICS	1	1		1		j	1	I
TRICHLOROETHENE	0.0E+00	No	1.10E~02	B2	Liver	Gavage/HEAST	NA	
TETRACHLOROETHENE	0.0E+00	No No	5.10E~02	B2	Liver	Gavage/HEAST	NA	1
H	1	1		ł		Į		
BASE NEUTRAL / ACIDS				i		1		
bis(2–ETHYLHEXYL)PHTHALATE	0.0E+00	No	1.40E02	B2	Liver	IRIS	NA	l
								1
NA: Not Applicable								

TABLE A.3–6S CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

11	CDI-ADULT	CDI					CHEM. SPEC.	TOTAL		
CHEMICAL	MEAN	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	RISK-ADULT	PATHWAY		
II.	(mg/kg/day)	ABSORPTION		EVIDENCE	CANCER	SOURCE	MEAN	RISK		
EXPOSURE PATHWAY: INHALA	TION OF AIRBORI	NE (VAPOR PHAS	E) CHEMICALS	FROM SHAL	LOW GROUNDWATER			NA		
VOLATILE ORGANICS								II .		
TRICHLOROETHENE	0.0E+00	No	1.70E-02	B2	Lung	HEAST	NA	11		
TETRACHLOROETHENE	0.0E+00	No	1.80E-03	B2	Leukemia, liver	HEAST	NA	11		
								11		
NA: Not Applicable										

TABLE A.3–7S CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

1	CHRONIC DAILY	CDI					CHEM. SPEC.	TOTAL
CHEMICAL	INTAKE	ADJUSTED FOR	SF	WEIGHTOF	TYPE OF	SF BASIS/	RISK	PATHWAY
11	(mg/kg/day)		(mg/kg/day)—1		CANCER	SOURCE		RISK
EXPOSURE PATHWAY: DERMAL								2E-05
						LINE ATTICCTICATION AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A AND A A		
INORGANICS								
ARSENIC	1.3E-05	No	1.75E+00	A	Skin	IRIS	2E-05	1
II								ļļ
VOLATILE ORGANICS								ļ
TRICHLOROETHENE	0.0E+00	No	1.10E-02	B2	Liver	Gavage/HEAST	NA NA	ļļ
[TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	I NA	
						· · · · ·	!	1
BASE NEUTRAL / ACIDS						· · ·		
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00		1.40E-02		Liver	I IRIS	NA	!!
								II .
NA: Not Applicable			÷,		·			

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TABLE A.3-89 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

	CHRONIC DAILY		NE EN CANADA DA DA DA DA DA DA DA DA DA DA DA DA				RFD			PATHWAY TOTAL
CHEMICAL	INTAKE	ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL		UNCERTAINTY	MODIFYING		HAZARD EXPOSURE
	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		OUOTIENT	
LU In and a dialactic distance in a dialactic dialactic distance in the second second second second second second										
IEXPOSURE PATHWAY: INGEST		US IN SHALLOW	GROUNDWATE	8	II TINTI UUTATATATI POULUITANI II UUTATI II UUTATI II UUTATI II UUTATI II UUTATI II UUTATI II UUTATI II UUTATI			100001000000000000000000000000000000000		6E+02 6E+02
I INORGANICS					LE DE LE RENER EN EN EN EN EN EN EN EN EN EN EN EN EN	60000000000000000000000000000000000000				
ALUMINUM	1.1E+00	No	I NA I			NA/IRIS	i	i	NA	i
ANTIMONY	0.0E+00	No	4.00E-04	Low	Longevity,blood glucose and cholesterol	Water/IRIS	1000	i i i	NA I	i
ARSENIC	2.0E-02	No	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST	İ 1	j	2E+01	i
BARIUM	2.4E-03	No	7.00E-02	Medium	None observed	Water/IRIS	j 3	i 1	3E02	i
BERYLLIUM	1.6E-02	No	5.00E-03	Low	None observed	Water/IRIS	100	1 1	3E+00	i
CADMIUM	2.1E-04	No	1.00E-03	High	Proteinuria	Diet/IRIS	i 10	i 1	2E-01	i
CHROMIUM III	2.3E-03	No	1.00E+00	Low	Hepatotoxicity	IRIS	1000	i	2E-03	Í
CHROMIUM VI	2.2E-07	No	5.00E-03	Low	No effects observed	Water/IRIS	500	i 1	4E-05	i
COBALT	2.1E-04	No	NA			NA/IRIS	i	i	I NA I	i
COPPER	3.6E-03	No	4.00E-02		Local GI irritation	NAHEAST	i	i	9E-02	i
LEAD	1.9E-03	No	NA		Neurobehavioral effects	NA/IRIS	i	i i	NA I	i .
MANGANESE	1.6E-02	No	1.00E-01	Medium	CNS effects	Diet/IRIS	i 1	1 1	2E-01	i
MERCURY	1.9E-05	No	3.00E04		Kidney effects	Oral/HEAST	1000	i	6E-02	i .
NICKEL	5.8E-03	No	2.00E-02		Reduced body and organ weight	Diet/HEAST	300	i	3E-01	
SELENIUM	0.0E+00	No	5.00E-03	Medium	Clinical sclenosis	Diet/IRIS	3	1	NA I	Å
ISILVER	0.0E+00	No	3.00E-03	Medium	Argyria	Oral/IRIS	2	1	NA	1
VANADIUM	3.5E+00	No	7.00E-03		None observed	Water/HEAST	100	i	5E+02	į.
ZINC	3.0E-02	No	2.00E-01		Anemia	Therap./HEAST	j 10	Ì	1E-01	1
CYANIDE	7.2E01	No	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration *	Diet/IRIS	100	5	4E+01	
BORON	4.0E-01	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1 1	4E+00	
STRONTIUM	0.0E+00	No	I NA			NA/IRIS	Ì	i -	NA I	1
TTTANIUM	4.1E-03	No	NA			NA/IRIS	i .	Ì	NA	1
Ň	İ	ĺ	i i			ĺ	İ	i		
VOLATILE ORGANICS	İ	ĺ	i			i .	ĺ	Ì	1 1	1
TRICHLOROETHENE	0.0E+00	No	NA			NA/IRIS	1	1	I NA I	
TETRACHLOROETHENE	0.0E+00	No	1.00E-02	Medium	 Hepatotoxicity,weight gain 	Gavage/IRIS	100	1	NA	1
ll l	Ì	1	1				l	1	I İ	
BASE NEUTRAL / ACIDS	1		1			1	l	1	I İ	.1
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00	No	2.00E-02	Medium	Increased relative liver weight	Diet/IRIS	1000	1	I NA I	1
10000000000000000000000000000000000000	I LINKLIN IN MARKENIN		TA COMPANYAN KUNANAN				İ A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	I HANDIN I	1
NA: Not Applicable										

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TABLE A.3-9S CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

							NIN MANY MANY MANY MANY MANY MANY MANY MAN			
N. Contraction of the second sec	CHRONIC DAILY	CDI	[RFC	RFD		HAZARD	PATHWAY
CHEMICAL	INTAKE ADULT	ADJUSTED FOR	RFC	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	QUOTIENT	HAZARD
11	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS	FACTORS	ADULT	INDEX (HI)
EXPOSURE PATHWAY: INHALA										NA []
							NANANANANANANANANANANANANANANANANANANA	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	JAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA MAANAA	NDI NI NI NI NI NI NI NI NI NI NI NI NI NI
									. 1	
VOLATILE ORGANICS				1				1 1	. 1	
TRICHLOROETHENE	0.0E+00	No	NA			NA/IRIS			NA I	l
[TETRACHLOROETHENE	0.0E+00	No	I NA			NA/IRIS		1	NA I	
						A A A A A A A A A A A A A A A A A A A	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	IN IN THE REAL PROPERTY IN THE REAL PROPERTY IN THE REAL PROPERTY IN THE REAL PROPERTY IN THE REAL PROPERTY IN	mmuni	Í
NA: Not Applicable										-

TABLE A.3-10S CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

	CHRONIC DAILY					1 RFD				ATHWAY
CHEMICAL	INTAKE ADULT	ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS	UNCERTAINTY	MODIFYING	• •	HAZARD
	(mg/kg/day)	ABSOR PTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		QUOTIENT IN	
						11114441111113440.04144.011010101010	1918/00/00/00/00/00/00/00	HIIIIIIIIIIIIIIIIII		
INORGANICS	1					[1	1	1	
ALUMINUM	1.6E-03	No ·	NA			NA/IRIS	i	i	I NA II	
LANTIMONY	0.0E+00	No	4.00E04	Low	Longevity, blood glucose and cholesterol	Water/IRIS	1000	1 1	NA I	
ARSENIC	3.1E-05	i No	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST	1 1	i	3E-02	
BARIUM	3.6E-06	i No	7.00E-02	Medium	None observed	Water/IRIS	j 3	1 1	5E-05	
BERYLLIUM	2.4E-05	i No	5.00E-03	Low	None observed	Water/IRIS	100	1	5E-03	
CADMIUM	3.2E-07	Í No	1.00E-03	High	Proteinuria	Diet/IRIS	10	1 1	3E-04	
CHROMIUM III	3.5E-06	No	1.00E+00	Low	Hepatotoxicity	IRIS	1 1000	i	4E-06	
CHROMIUM VI	3.3E-10	No	5.00E-03	Low	No effects observed	Water/IRIS	500	1 1	j 7E-08 jj	
COBALT	3.1E07	i No	NA			NA/IRIS	1	İ	NA I	
COPPER	5.4E-06	No	4.00E-02	-	Local GI irritation	NA/HEAST	i		1E-04	
LEAD	2.9E-06		NA	· ·	Neurobehavioral effects	· NA/IRIS	Ì	Í	j na ji	
MANGANESE	2.5E-05	No	1.00E-01	Medium	CNS effects	Diet/IRIS	Í 1	j 1	2E-04	
MERCURY	2.8E-08	No	3.00E-04		Kidney effects	Oral/HEAST	1000	İ	9E-05	
NICKEL	8.9E-06	No	2.00E-02		Reduced body and organ weight	Diet/HEAST	300	1	4E04	
SELENIUM	0.0E+00		5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	1 1	NA	
SILVER	0.0E+00		3.00E-03	Medium	Argyria	Oral/IRIS	2	1	NA	
VANADIUM	5.3E-03		7.00E-03		None observed	Water/HEAST	100	1	8E-01	
ZINC	4.5E-05		2.00E-01		Anemia	Therap./HEAST	10	1	2E-04	
CYANIDE	i 1.1E-03		2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5	6E-02	
BORON	6.1E-04	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	1	7E–03	
STRONTIUM	0.0E+00	No	NA			NA/IRIS	1	1	NA	
TITANIUM	6.2E06	l No	NA			NA/IRIS	1	1	NA I	
	1	1				1	ļ	1		
VOLATILE ORGANICS							ļ	ļ		
TRICHLOROETHENE	0.0E+00	No	NA			NA/IRIS	1		NA I	
TETRACHLOROETHENE	0.0E+00	No	1.00E-02	Medium	Hepatotoxicity, weight gain	Gavage/IR IS	100	1 1	NA	
	1					!	1	Į	i I	
BASE NEUTRAL / ACIDS		!						! .	1 1	
bis(2-ETHYLHEXYL)PHTHALATE	•	No	2.00E-02	Medium	Increased relative liver weight] Dict/IRIS	1000	1	NA II	

TABLE A.4–1 DERMAL CONTACT WITH CHEMICALS IN SOIL SCENARIO 4 – Construction (Future)

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	ABS. DOSE	ABS. DOSE	CONC. IN	CONVERSION			ABSORPTION		EXPOSURE		AVG.TIME	AVG.TIM
CHEMICAL	NONCANCER	CANCER	SOIL	FACTOR	AREA SKIN	FACTOR	FACTOR	FREQUENCY				CANCER
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(kg/mg)	(cm2/event)	(mg/cm2)	(unitiess)	(events/year)	(years)	(kg)	(days)	(days)
INORGANICS												
LUMINUM	NA	0.00E+00	5116.1	1.0E-06	6300	1.45	I NA	180	1	70	180	255
ANTIMONY	NA	0.00E+00	5.5	1.0E-06	6300	1.45	NA	180	i i	70	180	255
ARSENIC	NA	0.00E+00	1.3	1.0E-06	6300	1.45	I NA	180	i 1	70	180	255
	NA	0.00E+00	24.6	1.0E-06	6300	1.45		180		70	180	255
BARIUM BERYLLIUM	NA	0.00E+00	0.95	1.0E-06	6300	1.45	NA NA	180	1	70	180	255
CHROMIUM III	NA	0.00E+00	48.1	1.0E-06	6300	1.45	NA NA	180		70	180	i 255
	NA	0.00E+00	26.7	1.0E-06	6300	1.45	I NA	180	1 1	70	180	255
CHROMIUM VI	NA					•			1	70	180	255
COBALT		0.00E+00	3.5	1.0E-06	6300	1.45		180			,	-
COPPER	NA	0.00E+00	4.3	1.0E-06	6300	1.45	NA NA	180	1	70	180	255
EAD	NA	0.00E+00	13.0	1.0E-06	6300	1.45	NA NA	180	1	70	180	255
ANGANESE	NA	0.00E+00	132.8	1.0E-06	6300	1.45	I NA	180	1	70	180	255
MERCURY	NA	0.00E+00	0.10	1.0E-06	6300	1.45	I NA	180	1	70	1 180	255
NICKEL	NA	0.00E+00	12.9	1.0E-06	6300	1.45	NA	180	1	70	180	255
ELENIUM	NA	0.00E+00	0.58	1.0E-06	6300	1.45	NA	180	1	70	180	25
SILVER	NA	0.00E+00	1.4	1.0E-06	6300	1.45	NA	180	1	70	180	25
ANADIUM	NA	0.00E+00	304.9	1.0E-06	6300	1.45	I NA	180	1.1	70	180	25
LINC	NA	0.00E+00	20.0	1.0E-06	6300	1.45	I NA	180	1	70	180	255
ORON	NA	0.00E+00	24.5	1.0E-06	6300	1.45	NA	180	1	70	180	255
ITANIUM	NA	0.00E+00	149.8	1.0E-06	6300	1.45	NA	180	1	70	180	255
IRCONIUM	NA	0.00E+00	106.1	1.0E06	6300	1.45	NA	180	1 1	70	180	25!
VOLATILE ORGANICS			ł			1	1	1			ļ .	ļ
METHYLENE CHLORIDE	NA	0.00E+00	، ا 0.15	1.0E-06	6300	1.45	I NA	180	1	70	180	255
ACETONE	NA	0.00E+00	0.13	1.0E-06	6300	1.45	NA NA	180	i i	70	180	255
CHLOROFORM	NA	0.00E+00	0.0029	1.0E-06	6300	1.45	I NA	180	i 1	70	180	25
	NA					•	•		•			•
RICHLOROETHENE	NA	0.00E+00	0.0040	1.0E-06	6300	1.45	I NA	180	1	70	180	
TETRACHLOROETHENE		0.00E+00	0.0030	1.0E-06	6300	1.45	I NA	180	1	70	180	25
TOLUENE	NA	0.00E+00	0.0029	1.0E-06	6300	1.45 	NA	180	1	70	180 180	25
BASE NEUTRAL / ACIDS			1				i					i
HENOL	NA	0.00E+00	0.19	1.0E-06	6300	1.45	NA	j 180	j 1	j 70	180.	25
4,5-TRICHLOROPHENOL	NA	0.00E+00	i 1.40	1.0E-06	6300	1.45	NA ·	180	i 1	70	180	25
ENTACHLOROPHENOL	NA	0.00E+00	0.30	1.0E-06	6300	1.45	I NA	180	1	70	180	25
HENANTHRENE	NA	0.00E+00	0.16	1.0E-06	6300	1.45	I NA	180	i i	70	180	25
DI-n-BUTYLPHALATE	NA	0.00E+00	1.20	1.0E-06	6300	1.45	NA	180	i i	70	180	25
LUORANTHENE	NA	0.00E+00	0.20	1.0E-06	6300	1.45	NA	180	i i	70	180	25
YRENE	NA	0.00E+00	0.21	1.0E-06	6300	1.45	I NA	180	i i	70	180	25
BUTYLBENZYLPHTHALATE	NA	0.00E+00	0.13	1.0E-06	6300	1.45	I NA	180		70	180	25
ENZO(a)ANTHRACENE	NA	0.00E+00	0.13	1.0E-06	6300	1.45	NA NA	180		1 70	180	25
	NA	•	•	•		•						•
HRYSENE	NA NA	0.00E+00	0.13 0.47	1.0E-06	6300	1.45	NA	180		70	180	25
is(2-ETHYLHEXYL)PHTHALATE	NA NA			1.0E-06	6300	1.45	NA	180		70	180	25
ENZO(b)FLUORANTHENE		0.00E+00	0.21	1.0E-06	6300	1.45	NA	180	1	70	180	25
ENZO(k)FLUORANTHENE	NA	0.00E+00	0.075	1.0E-06	6300	1.45	NA	180	1	70	180	25
ENZO(a)PYRENE	NA	0.00E+00	0.066	1.0E-06	6300	1.45	I NA	180	1	70	180	25
PESTICIDES / PCB'S		1) 	1) 	1	1	1			[]	
4-DDT	NA	0.00E+00	31.0	1.0E-06	6300	1.45	NA	1 180	1	70	180	25
					1 0000	1.40		1 100		1 10	1 100	1 20

TABLE A.4-2 INGESTION OF CHEMICALS IN SOIL SCENARIO 4 - Construction (Future)

					CONVERSION					AVG. TIME	AVG. TIME
CHEMICAL	NONCANCER		SOIL	RATE						NONCANCER	
CHEMICAE	(mg/kg/day)	(mg/kg/day)	(mg/kg)		(10E-6 kg/mg)		(days/year)	(years)	(kg)	(days)	(days)
							<u> </u>				
INORGANICS	0.515 00	0.475 04	E A A C A	400	105 00		100		70	100	05550
ALUMINUM	3.51E-02	2.47E-04	5116.1	480	1.0E-06	1	180	1	70	180	25550
ANTIMONY	3.78E-05	2.67E-07	5.5	480	1.0E06	1	180	1	70	180	25550
ARSENIC	8.94E-06	6.30E-08	1.3	480	1.0E-06	1	180	1	70	180	25550
BARIUM	1.69E-04	1.19E06	24.6	480	1.0E06	1	180	1	70	180	25550
BERYLLIUM	6.49E-06	4.57E-08	0.95	480	1.0E-06	1	180	1	70	180	2555
CHROMUMIII	3.30E-04	2.32E-06	48.1	480	1.0E-06	1	180	1	70	180	2555
CHROMIUM VI	1.83E-04	1.29E-06	26.7	480	1.0E-06	1	180	1	70	180	2555
COBALT	2.39E05	1.68E-07	3.5	480	1.0E-06	1	180	1	70	180	2555
COPPER	2.97E-05	2.09E-07	4.3	i 480	1.0E-06	1	180	1	70	180	2555
LEAD	8.89E-05	6.26E-07	13.0	480	1.0E-06	i 1	180	1	70	180	2555
MANGANESE	9.11E-04	6.42E-06	132.8	480	1.0E06	i i	180	1	70	180	2555
MERCURY	6.71E-07	4.73E-09	0.10	480	1.0E-06		180	i i	70	180	2555
NICKEL	8.87E-05	6.25E-07	12.9	480	1.0E-06	1	180	i i	70	180	2555
	3.97E06	2.80E-08	0.58	480	1.0E-06		180	1	70	180	2555
SELENIUM						1	180		70	180	2555
SILVER	9.67E-06	6.81E-08	1.4	480	1.0E-06			1			
VANADIUM	2.09E-03	1.47E-05	304.9	480	1.0E-06	1	180	1	70	180	2555
ZINC	1.37E-04	9.68E07	20.0	480	1.0E-06	1	180	1	. 70	180	2555
BORON	1.68E-04	1.18E-06	24.5	480	1.0E-06	1 1	180	1	70	180	2555
TITANIUM	1.03E-03	7.24E-06	149.8	480	1.0E-06	1	180	1	- 70	180	2555
ZIRCONIUM	7.28E04	5.13E-06	106.1	480	1.0E-06	1	180	1	70	180	2555
VOLATILE ORGANICS							l			· ·	
METHYLENE CHLORIDE	1.03E-06	7.25E-09	0.15	480	1.0E06	i _ 1	180	1	70	180	2555
ACETONE	1.17E-06	8.21E-09	0.17	480	1.0E-06	1	180	i	70	180	2555
CHLOROFORM	2.02E-08	1.42E-10	0.0029	480	1.0E-06	i i	180	1	70	180	2555
	2.74E-08	1.93E-10	0.0023	480	1.0E-06	1	180	1	70	180	2555
TRICHLOROETHENE								1			
TETRACHLOROETHENE	2.04E-08	1.44E-10	0.0030	480	1.0E-06	1	180	1	70	180	2555
TOLUENE	1.96E-08	1.38E-10	0.0029	480	1.0E06	1	180	1	70	180	2555
BASE NEUTRAL / ACIDS							İ				
PHENOL	1.34E-06	9.42E-09	0.19	480	1.0E-06	1	180	1 1	70	180	2555
2,4,5-TRICHLOROPHENOL	9.58E06	6.75E08	1.40	480	1.0E06	1	180	1	70	180	2555
PENTACHLOROPHENOL	2.06E-06	1.45E-08	0.30	480	1.0E06	1	180	j 1	70	180	2555
PHENANTHRENE	1.10E-06	7.73E-09	0.16	480	1.0E06	1	180	1	70	180	2555
DI -n-BUTYLPHALATE	8.23E-06	5.80E-08	1.20	480	1.0E-06	i i	180	i i	70	180	2555
FLUORANTHENE	1.37E-06	9.67E09	0.20	480	1.0E-06	i i	180	i i	70	180	2555
PYRENE	1.43E-06	1.00E-08	0.21	480	1.0E-06	i	180	1	70	180	2555
BUTYLBENZYLPHTHALATE	8.91E-07	6.28E-09	0.13	480	1.0E-06	i i	180	l i	70	180	2555
BENZO(a)ANTHRACENE	8.91E-07	6.28E-09	0.13	480	1.0E-06		180		70	180	2555
		6.28E-09									
CHRYSENE	8.91E-07		0.13	480	1.0E-06	!	180	1	70	180	2555
sis(2-ETHYLHEXYL)PHTHALATE	3.22E06	2.27E-08	0.47	480	1.0E-06	1	180	1	70	180	2555
BENZO(b)FLUORANTHENE	1.41E-06	9.94E-09	0.21	480	1.0E-06	1	180	1	70	180	2555
BENZO(k)FLUORANTHENE	5.14E-07	3.62E-09	0.075	480	1.0E-06	1	180	1	70	180	2555
BENZO(a)PYRENE	4.53E-07	3.19E-09	0,066	480	1.0E-06	1	180	1 1	70	180	2555
PESTICIDES/PCB'S											
4.4-DDT	2.13E-04	1.50E-06	31.0	480	1.0E-06	1	180	1	70	180	2555
						•	,				

TABLEA.4-3
IABLEA.4-3
INHALATION OF AIRBORNE CHEMICALS ADSORBED TO DUST
SCENARIO 4 – Construction (Future)

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	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		DUST CONC.		INHALTION			EXPOSURE			AVG. TIME
CHEMICAL	NONCANCER	CANCER	AMBIENT	SOIL	RATE	TIME				NONCANCER	CANCER
	(mg/kg/day)	(mg/kg/day)	(kg/m3)	(mg/kg)	(m3/hour)	(hours/day)	(days/year)	(years)	(kg)	(days)	(days)
INORGANICS											
ALUMINUM	4.05E05	2.85E-07	3.46E-08	5116.1	2	8	180	1 1	70	180	25550
ANTIMONY	4.37E-08	2.85E-07 3.08E-10	3.46E-08	5.5	2	8	180	. 1	70	180	25550
					2				70		25550
ARSENIC	1.03E-08	7.27E-11	3.46E-08	1.3	2	8	180	1 1		180	
BARIUM	1.95E-07	1.37E-09	3.46E-08	24.6	2	8	180	1 1	70	180	25550
BERYLLIUM	7.49E-09	5.27E-11	3.46E-08	0.95	2	8	180	1	70	180	25550
CHROMIUM III	3.80E-07	2.68E-09	3.46E-08	48.1	2	8	180	1	70	180	25550
CHROMIUM VI	2.11E-07	1.49E-09	3.46E-08	26.7	2	· 8	180	1	70	180	25550
COBALT	2.75E-08	1.94E-10	3.46E-08	3.5	2	8	180	1	70	180	25550
COPPER	3.43E-08	2.42E-10	3.46E-08	4.3	2	8	180	1	70	180	25550
LEAD	1.03E07	7.22E-10	3.46E08	13.0	2	8	180	í 1	70	180	25550
MANGANESE	1.05E-06	7.40E-09	3.46E08	132.8	2	8	180	i 1	70	180	25550
MERCURY	7.74E-10	5.45E-12	3.46E-08	0.10	2	8	180	i 1	70	i 180	25550
NICKEL	1.02E-07	7.21E-10	3.46E-08	12,9	2	8	180	i i	70	180	25550
SELENIUM	4.58E-09	3.23E-11	3.46E-08	0.58	2	8	180	i i	70	180	25550
SILVER	1.11E-08	7.85E-11	3.46E-08	1.4	2	8	180	i i	70	180	25550
•	2.41E-06	1.70E-08	3.46E-08	304.9	2	8	180	1	70	180	25550
VANADIUM					2		180		70		25550
ZINC	1.58E-07	1.12E-09	3.46E-08	20.0	2	8		1		180	
BORON	1.94E-07	1.37E-09	3.46E-08	24.5	2	8	1 180	1	70	180	25550
TITANIUM	1.18E-06	8.35E-09	3.46E-08	149.8	2	8	180	1 1	70	180	2555
ZIRCONIUM	8.39E-07	5.91E-09	3.46E08	106.1	2	8	180	1	70	180	25550
VOLATILE ORGANICS]	ľ	
METHYLENE CHLORIDE	1.19E-09	8.36E-12	3.46E-08	0.15	2	. 8	180	1	70	180	25550
ACETONE	1.34E-09	9.47E-12	3.46E-08	0.17	2	8	180	į 1	70	180	25550
CHLOROFORM	2.33E-11	1.64E-13	3.46E08	0.0029	2	8	180	į 1	j 70	180	25550
TRICHLOROETHENE	3.16E-11	2.23E-13	3.46E08	0.0040	2	8	i 180	i 1	70	i 180	25550
TETRACHLOROETHENE	2.35E-11		3.46E-08	0.0030	2	8	180	1 1	70	180	2555
TOLUENE	2.27E-11	1.60E-13	3.46E-08	0.0029	2	8	180	i	70	180	2555
BASE NEUTRAL / ACIDS										1	
PHENOL	1.54E-09	1.09E-11	3.46E-08	0,19	2	. 8	180	1	70	180	2555
2,4,5-TRICHLOROPHENOL	1.11E-08	7.79E-11	3.46E-08	1.40	2	8	180		70	180	2555
	2.37E-09	1.67E-11	3.46E-08	0.30	4	8	180		70	180	2555
PENTACHLOROPHENOL					2	_					
PHENANTHRENE	1.27E-09	8.91E-12		0.16	2	8	180	1	70	180	2555
DI-n-BUTYLPHALATE	9.49E-09	6.69E-11	3.46E-08	1.20	2	8	180	1	70	180	2555
FLUORANTHENE	1.58E-09	1.12E-11	3.46E-08	0.20	2	8	180	1	70	180	2555
PYRENE	1.64E-09	1.16E-11	3.46E-08	0.21	2	8	180	1	70	180	2555
BUTYLBENZYLPHTHALATE	1.03E09	7.24E-12	3.46E-08	0.13	2	8	180	1	70	180	2555
BENZO(a)ANTHRACENE	1.03E-09	7.24E-12	3.46E-08	0.13	2	8	180	1	70	180	2555
CHRYSENE	1.03E-09	7.24E-12	3.46E-08	0.13	2	8	180	1	70	180	2555
bis(2-ETHYLHEXYL)PHTHALATE	3.71E-09	2.62E-11	3.46E08	0.47	2	8	180	į 1	70	180	2555
BENZO(b)FLUORANTHENE	1.63E-09	1.15E-11	3.46E-08	0.21	2	8	180	1	70	180	2555
BENZO(k)FLUORANTHENE	5.93E-10	4.18E-12	3.46E-08	0.075	2	8	180	1	70	180	2555
		3.68E-12	3.46E-08	0,066	2	8	180	i i	70	180	2555
BENZO(a)PYRENE	5.22E-10	0.000,12	0.402 00	0.000	<u>ح</u>		,	, ·	,	1 100	
BENZO(a)PYRENE	5.22E-10	3.00L-12	0.402 00	0.000	۲ ۲	Ū					
		1.73E-09		31.0	2	8	180		70	180	2555

TABLE A.4-4 CANCER RISK ESTIMATES SCENARIO 4 – Construction (Future)

			ANNALALALALALALALALALALALALALALALALALAL				CHEMICAL	TOTAL TOTAL
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY EXPOSURE
ii	(mg/kg/day)	ABSORPTION		EVIDENCE	CANCER	SOURCE	RISK	RISK RISK
								unanti nati junni junni juni j
JEXPOSURE PATHWAY: DERMA					***			0E+00 1E-06
		İNTRATATION					Launnun nun ku	E LECERENTE ELE ELE CALCOLITER ELE CALCOLITE ELE COLLECTION DE LE COLLECTI
II INORGANICS	0.0E+00	l No	1.75E+00	A	Skin	IRIS	0E+00	
I	0.00.700		1.756+00		Skii			
II VOLATILE ORGANICS	í I	1		i			i i	
METHYLENE CHLORIDE	0.0E+00	No	7.50E-03	B2	Heptacellular carcinomas, neoplastic nodules	Water/IRIS	0E+00	
CHLOROFORM	0.0E+00	No	6.10E-03	B2	Kidney tumors	Oral/IRIS	0E+00	
TRICHLOROETHENE	0.0E+00		1.10E-02	B2	Liver	Gavage/HEAST	0E+00	1
TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	0E+00	
								1
BASE NEUTRAL / ACIDS	0.05.00		4 005 04			Oral/IRIS	0E+00	
PENTACHLOROPHENOL	0.0E+00		1.20E-01	B2 C	Hepatocellular adenoma, carcinomas, pheochromocytoma Leukemia	Diet/IRIS	NA I	}
BENZO(a)ANTHRACENE	0.0E+00	No	NA NA	B2	Liver, lung, skin	I IRIS	NA I	
ICHRYSENE	0.0E+00	1 111	NA	B2	Malignant lymphoma	IRIS	NA	1
bis(2-ETHYLHEXYL)PHTHALATE		No	1.40E-02	B2	Liver	IRIS	0E+00	i
BENZO(b)FLUORANTHENE	0.0E+00	No	NA	B2	Lung, thorax, skin	IRIS	I NA I	j ·
BENZO(K)FLUORANTHENE	0.0E+00	No	NA NA	j B2	Lung, thorax, skin	IRIS	I NA I	Ì
BENZO(a)PYRENE	0.0E+00	No No	I NA	B2	Stomach, lung	IRIS	NA	• · ·
- <u>1</u>		ļ					[[[
PESTICIDES / PCB'S	0.05.00	l Na	0.405 04		T in a transmission	Oral/IRIS	05100	
[4,4-DDT	0.0E+00	No	3.40E-01	B2			0E+00	
NA: Not Applicable					ne e constante de la constante de la constante de la constante de la constante de la constante de la constante La constante de la constante de la constante de la constante de la constante de la constante de la constante de			1
Ind. Not Applicable					Ň			

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TABLE A.4-5 CANCER RISK ESTIMATES SCENARIO 4 - Construction (Future)

	CHRONIC DAILY	CDI	ATTACTUS ATTACTOR				CHEMICAL	TOTAL
CHEMICAL		ADJUSTED FOR		WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day) – 1	EVIDENCE		SOURCE	RISK	RISK
IEXPOSURE PATHWAY: INGEST	ON OF CHEMICA	LS IN SOIL				N 1341200000000000000000000000000000000000		1E~06
						IN TANAN AND AND AND AND AND AND AND AND AND	İTTANINAN MATARA MATARA	unnnnn i
INORGANICS	6.3E-08	No	1.75E+00	I A	Skin	IRIS	1 1E-07	
BERYLLIUM	4.6E-08	No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	2E-07	
LEAD	6.3E07	No	NA	B2	Renal tumors	Oral/IRIS	NA	
VOLATILE ORGANICS								
METHYLENE CHLORIDE	7.2E09	No	7.50E-03	B2	Heptacellular carcinomas, neoplastic nodules	Water/IRIS	5E11	
CHLOROFORM	1.4E-10	No	6.10E-03	B2	Kidney tumors	Oral/IRIS	9E-13	
TRICHLOROETHENE	1.9E-10	No	1.10E-02	B2	Liver	Gavage/HEAST	2E-12	
TETRACHLOROETHENE	1.4E-10	No	5.10E-02	B2	Liver	Gavage/HEAST	7E-12	
BASE NEUTRAL / ACIDS				{ 			1 1	
PENTACHLOROPHENOL	1.4E-08	No	1.20E-01	B2	Hepatocellular adenoma, carcinomas, pheochromocytoma	Oral/IRIS	2E-09	
JBUTYLBENZYLPHTHALATE	6.3E-09	No	NA	j c	Leukemia	Diet/IRIS	j NA j	i .
BENZO(a)ANTHRACENE	6.3E-09	No	1.15E+01	B2	Liver, lung, skin	IRIS	7E-08	1
CHRYSENE	6.3E-09	No	1.15E+01	B2	Malignant lymphoma	IRIS	7E-08	1 ·
bis(2-ETHYLHEXYL)PHTHALATE	2.3E-08	No	1.40E-02	82	Liver	IRIS	3E-10	
BENZO(b)FLUORANTHENE	9.9E-09	No	1.15E+01	B2 B2	Lung, thorax, skin	IRIS IRIS	1E-07 4E-08	
BENZO(k)FLUORANTHENE	3.6E-09 3.2E-09	No No	1.15E+01 1.15E+01	B2 B2	Lung, thorax, skin Stomach, lung	IRIS	4E-08 4E-08	
BENZO(a)PYRENE	3.20-09	00		02	Stomach, lung	11/13	42-00	
PESTICIDES/PCB'S				j			1	
4,4-DDT	1.5E06	No	3.40E-01	B2	Liver tumor	Oral/IRIS	5E07	
NA: Not Applicable								1

NA: Not Applicable

.

TABLE A.4–6 CANCER RISK ESTIMATES SCENARIO 4 – Construction (Future)

	CHRONIC DAILY	CDI					CHEMICAL	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/		PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day) - 1	EVIDENCE	CANCER	SOURCE	RISK	RISK II
(EXPOSURE PATHWAY: INHALA)	ION OF AIRBOR	NE CHEMICALS	ADSORBED TO	DUST		*************************	1	7E-08
								muunnii ii
INORGANICS								
ARSENIC	7.27E-11	No	5.00E+01	A	Respiratory Tract	Occupational/IRIS	4E-09	
BERYLLIUM	5.27E-11	No	8.40E+00	B2	Lung	Occupational/IRIS	4E-10	
CHROMIUMVI	1.49E-09	No	4.20E+01	A	Lung	Occupational/IRIS	6E-08	
LEAD	7.22E-10	No	NA NA	B2		NA/IRIS	NA	
NICKEL	7.21E-10	No	8.40E-01	A	Lung and nasal tumors	Occupational/IRIS	6E−10	
				1		1		
VOLATILE ORGANICS				1		1		
METHYLENE CHLORIDE	8.36E-12	No	1.60E-03	B2	Combined adenomas and carcinomas	IRIS	1E-14	
CHLOROFORM	1.64E-13		8.10E-02	B2	Liver	IRIS	1E-14	
TRICHLOROETHENE	2.23E~13		1.70E-02	B2	Lung	HEAST	4E-15	
TETRACHLOROETHENE	1.66E~13	No	1.80E-03	B2	Leukemia, liver	HEAST	3E-16	
						1		
BASE NEUTRAL / ACIDS							· !!	
PENTACHLOROPHENOL	1.67E-11	No	NA	B2		NA/IRIS	NA	
BUTYLBENZYLPHTHALATE	7.24E-12	No	NA	C	Leukemia	IRIS	NA	
BENZO(a)ANTHRACENE	7.24E~12	No	6.10E+00	B2	Liver, lung, skin	IRIS	4E-11	
CHRYSENE	7.24E-12	No	6.10E+00	B2	Malignant lymphoma	IRIS	4E−11	
bis(2-ETHYLHEXYL)PHTHALATE	2.62E-11		NA	B2		NA/IRIS	NA	
BENZO(b)FLUORANTHENE	1.15E-11	No	6.10E+00	B2	Lung, thorax, skin	IRIS	7E-11	
BENZO(k)FLUORANTHENE	4.18E-12	No	6.10E+00	B2	Lung, thorax, skin	I IRIS	3E-11	
BENZO(a)PYRENE	3.68E~12	No	6.10E+00	B2	Respiratory tract, stomach	Inhalation/HEAST	2E-11	
							[]	
PESTICIDES / PCB'S	4 705 40							
4,4 DDT	1.73E-09	No	NA	B2		IRIS	NA	
NA: Not Applicable								

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TABLE A4-7 SUBCHRONIC HAZARD INDEX ESTIMATES SCENARIO 4 – Construction (Future)

							80000000000000000000000000000000000000	REFERENCESCO		PATHWAY PATHWAY
CHEMICAL	SUBCHRONIC	CDI ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD	HAZARD HAZARD
	(mg/kg/day)	ABSORPTION	(= g/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		QUOTIENT	INDEX (HI) INDEX (HI)
İSTATI DAMAMAT KATALAR DA DA DA DA DA DA DA DA DA DA DA DA DA	in na statistica and statistica and statistica and statistica and statistica and statistica and statistica and s		NUMBER OF COMPANY					ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATTAL ATT	MÜNHUMMATİ	ATANAN MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA
IEXPOSUBE PATHWAY: DERMAL	CONTACT WITH	CHEMICALS IN S	OIL							0E+00 1E+00
İİR DALAR MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN MANARAMAN M	CUT I LI DA HANNA GENERAL MANAGAN		AND AN ANALY IN THE OWNER OF THE OWNER OWNER OF THE OWNER OWNER OWNER OWNER	ET BREKKERE KLER KEREN KERE		UF I AFAN I NA KANA KANA KANA KANA KANA KANA KA	HILTON AND AND AND AND AND AND AND AND AND AN		NURUUUUU RETTTTTTUU U	
INOR GANICS	l									1
	NA	No	NA	1		NAARIS			NA I	i i i i i i i i i i i i i i i i i i i
	NA	No	4E-04		Reduced life span, altered blood chemistry	Water/HEAST	1000		NA	1
	NA	No	1E-03		Keratosis and hyperpigmentation	NA/HEAST	1		NA	1
	NA	No	5E02		Increased blood pressure	Water/HEAST	100		NA	1
BERYLLIUM	NA	No	5E-03		None observed	Water/HEAST	100		NA	!
H	NA	No	1E+01		Hepatotoxicity	HEAST	100		NA	ł
	NA NA	No	2E-02		Not defined	Water/HEAST	100		NA	ł
COBALT	NA	No	NA			NAMEAST			NA NA	1
COPPER	NA	No	4E-02		Local GI irritation	NA/HEAST	NA		NA NA I	1
· · · · · ·	NA ·	No	NA		NT	NA/HEAST	1 1		NA NA I	1
	I NA	No	1E-01		No effect	Occupational/HEAST Oral/HEAST	1000		NA NA I	1
	INA	No	3E-04		Kidney effects	Diet/HEAST			NA NA	1
	I NA	No	2E-02		Decreased body and organ weight	NA/HEAST	300		I NA I	• · · · ·
	NA NA	No	NA		4	HEAST	2		NA	*
1	NA NA	No No	3E-03 7E-03		Argyria None observed	Water/HEAST	100		NA	
VANAD IUM		No No	2E-01		Anemia	Therapeutic/HEAST	1 10		NA	
		No No	9E-02	1	Testicular atrophy	Diet/HEAST	100		NA NA	1
	I NA	No No	NA SE-02	!	i esticular atrophy	NA/IRIS			NA I	
	I NA	No	NA NA	ļ		NAARIS NAARIS	1		NA I	
ZIRCONIUM	I NA	110	NA				}			
II VOLATILE ORGANICS	1	!		1			}			
	NA	No	6E-02		Liver toxicity	Water/HEAST	100		I NA	Å
	INA	No No	1E+00	ł	Increased liver and kidney weights, nephrotoxicity	Gavage/HEAST	100		NA	i .
	INA	No	1E-02	i	Liver lesions	HEAST	1000		NA	i i
	INA	No	I NA	i		NA/HEAST	i	i	I NA I	i .
	INA	No	1E-01	i	Hepatotoxicity	Gavage/HEAST	100	i	i na i	di di di di di di di di di di di di di d
TOLUENE	I NA	No	2E+00	i	Changes in liver and kidney weight	HEAST	100	i	I NA I	4
	1	i	i	i		İ	1	İ		1
BASE NEUTRAL / ACIDS	i	i	i			ĺ	i i	į.	1 1	1
	I NA	No	6E-01	l	Reduced fetal body weight	Gavage/HEAST	· ·	Í	I NA I	1
2.4.5-TRICHLOROPHENOL	NA	No	1E+00		Hepatotoxiciy and kidney effects	DietARIS	100	ł	NA	, I
PENTACHLOROPHENOL	NA	No	3E-02	1	Fetotoxicity	Gavage/HEAST	100	l	Í NA I	1
PHENANTHRENE	NA	No	NA	1		NA/HEAST	1	1	NA	1
DI-s-BUTYLPHALATE	NA	No No	1E+00		Mortality	Diet/HEAST	100	!	NA	1
FLUORANTHENE	NA	No	4E-01		Nephropathy, liver weight changes,	Gavage/HEAST	300		NA	
PYRENE	NA	No	3E-01	1	Reanal effects	Gavage/HEAST	300		NA	1
BUTYLBENZYLPHTHALATE	NA	No	2E+00	1	Effects on body weight gain, testes, liver	Diet/HEAST	100		NA	
BENZO(1)ANTHRACENE	NA	No	NA	1		NA/HEAST			NA	1
CHRYSENE	NA	No	NA			NA/HEAST			NA	1
bis(2-ETHYLHEXYL)PHTHALATE	NA	No	2E-02	1	Increased relative liver weight	Diet/HEAST	1000	1	NA	1
BENZO(b)FLUORANTHENE	NA	No	NA			NA/HEAST		ł	NA	4
BENZO(k)FLUORANTHENE	NA	No	NA	ł		NA/HEAST			NA	4
BENZO(1)PYRENE	NA	No	NA	ł		NA/HEAST	!		NA	4
	1	!		!		1	1	!		1
PESTICIDES / PCB'S				1	T for a first and	NA GIRACT	400	1	NA	13 44
4,4-DDT	NA	No	5E-04			NA/HEAST	100			
			AFTER \$1151451100511005			IN REFERENCE CONTRACTOR OF THE DESCRIPTION OF THE D		000000000000000000000000000000000000000	010111111000000000	ii -

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NA: Not Applicable

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TABLE A.4-8 SUBCHRONIC HAZARD INDEX ESTIMATES SCENARIO 4 - Construction (Future)

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CREMICAL DALK WITTAGE ADD/STROPOR RPD COMPARE COMPARE JACABO JACABO JACABO CREMICAL DALK WITTAGE ADD/STROPOR READ INFECT SOURCE ADJUSTMENT MOUNDER INFECTION		UNIUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU					RFD			UTHERE AND A A A A A A A A A A A A A A A A A A	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
Image: concent	II CHEMICAL			RFD	CONFIDENCE	CRITICAL			MODIFYING	HAZARD	
International and an analysis of the second secon								ADJUSTMENTS	FACTORS		
EPC 0218E PATHWAY: NO.25E-02 No. NA NA AUJINITYI 3.5E-02 No. NA Refuel in the paralitered Nood density NA(RIS) NA AUJINITYI 3.5E-02 No. No. RE-04 No. RE-05 NA MURRATION 3.5E-02 No. RE-04 Refuel in the paralitered Nood density NA(RIS) NA RE-03 MURRATION 3.5E-05 No. RE-03 No.4 RE-03 NA RE-03 Refuel in the paralitered Nood density NA(RIS) NO.4 RE-03 REPROMENTY 1.5E-05 No. RE-03 No.4 RE-03 No.4 RE-03 REPROMENTY 1.5E-05 No.4 RE-02 No.4 No.4 No.4 RE-03 REPROMENTY 1.5E-05 No.4 RE-02 No.4 No.4 No.4 No.4 No.4 No.4 RE-03 NO.4 No.4 NO.4 NO.4 RE-03 NO.4 RE-03 NO.4 NO.4 NO.4 NO.4 NO.4 <td>- HERRICH CONTRACTOR AND A CONTRACT AND A</td> <td>i la compaña i a compaña de compaña de compaña de compaña de compaña de compaña de compaña de compaña de compañ</td> <td></td> <td>hunde in in the second se</td> <td>İNTERNATORAN MANA</td> <td></td> <td></td> <td>inntnanthaannan</td> <td>i a na an an an an an an an an an an an a</td> <td>I MITTALITATION I</td> <td>HUUHINNNNN</td>	- HERRICH CONTRACTOR AND A CONTRACT AND A	i la compaña i a compaña de compaña de compaña de compaña de compaña de compaña de compaña de compaña de compañ		hunde in in the second se	İNTERNATORAN MANA			inntnanthaannan	i a na an an an an an an an an an an an a	I MITTALITATION I	HUUHINNNNN
DROBCANCS SEC-02 No NA NA NA NA LAUMINK 3.85-02 No 15-03 Refuel If gan shared Mood desainty NA NA 100 15-03 LARDIN 1.75-04 No 15-03 No 100 15-03 LERAMUM 1.75-04 No 15-03 No 100 15-03 LERAMUM 3.55-03 No 15-03 No 100 15-03 LERAMUM 3.55-03 No 15-03 No 100 15-03 LERAMUM 3.55-03 No 15-03 No 100 15-03 LERAMUM 3.65-03 No 15-03 No 100 16-03 LEAD 8.65-05 No 15-03 No 100 15-03 MALGAMER 8.85-05 No 25-02 Decreased body and organ weight No.41EAST NA MALGAMER 8.85-05 No 35-03 Macreaseteta and thom oregan weight No.41EAST	JEXPOSURE PATHWAY: INGEST	ION OF CHEMICAI	S IN SOIL								9E-01
LLUMINUM 3.3E-02 No NA Kathuse NA VATIMONY 3.6E-02 No 4E-04 Reduced life spanatered Mood chemistry Water/HEAST 100 9E-02 DARINY 6.8E-02 No 6E-02 No 9E-02 No 9E-02 DARINY 6.8E-02 No 9E-02 No 9E-02 No 9E-02 DERVLUTW 6.8E-04 No 6E-03 No 9E-03 No 9E-03 DERVLUTW 1.8E-04 No 1E-01 Higher decisity Higher decisity Higher decisity Higher decisity Higher decisity No 9E-03 DAROARSEE 0.8E-05 No MA No NA NA READ 0.8E-05 No MA No NA NA NA READ 0.8E-05 No MA NA NA NA NA READ 0.8E-05 No MA NA NA NA NA NA		IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	(FRUITERENDUNDUNDUNDUNEF	<u> panalan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunnan kunn</u>	j) si kanalasi tasharatasi k			NA ANNA ANNA ANNA ANNA ANNA ANNA ANNA			, INNINE EN LE EN LE EN LE EN LE EN LE EN LE EN LE EN LE EN LE EN LE EN LE
INTERNOTY 3.85-05 No 4E-04 Reduced life granulated blood chamistry Water/HEAST 1000 9E-02 IDARDING 1.75-08 No 1E-04 Kerston and hyperigizated blood chamistry WALLEAST 1000 3E-03 IDARDING 1.75-08 No 1E-04 Increased loop granue Water/HEAST 1000 3E-03 IDARDING 3.5E-04 No 1E-04 No 2E-03 Water/HEAST 1000 3E-03 ICERONUM VI 1.8E-04 No 2E-02 No NA NA 9E-03 ICERONUM VI 1.8E-05 No NA ICAS NA NA ICERONUM VI 1.8E-06 No NA ICAS NA NA NA ICERONUM VI 2.6E-05 No NA ICAS NA NA NA ICERONUM VI 2.7E-07 No 3E-04 No effect Occupational/REST 1 9E-03 INARCEL 6.7E-07 No 3E-04 NA		3.5E-02	No No	NA	5		NA/IRIS	í	í i	NA	
JARSENC 6.85-05 No. 15-03 Kentonian hyperpisentation NA/HEAST 1 65-03 JARUM 6.55-06 No. 55-02 Non costerved Water/HEAST 100 15-03 JERCHLUMW 6.55-06 No. 55-02 Non costerved Water/HEAST 100 15-06 JERCONLUM 1.85-06 No. 4.6-02 Non costerved Water/HEAST 100 16-06 JERCONLUM 1.85-06 No. 4.6-02 Local Offritation NA/HEAST NA.6 JEADUM 4.6-03 No. 4.6-02 Local Offritation NA/HEAST NA JEADUM 4.6-03 No. 1.6-04 Kinory effects OrderHEAST 100 2.6-03 NOLCEL 8.97-07 No. 3.6-04 NA NA NA JELADUM 4.05-06 No. NA NA NA NA JELADUM 5.75-06 No. 3.6-04 Na Na NA NA NA	ANTIMONY		No	4E04	i i	Reduced life span, altered blood chemistry		1000	i i	9E02	
IbARUM 1.72-04 No 55-02 Increased Work/HEAST 100 85-03 EREXULUM 3.55-04 No 15-03 High status 100 15-03 EREXULUM 3.55-04 No 15-03 High status 100 15-03 EREXULUM 3.55-04 No 15-03 High status 100 15-03 EREXULUM 3.55-05 No 4.5 No No No No ICOPAL 2.45-05 No 4.5 No No No No No ILAD 3.65-05 No 4.5 No No No No No No ILAD 3.65-05 No 4.5 No 15-03 No 100 4.5-03 No ILAD No 15-04 No 15-03 No 100 4.5-03 No ILAD A.5-03 No 100 100 100 100 100 100 100 <td>ARSENIC</td> <td>8.9E-06</td> <td>i No</td> <td>1E-03</td> <td>i</td> <td></td> <td>NA/HEAST</td> <td>i 1</td> <td>i i</td> <td>9E03</td> <td></td>	ARSENIC	8.9E-06	i No	1E-03	i		NA/HEAST	i 1	i i	9E03	
IEREAUUM III 3.3E-04 No IE+01 Hepstondity HEAST 100 9E-05 EXEMUUM III 1.8E-04 No 9E-02 No defined WaterHEAST 100 9E-00 ECRALT 2.4E-05 No NA NA NA NA ECRALT 2.4E-05 No NA NA NA NA ECRALT 2.4E-05 No NA NA NA NA EXAD 0.4E-05 No NA NA NA NA IMAGANESE 8.E-04 No 1E-01 No effect OccupationalifikaST 1000 2E-03 IMAESCURY 8.7E-03 No 7E-03 None observed WaterHEAST 100 2E-01 INARCE 1.7E-04 No 9E-02 None observed WaterHEAST 100 2E-03 INARCE NA 9E-02 Testicular atrophy NA NA NA INCOCONTA 7.7E-04 No 9E-02	BARIUM	1.7E-04	No	5E02	i i	Increased blood pressure	Water/HEAST	100		3E-03	i
ICREMUM VI ICRALT 1.8E-04 2.4E-05 No AZ No AZ No defined Water/HEAST 100 9E-00 ICOMLT 2.4E-05 No AZ Load GI initiation NA/HEAST NA NA ICOPTER 3.0E-05 No AZ-02 Load GI initiation NA/HEAST NA NA ICOPTER 3.0E-05 No AZ-02 No effet OperationAffEAST 1 NE SE-03 INCRE 6.8E-05 No AZ-02 Decreased boy and organ weight Diet/HEAST 300 AZ-03 INCRE 5.8E-04 NA Azgrin HEAST 100 ZE-03 INCRE 5.8E-04 NA Azgrin HEAST 100 ZE-03 INCRE NA 3.7E-04 NA Azgrin HEAST 100 ZE-03 INCRE NA 3.7E-04 NA Azgrin HEAST 100 ZE-05 IDRON 1.7E-04 NA Azgrin Hopatotodity	BERYLLIUM	6.5E-06	No	5E-03	i	None observed	Water/HEAST	j 100	i	1E-03	i '
COPALT 2.4E-05 No NA NA LOPTER 3.0E-05 No MA Last GI Irritation NA/IEAST NA BLAGA 8.8E-05 No MA No effect OccurationAllEAST NA BLAGA 8.8E-05 No MA States OperationAllEAST NA BLAGA 8.8E-05 No MA States OperationAllEAST NA BNSRL 8.8E-05 No MA States OperationAllEAST 1000 2E-08 BNSRL 8.8E-06 No AE-03 Argyia HEAST 2 3E-08 SELENIUM 4.4E-04 No 2E-01 Argyia HEAST 2 3E-01 VARADUM 1.4E-04 No 2E-01 Argyia HEAST 10 2E-08 VARADUM 7.3E-08 No HE-02 Tessolar arophy MarcHEAST 100 2E-05 VARADUM 7.3E-08 No HE-02 T Liver	CHROMIUM III	3.3E-04	No	1E+01	i	Hepatotoxicity	HEAST	100	Í	3E-05	
ICOPERA 3.0E-05 No 4E-02 Local Of Intrilation NAMILAST NA 7E-04 IMARXANESE 8.1E-04 No 1E-01 No effect OccupationA/IEAST 1 9E-03 IMARXANESE 8.1E-04 No 1E-01 No effect OccupationA/IEAST 1 9E-03 IMARXEL 6.3E-06 No 2E-02 Decreased body and organ weight Died/IEAST 300 4E-03 IMARXEL 6.3E-06 No 7E-06 No 7E-06 No 4E-03 INVER 9.7E-06 No 7E-03 None observed Water/IEAST 100 3E-03 INVARDUM 2.1E-03 No 7E-04 No 9E-02 None observed Water/IEAST 100 2E-03 IDRANN 1.7E-04 No 9E-02 Tesscular atophy NA/IEIS NA IDRANN 1.2E-06 No 1E-02 Increased liver and idney weights repletotoxicity Gawage/IEAST 100 2E-03 IDRANN	CHROMIUM VI	1.8E-04	No	2E-02	Ì	Not defined	Water/HEAST	100		9E-03	i
BEAD 8.8E-05 No NA No.41 No.41 No.41 No.41 MARXARSES 8.1E-04 No.32 1E-01 Kidney effects Organismithan itself <td>(COBALT</td> <td>2.4E-05</td> <td></td> <td></td> <td> </td> <td></td> <td></td> <td>1</td> <td> </td> <td></td> <td></td>	(COBALT	2.4E-05						1			
IMAGOARSEE 9.1E-04 No 1E-01 No effect Occupation_HEAST 1 9E-03 INCKELL 8.9E-05 No 2E-02 Decreased body and organ weight Div/HEAST 1000 2E-03 INCKELL 8.9E-05 No 2E-02 Decreased body and organ weight Div/HEAST 100 4E-03 INCKELL 8.9E-05 No 2E-02 Decreased body and organ weight NA/HEAST 300 4E-03 INCKELL 8.9E-05 No 9E-03 Anone harmon NA/HEAST 100 2E-01 INCKEL 1.4E-04 No 9E-02 Testicular atrophy WHATSAST 100 2E-03 INCALLDRACELLORIDE 1.0E-06 No NA NA NA NA INTRALING 1.2E-06 No 1E-02 Increased liver and kidney weights apperiodicity WaterHEAST 100 2E-05 INTRUM NOLLORIDE 1.2E-06 No 1E-02 Increased liver and kidney weight WaterHEAST 100 2E-05 INTR						Local GI irritation		NA NA	1 1		1
IMPROVEY 6.7E-07 No 3E-04 Kidney effects Öral/HEAST 1000 2E-03 INCKEL 8.8E-06 No NA A Argyria Diet/HEAST 300 4E-03 ISELENUM 4.0E-06 No NA Argyria HEAST 2 3E-04 MA IVAA ADIUM 2.1E-03 No 7E-03 Argyria HEAST 100 3E-01 7E-03 No SE-01 NA NA NA NA NA NA NA NA NA NA NA NA NA NA NA SE-01 NA NA NA NA NA NA NA NA NA NA NA NA SE-01 NA					1			1			1
INCKEL 8.9E-05 No 2E-02 Decreased body and organ weight Die//IE.AST 300 4E-03 ISIL.PUR 9.7E-06 No 3E-03 Argyria HEAST 2 3E-03 ISIL.PUR 9.7E-06 No 3E-03 Argyria HEAST 2 3E-03 ISIL.PUR 1.1E-06 No 2E-01 Anemia Therapeutic/HEAST 10 7E-04 IDICAL 1.7E-04 No 2E-01 Anemia Therapeutic/HEAST 10 7E-04 IDICAL 1.7E-04 No 2E-01 Anemia Therapeutic/HEAST 10 7E-03 IDICALISOROANCS NA 1.0E-06 No NA NA NA IDICALOROANCS 1.0E-06 No 1E-00 2 Increased liver and kidney weights, apphrotoxicity Garage/HEAST 100 1E-05 ICHLOROPORM 2.0E-08 No 1E-00 Hepatotoxicity NA HEAST 100 2E-05 ITRICHLOROPORMINCL 2.0E-06											
BELENUM 4.0E-06 No NA Active NA BULVER 9.7E-06 No 3E-03 Argyria HEAST 2 3E-03 IVANADUM 2.1E-03 No 7E-03 None observed Water/HEAST 100 3E-01 IVANADUM 2.1E-03 No 7E-04 No 9E-02 3E-01 IRCK 1.4E-04 No 9E-02 Testicular strophy NARIS NA IBORON 1.7E-04 No 9E-02 Testicular strophy NARIS NA VOLATILE ORGANICS IDE-06 No 6E-02 Increased liver and kidney weights, peptrotoxicity Water/HEAST 100 2E-05 IPERCHLOROPTHENE 2.0E-06 No 16E-01 Increased liver and kidney weights, peptrotoxicity Water/HEAST 100 2E-06 IPERCHLOROPTHENE 2.0E-06 No 16E-01 Heastoroxicity Garage/HEAST 100 2E-06 IPERCHLOROPTHENE 2.0E-06 No 1E-01 Heastoroxicity Garage/H									!		
BLUER 9.7E-06 No 3E-03 Argnia HBAST 2 3E-03 VANADUM 2.1E-03 No 7E-03 No 7E-03 No 7E-03 No 7E-03 No 7E-03 No 7E-04 No 2E-01 Anemia Therapeut/HEAST 10 7E-04 IDKON 1.7E-04 No 9E-02 Tasticular strophy NATRIST 10 7E-04 IDKENTULENCALLORDR 1.0E-03 No NA NA NA NA VOLATILE OROANCS IDE-06 No 1E-02 ILver toxicity Garage/HEAST 100 2E-05 CARTON 2.0E-06 No 1E-02 ILver toxicity Garage/HEAST 100 2E-05 CARTON CONCORN 2.0E-06 No 1E-01 Hepatotoxicity Garage/HEAST 100 2E-07 ITTCLUENC 2.0E-06 No 1E-01 Hepatotoxicity Garage/HEAST 100 2E-07 IDULUENC 2.0E-06 No 1						Decreased body and organ weight		300			
IVANADUM 2.1E-03 No 7E-03 Mone öserved Water/HEAST 100 9E-01 IBORON 1.7E-04 No 9E-01 Amenia Threaputin/HEAST 100 9E-01 IBORON 1.7E-04 No 9E-02 Testicular strophy Diet/HEAST 100 2E-03 ITTANUM 1.0E-03 No NA NA NA NA VOLATILE ORGANICS 0 No NA NA NA WOLATILE ORGANICS 1.0E-06 No 6E-02 7 Liver toxicity Water/HEAST 100 2E-05 INCHARCHLORIDE 1.0E-06 No 1E+00 7 Liver toxicity Gavage/HEAST 100 1E-06 INCHARCHLORIDE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 1E-06 INCHARCHLOROPTHENE 2.0E-08 No 2E-07 Hepatotoxicity Gavage/HEAST 100 1E-06 INCLUENE 2.0E-06 No 1E-00 Hepatotoxidy an											1
IZINC 1.4E-04 No 2E-01 Amemia Therapeutio/HEAST 10 7E-04 BORON 1.7E-04 No 9E-02 Testicular strophy NA/RIS NA/RIS NA ITTANUM 1.0E-03 No NA NA NA NA ITTANUM 1.0E-03 No NA NA NA NA ITTANUM 1.0E-06 No NA NA NA NA VOLATLE ORGANICS Increased liver vicibity Uver toxicity Water/HEAST 100 2E-05 ITTERCHLORGETHENE 1.2E-06 No 1E-02 Increased liver and kidney weights.neptrotoxicity Gavage/HEAST 100 2E-05 ITTERCHLORGETHENE 2.0E-06 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-06 ITTE-04 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-06 ITTE-04 2.0E-08 No 1E-01 Reduced fetal body weight HEAST 100 1E											
IDDORON 1.7E-04 No 9E-02 Testicular stropby DieV/IEAST 100 2E-03 VULATLE ORGANICS V NA NA NA NA NA VULATLE ORGANICS V Vater/IEAST 100 2E-03 NA WITH YLENECHLORIDE 1.0E-06 No 6E-02 Z Liver toxicity Water/IEAST 100 2E-03 CHLOROPORM 2.0E-06 No 1E-06 Liver toxicity Water/IEAST 100 2E-07 DIRUCHOROPTHENE 2.0E-06 No 1E-01 Hepatotoxicity Gavage/IEAST 100 2E-07 TOLUERE 2.0E-06 No 1E-01 Hepatotoxicity Gavage/IEAST 100 2E-07 TOLUERE 2.0E-06 No 6E-01 Hepatotoxicity Gavage/IEAST 100 2E-07 THENOLLOROPTHENOL 9.6E-06 No 6E-01 Hepatotoxicity and kidney effects Diet/IEAST 100 7E-05 PASE NEUTRAL/ACIDS 1.1E-06 NO 6E-01											
ITTANUM 1.0E-03 No NA NA/RIS NA ZIRCONUM 7.3E-04 No NA NA NA/RIS NA V0LATLE ORGANICS Increased liver toxicity Liver toxicity Water/HEAST 100 12E-05 INCETONE 1.0E-06 No 16E-02 Increased liver and bidney weights.ephrotoxicity Gavage/HEAST 100 12E-05 INCCHLOROFTHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 INCCHLOROFTHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 ITTAKULACROFTHENG 2.0E-06 No 1E-01 Hepatotoxicity Gavage/HEAST 100 1E-08 ITTAKULACROFTHENG 2.0E-06 No 1E-01 Hepatotoxicity and bidney weight HEAST 100 1E-08 IPHENOL 1.3E-06 No 1E-02 Diet/IRIS 100 1E-08 IPHENOL 2.6E-06 No 1E+00 Mortality Gavage/HEAST											
ZIRCONUTM 7.3E-04 No NA VOLATLE ORGANICS						Testicular atrophy		100			
VOLATLE ORGANICS METHYLENECHLORIDE 1.0E-06 No BE-02 Increased liver not kines weights, nephrotoxicity Water/HEAST 100 2E-05 CAETOME 1.2E-06 No 1E+00 Increased liver not kines weights, nephrotoxicity Gavage/HEAST 100 2E-05 CHLOROFORM 2.0E-08 No 1E-01 Increased liver not kines weights, nephrotoxicity Gavage/HEAST 100 2E-05 TRICHLOROFTHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 1E-06 TRUCHLOROFTHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 1E-06 TRUCHLOROFTHENOL 1.3E-06 No 6E-01 Reduced fetal body weight Gavage/HEAST 100 1E-06 PHENOL 1.3E-06 No 1E+00 Hepatotoxicity and kidney effects Diet/IRS 100 1E-05 Di-a-BUTTLHLARDE 3.8E-06 No 1E+00 Mortality No/HEAST 100 1E-05 PHENOL 2.8E-06 No 1E+00 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>											
IMETIVLENECHLORIDE 1.0E-o6 No 6E-02 T Liver toxicity Water/HEAST 100 2E-05 ACETONE 1.2E-o6 No 11E+00 Increased liver and kidney weights, nephrotoxicity Gavage/HEAST 1000 1E-06 CHLOROFORM 2.0E-o8 No 1E-02 Liver tesions NA/HEAST 1000 2E-06 ITRUCHLOROFTHENE 2.0E-o8 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 ITOUDENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 ITOUDENE 2.0E-06 No 1E-01 Hepatotoxicity and kidney weight Gavage/HEAST 100 1E-05 IPHENATHRENE 1.3E-06 No 1E+00 Hepatotoxicity and kidney effects Diet/IRIST 100 1E-05 IPHENATHRENE 1.1E-06 No 1E+00 Mortality Diet/IEAST 100 7E-05 IPHENATHRENE 1.4E-06 No 1E+00 Mortality Diet/IEAST 100	IZIRCONIUM	7.3E-04	No	I NA			NA/IRIS	ļ		NA	
IMETIVLENECHLORIDE 1.0E-06 No 6E-02 T Liver toxicity Water/HEAST 100 2E-06 ACETONE 1.2E-06 No 1E+00 Increased liver and kidney weights, nephrotoxicity Gavage/HEAST 1000 1E-08 CHLOROFORM 2.0E-08 No 1E-02 Liver testons NA/HEAST 1000 2E-08 ITRUCHLOROFTHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 ITOUDENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 ITOUDENE 2.0E-06 No 1E-01 Hepatotoxicity Gavage/HEAST 100 1E-06 IPHENALLOROPHENOL 9.6E-06 No 1E+00 Hepatotoxicity and kidney weight Gavage/HEAST 100 1E-05 IPHENATHENE 1.1E-06 No 3E-02 Petotoxicity Diet/REAST 100 7E-05 IPHENATHENE 1.4E-06 No 1E+00 Mortality Diet/REAST 100 7E									[[[
Increased 1.2E-06 No 1.2E-06		105.00	N-	05 00		t leven sendelser	1 IV- Ann/LITZ AST	100		0F 0F	
ICHLOROFORM 2.0E-08 No 1E-02 Liver tesions HEAST 1000 2E-06 TRICH-DROFHENE 2.7E-08 No NA HEAST NA NA TRICH-DROFHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 TOLUENE 2.0E-08 No 2E+00 Changes in liver and kidney weight HEAST 100 2E-07 TRICH-DROFHENC 1.3E-06 No 2E+00 Changes in liver and kidney weight Gavage/HEAST 2E-08 PHENOL 1.3E-06 No 1E+00 Hepatotoxicity and kidney effects Diet/IRIS 100 1E-05 PENTACHLOROPHENOL 2.1E-06 No NA NA NA NA IDI-n-BUTYLPHALATE 8.2E-06 No 1E+00 Mortality Diet/HEAST 100 8E-06 IPVENNE 1.4E-06 No 3E-01 Mortality Diet/HEAST 300 3E-06 IPVTNENCYLPHTHALATE 8.9E-07 No NA AE					Ξ						
ITRICHLOROETHENE 2.7E-08 No NA ITETRACHLOROETHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-08 ITRICHLOROETHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-08 IPHENOL 1.2E-06 No 6E-01 Reduced fetal body weight Gavage/HEAST 2E-08 IPHENOL 3.6E-06 No 1E-00 Hepatotoxicity Gavage/HEAST 100 7E-05 IPASE NEUTRAL/ACIDS IE-06 No 1E-00 Hepatotoxicity Gavage/HEAST 100 7E-05 IPASE NEUTRAL/ACIDS IE-06 No 1E-02 Petotoxicity Gavage/HEAST 100 7E-05 IPASE NEUTRAL/ACIDS IE-06 No 3E-02 Petotoxicity Gavage/HEAST 100 7E-05 IPASE NEUTRAL/ACIDS IE-06 No 3E-01 Mortality Die/HEAST 100 8E-06 IPASE NEUTRAL HARDE 1.4E-06 No 4E-01 NA <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>											
ITETRACELOROBETHENE 2.0E-08 No 1E-01 Hepatotoxicity Gavage/HEAST 100 2E-07 TOLUENE 2.0E-08 No 2E+00 Changes in liver and kidney weight HEAST 100 1E-08 PASE NEUTRAL/ACIDS						LAVEL (ESIONS		1000			}
TOLUENE 2.0E-08 No 2E+00 Changes in liver and kidney weight HEAST 100 1E-08 BASE NEUTRAL/ACIDS 1.3E-06 No 6E-01 Reduced fetal body weight Gavage/HEAST 2E-06 L2,45-TRICHLOROPHENOL 2.1E-06 No 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS 100 1E-06 IPHENANTHRENE 1.1E-06 No 3E-02 Petotoxicity Gavage/HEAST 100 7E-05 IPHENANTHRENE 1.1E-06 No 1E+00 Mortality Diet/IEAST 100 8E-06 IPUTABENZTLPHIALATE 8.2E-06 No 1E+00 Mortality Diet/HEAST 100 8E-06 IPUTABENZTLPHIALATE 8.2E-07 No 4E-01 Nephropathy, liver weight changes, Gavage/HEAST 300 5E-06 IBUTYLBENZTLPHTHALATE 8.9E-07 No 2E+00 Effects on body weight gain, testes, liver Diet/HEAST 100 4E-07 IBENZO(s)(ANTHENE 8.9E-07 No NA NA NA NA <td></td> <td></td> <td></td> <td></td> <td></td> <td>Henatotovicity</td> <td></td> <td>100</td> <td></td> <td></td> <td></td>						Henatotovicity		100			
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FLUORANTHENE1.4E-06No4E-01Nephropathy, liver weight changes, Reanal effectsGavage/HEAST3003E-06IPYRENE1.4E-06No3E-01Reanal effectsGavage/HEAST3005E-06IBUTYLBENZYLPITHALATE8.9E-07No2E+00Bffects on body weight gain, testes, liverDiet/HEAST1004E-07IBENZO(a)ANTHRACENE8.9E-07NoNANANA/HEASTNANAICHRYSENE8.9E-07NoNANANA/HEASTNAIbit(2-ETHYLHEXYL)PHTHALATE3.2E-06No2E-02Increased relative liver weightDiet/HEAST100012E-04IBENZO(a)FLUORANTHENE1.4E-06NoNANANANANAIBENZO(a)FLUORANTHENE5.1E-07NoNANANAIBENZO(a)FLUORANTHENE4.5E-07NoNANANAIBENZO(a)FLUORANTHENE4.5E-07NoNANAIBENZO(a)FLUORANTHENE5.1E-07NoNANAIBENZO(a)FLUORANTHENE5.1E-07NoNANAIBENZO(a)FLUORANTHENE4.5E-07NoNANAIBENZO(a)FLUORANTHENE5.1E-07NoNANAIBENZO(a)FLUORANTHENE4.5E-07NoNANAIBENZO(b)FLUORANTHENE4.5E-07NoNANAIBENZO(b)FLUORANTHENE4.5E-07NoNANAIBENZO(b)FLUORANTHENE4.5E-07NoNANAIBENZO(b)FLUORAN						Montolity		100	ļ		
PYRENE 1.4E-06 No 3E-01 Reanal effects Gavage/HEAST 300 5E-08 BUTYLBENZYLPHTHALATE 8.9E-07 No 2E+00 Effects on body weight gain, testes, liver Diet/HEAST 100 4E-07 BENZQ(a)ANTHRACENE 8.9E-07 No NA NA/HEAST NA CHRYSENE 8.9E-07 No NA NA/HEAST NA bit/2-ETHYLHEXYL)PHTHALATE 3.2E-06 No 2E-02 Increased relative liver weight NA/HEAST NA bit/2-ETHYLHEXYL)PHTHALATE 3.2E-06 No 2E-02 Increased relative liver weight Na/HEAST NA BENZQ(a)APTRENE 1.4E-06 No NA NA NA NA BENZQ(a)PYRENE 5.1E-07 No NA NA NA NA BENZQ(a)PYRENE 4.5E-07 No NA NA NA NA A/4-DDT 2.1E-04 No 5E-04 Liver lesions NA/HEAST 100 4E-01											
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BENZO(b)FLUORANTHENE 1.4E-06 No NA BENZO(b)FLUORANTHENE 5.1E-07 No NA BENZO(b)FLUORANTHENE 5.1E-07 No NA BENZO(b)FLUORANTHENE 5.1E-07 No NA BENZO(b)FLUORANTHENE 5.1E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 No NA BENZO(b)FLUORANTHENE 4.5E-07 NO NA BENZO(b)FLUORANTHENE 100 4E-01 BENZO(b)FLUORANTHENE 100 4E-01						Increased relative liver weight		1000	1 1		
BENZO(x)FLUORANTHENE 5.1E-07 No NA BENZO(x)FLUORANTHENE 5.1E-07 No NA BENZO(x)PYRENE 4.5E-07 No NA PESTICIDES / PCB'S 1 1 14-0DT 2.1E-04 No 5E-04						Indeast I can to make wakin			(' I		
BENZO(a)PYRENE 4.5E-07 No NA PESTICIDES / PCB'S NA NA 14.4 - DDT 2.1E-04 No 5E-04 Liver lesions NA/HEAST 100 4E-01								1	1		
PESTICIDES / PCB'S Liver lesions NA/HEAST 100 4E-01								1	1		
14.4-DDT 2.1E-04 No 5E-04 Liver lesions NA/HBAST 100 4E-01				1973				1	1		
14.4-DDT 2.1E-04 No 5E-04 Liver lesions NA/HBAST 100 4E-01	PESTICIDES / PCB'S										
		2.1E-04	No	5E04		Liver lesions	NA/HEAST	Í 100	í	4E-01	í
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TABLE A.4-9 SUBCHRONIC HAZARD INDEX ESTIMATES SCENARIO 4 - Construction (Future)

	SUBCHRONIC		NAMES AND AND AND AND AND AND AND AND AND AND			RFD				PATHWAY
CHEMICAL	DAILY INTAKE	ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD	HAZARD
	· · · · · · · · · · · · · · · · · · ·	A DOOD POTON	1	1 121/201	Brenze	COURCE	ADJUSTMENTE	EACTORS I	OUOTIRNT I	INDEX (HI)
	່ມບານນັ້ນມື້ນມື້ນມື້ນແມ່ນ	I DI ນທີ່ແມ		APPENA AND AND AND AND AND AND AND AND AND AND		inannnaanuuuu i	100000000000000000000000000000000000000		KANYA MANANA MANANA M	
EXPOSURE PATHWAY: INHALA	TION OF AIRBORN	E CHEMICALS A	DSORBED TO D	UST						1E-01
	TITLEITER THE AND A DESCRIPTION OF A DES									
INORGANICS	1					ł			. 1	
ALUMINUM	4.0E-05	No	NA			NA/HEAST			NA	
ANTIMONY	4.4E08	No	4.00E-04						1E-04	
ARSENIC	1.0E-08	No	1.00E-03		T		100	ļ	1E-05 2E-04	
BARIUM	1.9E07	l No	1.00E-03		Fetotoxicity	HEAST	100		12-04	
BERYLLIUM	7.5E09	No	5.00E-03		Next manual to	HEAST	30		7E-02	
CHROMIUM III	3.8E-07 2.1E-07	No No	5.71E-06 5.71E-06		Nasal mucosa atrophy Nasal mucosa atrophy	HEAST	30		4E-02	
CHROMIUM VI	2.12-07	No	5.71E-08		wasai mucosa arophy	NA/HEAST			NA I	
COBALT	3.4E-08	No	NA NA			NA/HEAST			NA	
LEAD	1.0E-07	i No	Í NA	1		NA/HEAST			NA	
MANGANESE	1.1E-06	No	1.00E-04		Increased prevalance of respiratory disease, psycomotor disturbances		900		1E02	
MERCURY	7.7E-10	No	9.00E-06		Neurotoxicity	Occupational/HEAST			9E-05	
INICKEL	1.0E-07	No	2.00E-02	i	····		1		5E-06	
SELENIUM	4.6E-09	No	NA			NA/HEAST	1		NA İ	
SILVER	1.1E-08	No	I NA	i		NA/HEAST			NA	ĺ
VANADIUM	2.4E-06	No	7.00E03	i		1	i 1	i i	3E04 (· ·
ZINC	1.6E07	No	2.00E-01	l			1		8E-07	
BORON	1.9E07	No	NA			NA/HEAST	ļ		NA	
TTTANIUM	1.2E-06	No	NA			NA/HEAST			NA	
ZIRCONIUM	8.4E07	No	NA NA	1	· · ·	NA/HEAST	1	.	NA	
"		1	1	!		l de la companya de l	ļ			
VOLATILE ORGANICS		!				HEAST	100		1E09	
METHYLENECHLORIDE	1.2E-09	No No	9.00E-01			NA/HEAST	100		NA I	
ACETONE	1.3E09 2.3E-11	No	I NA			NA/HEAST			NA I	1 .
CHLOROFORM	3.2 - 11	No	I NA	1 .		NA/HEAST			NA I	
ITETRACHLOROETHENE	2.4E-11	No	NA			NA/HEAST			NA	1
TOLUENE	2.3E-11	No No	6.00E-01		CNS effects, eyes and nose irritation	HEAST	100	í í	4E-11	1
				i	, , , , ,		i .	i i	i	İ
BASE NEUTRAL / ACIDS	1	i i	i	İ	· · ·		1		Í	İ
PHENOL	1.5E09	No No	į NA			NA/HEAST	1		NA Į	
2,4,5 - TRICHLOROPHENOL	1.1E-08	No No	I NA	1		NA/HEAST	ļ		NA	
[PENTACHLOROPHENOL	2.4E09	No	NA NA	ł		NA/HEAST	1		NA j	1
PHENANTHRENE	1.3E-09	No No	NA			NA/HEAST			NA I	
DI-1-BUTYLPHALATE	9.5E09	No No	1.00E+00			1	ļ		9E-09 4E-09	
FLUORANTHENE	1.6E-09	No	4.00E-01	ļ			1		4E-09 5E-09	
PYRENE	1.6E-09	No No	3.00E-01 2.00E+00	1					5E-10	
BUTYLBENZYLPHTHALATE	1.0E-09	i No	I NA	}		NA/HEAST	ł		NA	
BENZO(*)ANTHRACENE	1.0E-09	No	NA NA			NA/HEAST	1	[]	NA	í
bis(2-ETHYLHEXYL)PHTHALATE		No	2.00E-02	i			1		2E-07	
BENZO(b)FLUORANTHENE	1.€E-09	No	NA NA	i		NA/HEAST	i		NĂ	i
BENZO(k)FLUORANTHENE	5.9E-10	No	NA	i		NA/HEAST	i i	i l	NA	
BENZO(a)PYRENE	5.2E-10	No	NA	1	· · · ·	NA/HEAST	i		NA	
	1	l	i	i		1	1			1
PESTICIDES / PCB'S	l	1	1	l I		1	1	I	l i	l
4,4-DDT	2.5E07	No	I NA	I		NA/HEAST			NA	
NA: Not Applicable										

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NA: Not Applicable

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TABLE A.5-1 DERMALCONTACT WITH CHEMICALS IN SOIL SCENARIO 5 - Residential (Future)

CHRUCA, URLEB, CARLED, CARLED, CARLES,	NAN ANA ANA ANA ANA ANA ANA ANA ANA ANA	ABS. DOSE ADULT	ABS. DOSE ADULT	SOIL CONC	CONVERSION	SURFACE	ADHERENCE	ABSORPTION	EXPOSURE	EXPOSURE	BODY WT.	AVERAGING TIME	AVERAGING TIME
DADARCE Description <thdescrip< th=""> <thdescrip< th=""> Descrip</thdescrip<></thdescrip<>	CHEMICAL	(NONCANCER)	(CANCER)										
LUMINOM NA 0.00E-c0 92.25 IE-06 54.00 1.45 NA 350 30 70 19782 225 THOMAY MA 0.00E-c0 5.7 IE-06 64.00 1.45 NA 350 30 70 10780 225 SERLINA MA 0.00E-c0 5.4 IE-06 64.00 1.45 NA 350 30 70 10780 225 SERLINA MA 0.00E-c0 5.9.2 IE-06 64.00 1.46 NA 350 30 70 10780 225 SERLINA MA 0.00E-c0 5.0 IE-06 64.0 1.46 NA 350 30 70 10780 225 SERLINA MA 0.00E-c0 5.0.1 IE-06 64.0 1.46 NA 350 30 70 10780 225 SERLINA MA 0.00E-c0 5.06 IE-06 64.0 1.46 NA 350													
Intrinsory NA 0.002+00 56 IE-08 6400 1.65 NA 550 70 10800 252 Intrinsory NA 0.002+00 7.54 IE-08 6440 I.46 NA 550 70 10800 252 EPR/LIDIN NA 0.002+00 7.54 IE-08 6440 I.46 NA 550 70 10800 252 EPR/LIDIN NA 0.002+00 7.54 IE-08 6440 I.46 NA 550 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 70 10800 252 252 252 252 252 252 252 252 252 252 252 </td <td></td> <td>NA NA</td> <td></td> <td>8400 5</td> <td>15-08</td> <td>9440</td> <td>1.45</td> <td>NA</td> <td>350</td> <td>30</td> <td>70</td> <td>10950</td> <td>25550</td>		NA NA		8400 5	15-08	9440	1.45	NA	350	30	70	10950	25550
DESNIC NA 0.002-00 2.0 IE-00 B440 1.45 NA SD0 SD TO 10000 225 ALVILLING NA 0.024-00 7.4 IE-00 B440 1.45 NA SD0 SD TO 10000 225 ADRUM NA 0.024-00 326 IE-00 B440 1.46 NA SD0 SD TO 10000 225 IRROMIN IL NA 0.024-00 1.56 IE-00 B440 1.46 NA SD0 SD TO 10000 225 IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL IEROMIN IL NA 0.002+00 IEROMIN IL IEROMIN IL IEROMIN IL IEROMIN IL IEROMIN IL IEROMIN IL IEROMIN IL													25550
ARIUM NA COCE+00 77.4 (T=0) 6440 (A6) MA (50) 30 70 (1050) (252) SPRLIMM NA COCE+00 5.4 (T=0) 6440 (A6) NA (30) 70 (1050) (22) SPRLIMM NA COCE+00 4.3 (T=0) 6440 (A6) NA (30) 70 (1050) (22) (23) (24) (25550
BRALLINM NA 0.000+00 5.4 IE-00 6440 I.65 MA SO 70 10800 255 ANUMA MA 0.000+00 4.0 IE-00 8440 IA.6 NA 350 30 70 10800 255 BRALT NA 0.000+00 4.0 IE-00 8440 I.46 NA 350 30 70 10800 255 BRALT NA 0.000+00 4.3 IE-00 8440 I.46 NA 350 30 70 10800 255 OTRA NA 0.000+00 4.93 IE-00 8440 I.46 NA 350 30 70 10800 255 ARACAREE NA 0.000+00 4.93 IE-00 8440 I.46 NA 350 30 70 10800 255 ARACAREE NA 0.000+00 1.53 IE-00 8440 I.45 NA 350 30 70													25550
ADMINM 1.77E-05 7.8E-07 0.94 1.6-01 0.01 0.01 0.00 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01						•							25550
NAROMINA III NA 0.00E-00 242.5 IE-00 0.440 1.45 NA 0.00 70 10050 252 NAM 0.00E-00 4.5 IE-00 0.440 1.45 NA 0.00 30 70 10050 252 OPTER NA 0.00E-00 5.61 IE-00 0.440 1.45 NA 0.00 30 70 10050 252 DEAD NA 0.00E-00 5.21 IE-00 0.440 1.45 NA 0.00 30 70 10050 252 LINCAL NA 0.00E-00 1.23 IE-00 0.440 1.45 NA 0.00 30 70 10050 252 LINCAL NA 0.00E-00 1.56 0.440 1.45 NA 300 30 70 10050 252 LINCAL NA 0.00E-00 0.058 IE-00 0.440 1.45 NA 300 30 70 10050													25550
REAMING YF ANA 0.005-00 4.0 150 150 150 150 252 SORAT. IMA 0.005-00 4.0 150 150 150 150 252 SORAT. IMA 0.005-00 4.0 150 150 150 252 SORAT. IMA 0.005-00 4.0 150 150 150 150 252 SORAT. IMA 0.005-00 4.0 15													25550
OBALT NA 0.005-00 1.50 FE-OB P440 1.45 NA 0.350 30 70 10350 225 CAD OFFER MA 0.005+00 1.51 FE-OB 8440 1.45 NA 0.305 30 70 10350 225 CRUE MA 0.005+00 0.31 FE-OB 8440 1.45 NA 0.305 30 70 10350 225 CRUE MA 0.005+00 223.6 FE-OB 8440 1.45 NA 0.305 30 70 10350 225 CRUE MA 0.005+00 63.8 FE-OB 8440 1.45 NA 350 30 70 10350 225 CROM MA 0.005+00 33.0 FE-OB 8440 1.45 NA 350 30 70 10350 225 CROM MA 0.005+00 0.002 FE-OB 8440 1.45 NA 350 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>25550</td>													25550
OPTER NA 0.0004-00 15.6 IE-op 94.01 1.45 NA 350 30 70 10500 253 ALAD INSE MA 0.0024-00 5.61 IE-op 84.00 1.45 NA 350 30 70 10550 253 ISECONY MA 0.0024-00 2.63 IE-op 84.00 1.45 NA 350 30 70 10550 253 ISECONY MA 0.0024-00 0.86 IE-op 84.00 1.45 NA 350 30 70 10550 253 ILENNM MA 0.0024-00 1.86 IE-op 84.00 1.45 NA 350 30 70 10550 253 INC NA 0.0024-00 3.16 IE-op 84.00 1.45 NA 350 30 70 10550 253 INC NA 0.0024-00 0.022 IE-op 84.00 1.45 NA 350	COBALT												25550
EAD NA 0.000 + 00 95.1 15-00 94.0 1.45 NA 350 30 70 10550 237 MACAMESE NA 0.000 + 00 5.1.0 11-00 1.45 NA 350 30 70 10550 237 MACAMESE NA 0.000 + 00 5.1.0 11-00 84.0 1.45 NA 350 30 70 10550 237 MACAMESE NA 0.000 + 00 1.2 11-00 84.0 1.45 NA 350 30 70 10550 237 MACM 0.000 + 00 1.2 11-00 84.0 1.45 NA 350 30 70 10550 237 MACM 0.000 + 00 0.3.0 11-00 84.0 1.45 NA 350 30 70 10550 237 NON NA 0.000 + 00 0.020 1.45 NA 350 30 70 10550 237 70	COPPER					9440		NA				10950	25550
NAMA_ANSE NA 0.0065-00 48:1 1E-00 9440 1.45 NA 350 90 70 10950 237 RECUMY NA 0.0055-00 22:081 1E-08 8440 1.45 NA 350 30 70 10950 237 RECUMY NA 0.0055-00 12:1 1E-08 8440 1.45 NA 350 30 70 10950 237 LIVER NA 0.0055-00 154.85 1E-08 8440 1.45 NA 350 30 70 10950 237 ANADUM NA 0.0055-00 35.1 1E-08 8440 1.45 NA 350 30 70 10950 237 CRONTUM NA 0.0055-00 35.1 1E-08 8440 1.45 NA 350 30 70 10950 237 CRONTUM NA 0.0055-00 0.0221 1E-08 8440 1.45 NA 350	LEAD					• • • •							25550
Description NA 0.0054-00 0.13 1E-00 9440 1.45 NA 350 30 70 10950 252 ELBURG NA 0.0054-00 0.68 1E-00 5440 1.45 NA 350 70 10950 252 ELBURG NA 0.0054-00 1.46 NA 350 30 70 10950 252 ADDUTY NA 0.0054-00 74.64 1.45 NA 350 30 70 10950 252 NCC NA 0.0054-00 74.64 1.45 NA 350 30 70 10950 252 NCC NA 0.0054-00 1.46 NA 350 30 70 10950 252 NUM NA 0.0054-00 0.062 1.46-0 NA 350 30 70 10950 252 NUM NA 0.0054-0 0.062 1.66-0 9440 1.45 NA 350 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>													2555
ICAGE. NA 0.005-00 22.3.6 1E-06 944.0 1.4.5 NA 350 30 70 10950 252 LURR NA 0.005-00 1.2 1E-08 944.0 1.4.5 NA 350 30 70 10950 252 LURR NA 0.005-00 1.2 1E-08 944.0 1.4.5 NA 350 30 70 10950 252 DRN NA 0.005-00 0.3.6 1E-08 944.0 1.4.5 NA 350 30 70 10950 252 DROM NA 0.005-00 0.0.2 1E-06 944.0 1.4.5 NA 350 30 70 10950 252 TRONTINA NA 0.005-00 1E-06 944.0 1.4.5 NA 350 30 70 10950 252 TRONTINA NA 0.005-00 0.0.082 1E-06 944.0 1.45 NA 350 30													2555
LEANUM NA 0.00E+00 0.08 1E-06 944.0 1.45 NA 350 30 70 10950 232 AND 0.00E+00 1.2 1E-06 944.0 1.45 NA 350 30 70 10950 232 AND NA 0.00E+00 154.3 1E-06 844.0 1.45 NA 350 30 70 10950 232 ORON NA 0.00E+00 66.1 1E-06 844.0 1.45 NA 350 30 70 10950 232 IGBUM NA 0.00E+00 66.1 1E-06 844.0 1.45 NA 350 30 70 10950 232 IGBUM NA 0.00E+00 0.003 1E-06 844.0 1.45 NA 350 70 10950 232 VOLATLESORANCS NA 0.00E+00 0.0035 1E-06 844.0 1.45 NA 350 70 10950													2555
LLUER NA 0.00E+00 1.2 1E-06 9440 1.45 NA 350 30 70 10650 232 NNC NA 0.00E+00 94.8 1E-06 64.00 1.45 NA 350 30 70 10650 232 NNC NA 0.00E+00 65.1 1E-06 64.0 1.45 NA 350 30 70 10650 232 TRONTUM NA 0.00E+00 41.6 1E-06 64.0 1.45 NA 350 30 70 10650 232 TRONTUM NA 0.00E+00 90.2 1E-06 64.0 1.45 NA 350 30 70 10650 232 TRONTUM NA 0.00E+00 0.0023 1E-06 64.0 1.45 NA 350 30 70 10650 232 TRONTUM NA 0.00E+00 0.023 1E-06 64.0 1.45 NA 350 30 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>													2555
ANADIDIM NA 0.006+00 154.6s 15-06 94.00 1.45 NA 350 30 70 10550 233 ORCN NA 0.006+00 33.8 IE-06 94.40 1.45 NA 350 30 70 10550 233 ORCN NA 0.006+00 44.6 IE-06 94.00 1.45 NA 350 30 70 10550 233 TONTIM NA 0.006+00 44.6 IE-06 94.0 1.45 NA 350 30 70 10550 235 TONTIM NA 0.006+00 0.002 IE-06 94.0 1.45 NA 350 30 70 10550 235 ABON TONUFDE NA 0.006+00 0.0021 IE-06 94.0 1.45 NA 350 30 70 10550 235 ABON TONUFDE NA 0.006+00 0.00251 IE-06 944.0 1.45 NA 350<	SILVER												2555
INC NA 0.00E+00 69.9 1E=-06 9440 1.45 NA 350 30 70 10950 253 IGNUM NA 0.00E+00 6.6.1 1E=-06 8440 1.45 NA 350 30 70 10950 235 IGNUM NA 0.00E+00 6.1.1 1E=-06 8440 1.45 NA 350 30 70 10950 235 ISCONITM NA 0.00E+00 90.2 1E=-06 8440 1.45 NA 350 30 70 10950 235 ISCONITM NA 0.00E+00 0.008 1E=-06 8440 1.45 NA 350 30 70 10950 235 VOLATLE 0ROANCS CETWR NA 0.00E+00 0.0035 1E=-06 8440 1.45 NA 350 30 70 10950 235 VOLATLE 0ROANCS CETWR NA 0.00E+00 0.0035 1E=-06 8440	VANADIUM												2555
ORX NA 0.00E+00 33.0 1E=-06 9440 1.45 NA 350 30 70 10950 257 TRONTUM NA 0.00E+00 41.6 1E=-06 9440 1.45 NA 350 30 70 10950 258 TRONTUM NA 0.00E+00 41.60 1E=-06 9440 1.45 NA 350 30 70 10950 258 VCLATLE GROANCS V V VELATLE GROANCS V 10950 251 VELATLE GROANCS	LINC												2555
IDGRUM NA 0.000-00 66.1 IE-06 9440 1.45 NA 350 30 70 10950 225 TTARUTM NA 0.000-0 14.60 IE-06 8440 1.45 NA 350 30 70 10950 225 CAULTLE ORGANCS -	BORON												2555
TROMTUM NA 0.00E+00 41.6 IE-06 9440 1.45 NA 350 30 70 10950 22 NCATUE NA 0.00E+00 90.2 IE-06 9440 1.45 NA 350 30 70 10950 223 NCATUE RCONIUM NA 0.00E+00 0.002 IE-06 9440 1.45 NA 350 30 70 10950 223 ABOD NSULFIER NA 0.00E+00 0.0030 IE-06 9440 1.45 NA 350 30 70 10950 233 2-DICHLORETIER NA 0.00E+00 0.0030 IE-06 9440 1.45 NA 350 30 70 10950 233 RETLINE NA 0.00E+00 0.0031 IE-06 9440 1.45 NA 350 30 70 10950 233 NLTHINE NA 0.00E+00 0.031 IE-06 9440 1.45	NIOBIUM												25550
TITANUM NA 0.00E+00 14-0 1E-06 9440 1.45 NA 350 30 70 10950 224 VOLATLE ORGANICS - - - - - - - - - - - - 240 - 350 30 70 10950 225 VOLATLE ORGANICS - - - - - - - - - - - 24 - - - - - - 25 - - - - - - - 25 - 25 - - - - - - 0 0 0 0 0 0 16 6 440 145 NA 350 30 70 10950 25 - 25 24 16 145 NA 350 30 70 10950 25 - 1111 111 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>													2555
IRECONDM NA 0.00E+00 90.2 1E-08 9440 1.45 NA 350 30 70 10950 251 VOLATLE ORGANICS NA 0.00E+00 0.002 1E-08 9440 1.45 NA 350 30 70 10950 255 ARBON DISULIDE NA 0.00E+00 0.0021 1E-08 9440 1.45 NA 350 30 70 10950 255 ARBON DISULIDE NA 0.00E+00 0.0025 1E-08 9440 1.45 NA 350 30 70 10950 255 NA 0.00E+00 0.0035 1E-06 9440 1.45 NA 350 30 70 10950 255 RECABLERER NA 0.00E+00 0.0036 1E-08 9440 1.45 NA 350 30 70 10950 235 THYLBERZENE NA 0.00E+00 0.013 1E-08 9440 1.45 NA 350 30 70 10950 235 THYLBERZENE NA 0.00E+													2555
CETORE NA 0.00E+00 0.06E2 1E-06 9440 1.45 NA 350 30 70 10950 252 a-DICHLORETHENE (u+1) NA 0.00E+00 0.0020 1E-08 9440 1.45 NA 350 30 70 10950 255 a-DICHLORETHENE (u+1) NA 0.00E+00 0.0035 1E-08 9440 1.45 NA 350 30 70 10950 255 RICHLORETHENE NA 0.00E+00 0.0035 1E-08 9440 1.45 NA 350 30 70 10950 255 RIZERE NA 0.00E+00 0.0034 1E-06 9440 1.45 NA 350 30 70 10950 255 RIZERE (u+1) NA 0.00E+00 0.051 1E-06 9440 1.45 NA 350 30 70 10950 255 RIZERE (u+1) NA 0.00E+00 0.15 1E-06 9440 1.45 <td>LIRCONIUM</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>	LIRCONIUM												2555
ARLONDISULTIDE NA 0.002E+00 0.00320 1E-08 9440 1.45 NA 350 30 70 10950 252 - DCHLORETTIRE (str.) NA 0.00E+00 0.0026 1E-06 9440 1.45 NA 350 30 70 10950 252 - DCHLORETTIRE N NA 0.00E+00 0.0035 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZENS NA 0.00E+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZENS NA 0.00E+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 253 CLUBNS NA 0.00E+00 0.015 1E-06 9440 1.45 NA 350 30 70 10950 253 VIENS (etal) NA 0.00E+00 0.15 1E-06 9440 1.45	VOLATILE ORGANICS	1]			1			l	}
2-DICHLORETTERE(ext.1) NA 0.00E+00 0.0001 1E-06 9440 1.45 NA 350 30 70 10950 287 NCHLORETTERE NA 0.00E+00 0.0035 1E-06 9440 1.45 NA 350 30 70 10950 287 RICHLOROTTERE NA 0.00E+00 0.015 1E-06 9440 1.45 NA 350 30 70 10950 287 RIZENE NA 0.00E+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 287 OLUBNE NA 0.00E+00 0.035 1E-06 9440 1.45 NA 350 30 70 10950 287 BASE NUTRAL/ACIDS NA 0.00E+00 0.015 1E-06 9440 1.45 NA 350 30 70 10950 287 REXOL NA 0.00E+00 0.16 1E-06 9440 1.45 <t< td=""><td>ACETONE</td><td>NA</td><td>0.00E+00</td><td>0.082</td><td>1E-06</td><td>9440</td><td>1.45</td><td>NA</td><td>350</td><td>30</td><td>70</td><td>10950</td><td>2555</td></t<>	ACETONE	NA	0.00E+00	0.082	1E-06	9440	1.45	NA	350	30	70	10950	2555
- PUTANONE NA 0.00E+00 0.0035 1E-06 9440 1.45 NA 350 30 70 10950 257 ENZENS NA 0.00E+00 0.0035 1E-06 9440 1.45 NA 350 30 70 10950 257 ENZENS NA 0.00E+00 0.0036 1E-06 9440 1.45 NA 350 30 70 10950 257 OLUENS NA 0.00E+00 0.0014 1E-06 9440 1.45 NA 350 30 70 10950 257 THYLENEZENS NA 0.00E+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 257 BASE NEUTRAL/ACIDS - - - - - - - - - - - 1055 257 257 257 257 257 257 257 257 257 257 257	CARBON DISULFIDE	NA	0.00E+00	0.0030	1E-06	9440	1.45	NA	350	30	70	10950	2555
NA 0.002+00 0.035 1E-06 9440 1.45 NA 350 30 70 10950 28 EFRACHLOROFTHENE NA 0.002+00 0.038 1E-06 9440 1.45 NA 350 30 70 10950 28 DULUENE NA 0.002+00 0.038 1E-06 9440 1.45 NA 350 30 70 10950 28 DULUENE NA 0.002+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 28 BASE NUTRAL/ACIDS 28 NA 350 30 70 10950 28 NA 350 30 70 10950 28 <t< td=""><td>1,2-DICHLORETHENE (total)</td><td>NA</td><td>0.00E+00</td><td>0.0020</td><td>1E-06</td><td>9440</td><td>1.45</td><td>NA*</td><td>350</td><td>30</td><td>70</td><td>10950</td><td>2555</td></t<>	1,2-DICHLORETHENE (total)	NA	0.00E+00	0.0020	1E-06	9440	1.45	NA*	350	30	70	10950	2555
ENZENE NA 0.005+00 0.15 1E-06 9440 1.45 NA 350 30 70 10950 253 CUUENB NA 0.005+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 253 CUUENB NA 0.005+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 253 TYLENE (Mai) NA 0.005+00 0.051 1E-06 9440 1.45 NA 350 30 70 10950 253 BASE NEUTRAL/ACIDS	2-BUTANONE		0.00E+00	0.0061		9440							2555
ETRACRLOROFTHENE NA 0.00E+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 283 THYLERMENE NA 0.00E+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 283 THYLERMENE NA 0.00E+00 0.051 1E-06 9440 1.45 NA 350 30 70 10950 283 VLER (Ma) NA 0.00E+00 0.16 1E-06 9440 1.45 NA 350 30 70 10950 283 RATCHLANC NA 0.00E+00 0.15 1E-06 9440 1.45 NA 350 30 70 10950 283 ATTROPIENCIC NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 233 ATTROPIENCIC NA 0.00E+00 0.13 1E-06 9440 1.45 NA <td>TRICHLOROETHENE</td> <td></td> <td>0.00E+00</td> <td>0,0035</td> <td></td> <td>9440</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>	TRICHLOROETHENE		0.00E+00	0,0035		9440							2555
OLUBINE NA 0.005+00 0.0038 1E-06 9440 1.45 NA 350 30 70 10950 288 YILENE (w1a) NA 0.00E+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 288 BASE NEUTRAL/ACIDS	BENZENE	NA	0.00E+00	0.15	1E-06	9440	1.45	NA		30	70	10950	2555
THYLERE NA 0.00E+00 0.014 1E-06 9440 1.45 NA 350 30 70 10950 28 STLENE (unit) NA 0.00E+00 0.051 1E-06 9440 1.45 NA 350 30 70 10950 28 BASE NEUTRAL/ACIDS	TETRACHLOROETHENE		0.00E+00	0.0036	1E-06	9440							2555
YILENE (w1n) NA 0.00E+00 0.051 1E-06 9440 1.45 NA 350 30 70 10950 28 BASE NEUTRAL/ACIDS	TOLUENE	NA NA	0.00E+00	0.0038	1E-06	9440	1.45	NA		30			2555
BASE BEUTRAL/ACIDS NA 0.00E+00 0.16 1E-06 9440 1.45 NA 350 30 70 10950 253 HENOL NA 0.00E+00 0.15 1E-06 9440 1.45 NA 350 30 70 10950 253 AHTHALENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 -NITROPILENC NA 0.00E+00 1.0 1E-06 9440 1.45 NA 350 30 70 10950 253 ENTACTILOROPHENCL NA 0.00E+00 2.8 1E-06 9440 1.45 NA 350 30 70 10950 253 INTHACENE NA 0.00E+00 0.064 1E-06 9440 1.45 NA 350 30 70 10950 253 ILORANTHENE NA 0.00E+00 0.026 1E-06 9440 1.45 NA	ETHYLBENZENE	NA	0.00E+00	0.014		9440		NA		30			2555
HENOL NA 0.00E+00 0.16 IE-06 9440 1.45 NA 350 30 70 10950 253 APHTHALENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 APHTHALENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 APHTHALENE NA 0.00E+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 253 ENTACHLOROPHENCL NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 ENTACKENE NA 0.00E+00 0.033 1E-06 9440 1.45 NA 350 30 70 10950 253 LUORANTHENE NA 0.00E+00 0.026 1.45 NA 350 30 <td< td=""><td>XYLENE (total)</td><td>NA</td><td>0.00E+00</td><td>0.051</td><td>1E-06</td><td>9440</td><td>j 1.45</td><td>NA</td><td>350</td><td>30</td><td>70</td><td>10950</td><td>2555</td></td<>	XYLENE (total)	NA	0.00E+00	0.051	1E-06	9440	j 1.45	NA	350	30	70	10950	2555
ENZOLC ACID NA 0.00E+00 0.15 1E-08 9440 1.45 NA 350 30 70 10950 255 APHTHALENE NA 0.00E+00 0.13 1E-08 9440 1.45 NA 350 30 70 10950 255 APHTHALENE NA 0.00E+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 255 4 - DINTROTOLUENE NA 0.00E+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 255 HENANTRENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 255 HENANTRENE NA 0.00E+00 0.093 1E-06 9440 1.45 NA 350 30 70 10950 255 HITACELENE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 255 LUORANTHENE NA													
AFHTRALENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 -NTROPHENOL NA 0.00E+00 1.0 1E-06 9440 1.45 NA 350 30 70 10950 253 -NTROPHENOL NA 0.00E+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 253 ENTACHLOROPHENOL NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 INTROFILENCL NA 0.00E+00 0.31 1E-06 9440 1.45 NA 350 30 70 10950 253 In-a-BUTYLPHALATE NA 0.00E+00 0.026 1E-06 9440 1.45 NA 350 30 70 10950 253 In-a-BUTYLPHALATE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 255 VEYLENEX	PHENOL												2555
NTROPHENOL NA 0.002+00 1.0 1E-06 9440 1.45 NA 350 30 70 10950 253 4 - DINTROTOLUENE NA 0.002+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 253 4 - DINTROTOLUENE NA 0.002+00 0.28 1E-06 9440 1.45 NA 350 30 70 10950 253 HENARTHRENE NA 0.002+00 0.044 1E-06 9440 1.45 NA 350 30 70 10950 253 1- a- BUTYLPHALATE NA 0.002+00 0.044 1E-06 9440 1.45 NA 350 30 70 10950 253 UORANTHENE NA 0.002+00 0.046 1E-06 9440 1.45 NA 350 30 70 10950 253 UTYLBAZYLPHTHALATE NA 0.002+00 0.25 1E-06 9440 1.45 <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2555</td>						1							2555
4 - DINTROTOLUENE NA 0.00E+00 0.11 1E-06 9440 1.45 NA 350 30 70 10950 255 ENTACHLOROPHENOL NA 0.00E+00 2.8 1E-06 9440 1.45 NA 350 30 70 10950 255 ENTACHLOROPHENOL NA 0.00E+00 0.03 1E-06 9440 1.45 NA 350 30 70 10950 255 INTHRACENE NA 0.00E+00 0.084 1E-06 9440 1.45 NA 350 30 70 10950 255 LUCRANTHENE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 255 LUCRANTHENE NA 0.00E+00 0.22 1E-06 9440 1.45 NA 350 30 70 10950 255 LUCRANTHENE NA 0.00E+00 0.42 1.45 NA 350													2555
ENTACHLOROPHENOL NA 0.00E+00 2.8 1E-06 9440 1.45 NA 350 30 70 10950 253 HENANTHRENE NA 0.00E+00 0.13 1E-06 9440 1.45 NA 350 30 70 10950 253 It=-neUTYLPHALATE NA 0.00E+00 0.094 1E-06 9440 1.45 NA 350 30 70 10950 253 It=-neUTYLPHALATE NA 0.00E+00 0.093 1E-06 9440 1.45 NA 350 30 70 10950 253 LUORANTHENE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 253 LUORANTHENE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 253 UTYLBENZYLPHTHALATE NA 0.00E+00 0.42 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZO(b/LUORANTH						1							
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NI-n - BUTYLPHALATE NA 0.00E+00 0.093 1E-06 9440 1.45 NA 350 30 70 10950 253 LUDRANTHENE NA 0.00E+00 0.26 1E-06 9440 1.45 NA 350 30 70 10950 253 VRENE NA 0.00E+00 0.046 1E-06 9440 1.45 NA 350 30 70 10950 253 VITLEBNZYLPHTHALATE NA 0.00E+00 0.12 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZC0/ANTHENE NA 0.00E+00 0.42 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZC0/ANTHENE NA 0.00E+00 0.25 1E-06 9440 1.45 NA 350 30 70 10950 253 ENZC0/ANTHENE NA 0.00E+00 0.27 1E-06 9440 1.45 NA 350 30 70 10950 255 ENZC0/APTRENE													
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ENZO(k)FLUORANTHENE NA 0.00E+00 0.16 1E-06 9440 1.45 NA 350 30 70 10950 250 ENZO(k)FLUORANTHENE NA 0.00E+00 0.74 1E-06 9440 1.45 NA 350 30 70 10950 250 ENZO(k)FLUORANTHENE NA 0.00E+00 0.74 1E-06 9440 1.45 NA 350 30 70 10950 250 VDENO(1,2,3-cd)PYRENE NA 0.00E+00 0.38 1E-06 9440 1.45 NA 350 30 70 10950 250 VDENO(1,2,3-cd)PYRENE NA 0.00E+00 1.1 1E-06 9440 1.45 NA 350 30 70 10950 250 PESTCIDES / PCB'S													
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PESTICIDES / PCB'S PESTICI	NDENO(1,2,3-cd)PYRENE												
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ROCLOR-1254 1.30E-05 5.56E-06 1.2 1E-08 9440 1.45 0.06 350 30 70 10950 25 ROCLOR-1260 2.48E-07 1.06E-07 0.022 1E-06 9440 1.45 0.06 350 30 70 10950 25	PESTICIDES / PCB'S	1	1			1	1	Į .	j	1	1.	1	1
ROCLOR-1260 2.48E-07 1.06E-07 0.022 1E-06 9440 1.45 0.06 350 30 70 10950 25	AROCLOR ~ 1248			1.9	1E-06	9440		0.06					
	AROCLOR-1254												
	AROCLOR-1260												

321	03601	5180	02			9) L	90-3L	001	500	0.022	80 - 392.1	80 - ∃10.£	2.49E ~ 08	2.915-07	0921-300
561	09601	0612	02			9		1.	1E-00	001	500	5.1	20-322'9	80-368.1	80-31C.1	80 - 328. r	1254 1324
522	09601	0612	04	8.41	00	9	360	1	1E-04	001	500	6. r	1,12E-06	2.60E - 06	\$'18E-06	30-318.5	OB-1548 bERICIDER/BCB/R
	1			İ				İ.		İ	1	i i	į į	i	İ		1
521 521	0960 L 0960 L	5190		8.21 8.21		9	320 320		90-31 90-31	001	500	1.1	6.46E - 07	80-318,1	1.25E-06	20-334.1	(i'v'i)segyleng
35	109601	1 0612	1 02			9	1096		190-31	00 L 00 L	500	\$2'0	120-346.4	80 - 310.1 70 - 312.8	170-316.8	90 - 367.6	0(1'52-99)578ENE
52	09601	5100							90-31	001	500	91.0	80-365.6	2.19E-07	20-318.1	212E-06	(F) LUOKVATHENE
520	09601	5180						li	90-31	001		72.0	20-329.1	3.665 - 07	20-3000	30-3610	(a) FLUORANTHENE
52	03601	5130						li.	1E-06	001		0.25	20-341	3.426 - 07	2.835-07		BIATAHEXYL)PHTHALATE
58	109601	5180		9.41		9			90-3L	001			1.76-387.1	20-3114	20-301.0	90-346°C	SIN SINGLASSING SINGLASSING
52	109601	5180		9.41			320	1+	90-3L	001			2476-07	20-394.8	4.76-387.4	90-399'S	(*)VITHRACENE
5	109601	5190	02	8.41	00	9	320	1 6	190-3L	001	500	121.0	80~ 390.7	170-348.f	TO 386. P	80-369.F	BENZYLPHTHAJYZNAB
56	103601	5190		3.41		9	320	1.	1E-00	001	500	990.0	2.70E 06	80-300.8	80-315,8	20-390'9) a
5	103601	0612	04			9	380	L .	90-3L	001	500	82.0	1.62E-07	20-3+9°C	70- 306.S	3'45E-08	ANTHENE
51	03601	2190	02			9	320	1 6	180-3L	001	500	£60'0	80~344.8	1.275-07	TO~ 380. P	1.23E-06	INTERPATIVIE 1
5	03601	5190		8.41		9	320	1	90-3L	001	500	980.0	80 - 356 ¥	TO-381.1	9.62E-06	80-311.1	VCENE
51	09604	0612				9	360	1	1E-06	001		61.0	7.63E-08	170-367.1	1.475-07	1.72E - 06	итнкеие
5	109601	5190						•	90-3L	001		9.5	80-349.1	3.62E ~06	30-391.6	80-368.£	TONEHIAOBOTH
5	09601			3.41				1.	90-BL	001		110	80-394.8	10-318.1	1.26E-07	20-324.1	EROTOLUENE
51	103601	5190						L	1E-00	001		0.1	60-363.7 7.63E-08	1 70 ~ 367,1 1 80 ~ 376,1	1'13E-04	1,322-05	JONEHAOL
5	09601	10612					1090		190-31	001		1910	80-318.8	20-390'2	1 70-307.1	1.72E ~ 06	IVTENE CVCID
5	09601	5180						1	90-31	001		91.0	20-310	2.475-07	20-300 1	2.36E-06	
•					Ť	•				1	1		1	120-3200	120-3100	1 10-3000	SE NEUTRAL / ACIDS
. 5	02601	0612	04	1 9' + 1	loc	•	320	1	90-3L	001	500	1.50.0	2.976-08	190-369,8	 90-3£2'9	 ∠0~∃69'9	(istal):
5	09601	5180	02	18.41			980	i i	90-31	001	500	+10.0	60-340.8	160-368.f	80-399'1	1.82E-07	ENSERE
5	09601	5180	04			9	380	1.	18-04	001	500	0'0038	2.21E-09	60-391'S	4.27E~09	90-396'*	AE AE
5	109601	5190	04	8.41		9	090	i	10-31	001	5001	9600.0	5'13E-00	60-346.4	60-311'#	80-308.4	BNBHTBOROTH
5	109601	5190	04			9	090	1.	15-04	001	500	81.0	80-318,8	2.05E - 07	1.705-07	90-396.F	4E
3	109601	5180	02			9	360	1.	90-3L	001	500	90000	2.06E~09	60-309'¥	0-366.C	80-3+9.4	OROETHENE
31	103601	2190	04					1	80~3L	001	500	1800.0	€0≁∃68.£	60-375.8	60-369.8	80-380.8	I SNON
56	02601	0612	02	3.41				1	180-31	001	500	0200.0	0-311.1	2,74E - 09	2.27E-09	2.65E - 08	HLORETHENE (10161)
51	09601	0612		3.41				1	90-3L	001	500		eo-36%,†	60-3+1'+	0-3C+.C	80-300.A	BORLFIDE
31	09601	2190	04	8.41	90	•	320	F	90-3L	001	500	0.082	80-316.4	112E-07	80-30£.6] 90∃90,⊧	AE DEVICE OBG VAICS
5															1		
	09601	5190		8.41			980		90-31	001	500	5.06	80-30£.8	1.24E-04	1.025-04	1 EO-361,1	MUI
5	0960L	10812							190-31	001	500	0'9#L 0'9#L	80-378.8	2.00E-04	1.65E-04	1.926-359.1	W
5	09601	519012	01	3.41					190-31 190-31	001	500	1.88	3,44E - 05	80-300.0	7.49E-05	90-392'9	พกเ
5	09601	5190	102	9.41			1090		90-31	001	1002	9.55	80-379.1	90-300'F	80-308.C	4.44E-04	, n
ŝ	09601	5180		9.41				1	190-31	001	500	6.69	90-3LI'Y	80-368.6	2-3ce.7	9.26E-04	
5	109601	0612		18.91		9		i.	190-31	001	500	9.6481	\$0-360'6	2.12E-03	CO-397.1	2.05E-02	พณ
5	109601	5180						i.	90-31	001	500	2.1	20-340.7	90-399'L	90-346.1	1'29E-02	
5	09601	5180						i.	100-31	001	500	99'0	20-368°C	20-360'6	70-328.7	90-311,8	WO
3	09601	5180						i.	190-3L	001		553.4	1.0-316.1	3.06E - 04	2.63E-04	2,965-03	
5	103601	5130	02	3.41	OC	9		1	1E-06	001		1010	80- 34¥'4	1.745-07	10-3++.1	80-368.F	к
5	09601	5130						1.	90-3L	001	500	1.864	2.56E-04	+0-316'9	+0-3+6 +	6.77E-03	BSEN
3	109601							1	190-3L	001	500	1.88	30~362.E	7.68E - 06	80-39C.8	7.42E-04	
5	109601							L L	1E-06	001	500	9.81	80-381.e	2,14E-06	1 - 37T. P	2.07E-04	1
5	09601	5190						L L	180-3L	001	500	¢. Þ	2,855 - 06	80-386.8	4.93E-06	80-387.8	-
5	09601	5190						1	1E-06	001		0.4	2.35E - 06	80-364.8	4.63E-06	50-365.2	IA MAII
5	03601	5190				9	360	11	90-3L	001	500	545.6	1,42E-04	3.32E - 04	2.76E - 04	3.21E-03	111 MOI
5	09601	5130	02	8.4F		\$	360	!!	15-06	001	500	#6'0	20-399'9	1.29E - 06	80-370.1	1.26E-05	WI
5	09601	5190	02	3.41 3.41		9	320	11	1E-00	001	500	9.8	90-301°C	7.43E 06	80-391.8	20-341.4	WOI
5	09601	2190	02	8.41 8.41		9	920	11	1E-00	001	500	+.77	4'24E-02	1.00-380.F	90~3/1.8	1.028-03	i i
-	09601	10612	04			9	320		190-3L 190-3L	001		6.8 0.2	90-361'1	2.77E - 06	5"53E ~08 9"66E ~08	2.67E - 05	D
5	103601	10612	02			9	360		[90-31	001 001	500	8,22,8	3,465 - 06	20-381.1 80-381.1	20 388.8 80 388.8	80-344.7	ANG
•	1			1	!	-					1000		CO-346.4	100-3811	0 885-00	10-311.1	AUM INORGANICS
(sásp)	(ansb) LIUGA	CHIED (4123)	(\$3)	(\$3)	(LUNSA)	(Acerca)	(1804/468p)	(mattiou)	(\$u/\$t9-51)	(ລົສ ຄູງແດະ ສືພ)	(Wit soing all)	(\$ty\$w)	(ásy/8s/8w)	(áng fay/fitti)	(ásg/8y/fw)	 (átg/\$ty/\$tu)	
(CVACEB	NONCYNCHE	RONCANCIER	nor	CHILD	moay	CHILD	FREQUENCY	GELSEDNI	FACTOR	RATEADULT		CONC	(CVIACER)	(NONCYNCER)	(CVINCER)	(NONCYNCER)	CHEWICVT
		YARESYCING LINE															

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TABLE A.S-2 INGESTION OF CHEMICALS IN SOIL AND HOUSE DUST SCENARIOS - Reidential (Patare) SCENARIOS - Reidential (Patare)

TABLE A.5–3	
OUTDOOR INHALATION OF AIRBORNE CHEMICALS ADSORBED TO I	DUST
SCENARIO 5 - Residential (Future)	

	ABS. DOSE ADULT	ABS. DOSE ADULT	SOIL	DUST	INHALATION	EXPOSURE	EXPOSURE	EXP. DUR.	BODY WT.	AVERAGING TIME	AVERAGING TIM
CHEMICAL	(NONCANCER) (mg/kg/day)	(CANCER) (mg/kg/day)	CONC. (mg/kg)	CONC. (mg/m3)	RATEADULT (m3/br)	TIME (hr/day)	FREQUENCY (events/year)	ADULT (years)	ADULT (kg)	NONCANCER ADULT (days)	(CANCER) (days)
INORGANICS									 -	 -	
LUMINUM	1.49E06	6.40E-07	8422.5	3.9E09	0.83	4	350	30	. 70	10950	255
NTIMONY	1.04E-09	4.47E-10	5.9	3.9E~09	0.83	1 4	350	30	70	10950	255
RSENIC	3.58E-10	1,54E-10	2.0	3.9E-09	0.83	4	350	30	70	10950	255
ARIUM	1.37E-08	5.88E-09	77.4	3.9E-09	0.83	4	350	30	70	10950	255
	9.62E-10	4.12E-10	5.4	3.9E-09	0.83	4	350	30	70	10950	255
ERYLLIUM							350		70		255
ADMIUM	1.67E-10	7.17E-11	0.94	3.9E-09	0.83	4		30		10950	
HROMIUM III	4.30E08	1.84E08	242.6	3.9E-09	0.83	4	350	30	70	10950	255
HROMIUM VI	7.09E-10	3.04E-10	4.0	3.9E09	0.83	4	350	30	70	10950	255
OBALT	7.71E10	3.30E-10	4.3	3.9E09	0.83	4	350	30	70	10960	255
OPPER	2.77E-09	1.19E-09	15.6	3.9E-09	0.83	4	350	30	70	10950	255
EAD	9.95E-09	4.26E-09	56.1	3.9E-09	0.83	İ 4	350	30	70	10950	255
ANGANESE	7.74E-08	3.32E-08	436.1	3.9E-09	0.83	4	350	30	70	10950	255
		9.67E-12	0.13	3.9E-09	0.83	4	350	30	70	10950	255
IERCURY	2.26E-11				0.83	4	350		70	10950	255
ICKEL	3.97E-08	1.70E-08	223.6	3.9E-09				30			
ELENIUM	1.18E10	5.04E-11	0.66	3.9E09	0.83	4	350	30	70	10950	255
LVER	2.14E-10	9.15E-11	1.2	3.9E-09	0.83	4	350	30	70	10950	255
ANADIUM	2.75E-07	1.18E-07	1548.6	3.9E09	0.83	4	350	30	70	10950	255
INC	1.24E08	5.32E09	69.9	3.9E-09	0.83	į 4	350	30	70	10950	255
ORON	5.95E09	2.55E-09	33.6	3.9E09	0.83	1 4	350	30	70	10950	255
IOBIUM	1.17E-08	5.02E-09	66.1	3.9E-09	0.83	4	350	30	70	10950	255
TRONTIUM	7.38E09	3.16E-09	41.6	3.9E-09	0.83	4	350	30	70	10950	25
TANIUM	2.59E-08	1.11E-08	146.0	3.9E-09	0.83		350	30	70	10950	25
IRCONIUM	1.60E-08	6.86E-09	90.2	3.9E-09	0.83	4	350	30	70	10950	25
VOLATILE ORGANICS	i				İ				i		
CETONE	1.45E-11	6.23E-12	0.082	3.9E09	0.83	1 4	350	30	70	10950	25
RBON DISULFIDE	5.37E-13	2.30E-13	0.0030	3.9E-09	0.83	i 4	350	30	i 70	10950	25
-DICHLORETHENE (total)	3.55E-13	1.52E-13	0.0020	3.9E-09	0.83	4	350	30	70	10950	25
BUTANONE	1.08E-12	4.65E-13	0.0061	3.9E-09	0.83	4	350	30	70	10950	25
						4	350		70		25
RICHLOROETHENE	6.22E13	2.67E-13	0.0035	3.9E-09	0.83	· ·		30		10950	
ENZENE	2.66E-11	1.14E11	0.15	3.9E-09	0.83	4	350	30	70	10950	25
ETRACHLOROETHENE	6.43E-13	2.76E-13	0.0036	3.9E-09	0.83	4	350	30	j 70	10950	25
OLUENE	6.68E-13	2.86E-13	0.0038	3.9E-09	0.83	4	350	30	70	10950	25
THYLBENZENE	2.44E-12	1.04E-12	0.014	3.9E-09	0.83	į 4	350	j 30	70	10950	255
YLENE (total)	8.97E-12	3.84E12	0.051	3.9E09	0.83	4	350	30	70	10950	25
BASE NEUTRAL / ACIDS						1		1	1		
HENOL	3.19E-11	1.37E11	0.18	3.9E-09	0.83	4	350	30	70	10950	25
								· · ·			
ENZOIC ACID	2.66E-11	1.14E-11	0.15	3.9E09	0.83	4	350	30	70	10950	25
APHTHALENE	2.31E-11	9.88E-12	0.13	3.9E-09	0.83	4	350	30	70	10950	25
NITROPHENOL	1.77E-10	7.60E-11	1.0	3.9E-09	0.83	4	350	30	70	10950	25
-DINITROTOLUENE	1.95E-11	8.36E-12	0,11	3.9E09	0.83	4	350	j 30	70	10950	25
NTACHLOROPHENOL	4.95E-10	2.12E-10	2.8	3.9E-09	0.83	4	350	j 30	70	10950	25
IENANTHRENE	2.31E-11	9.88E-12	0.13	3.9E-09	0.83	i 4	350	30	70	10950	25
THRACENE	1.49E-11	6.39E-12	0.08	3.9E-09	0.83	4	350	30	70	10950	25
		7.04E-12	0.09	3.9E-09	0.83		350	30	1 70	10950	25
-n-BUTYLPHALATE	1.64E-11					1					
UORANTHENE	4.59E-11	1.97E-11	0.26	3.9E-09	0.83	4	350	30	70	10950	25
RENE	8.16E12	3.50E-12	0.046	3.9E09	0.83	4	350	30	70	10950	25
TYLBENZYLPHTHALATE	2.13E-11	9.12E-12	0.12	3.9E-09	0.83	4	350	30	70	10950	25
NZO(1)ANTHRACENE	7.45E-11	3.19E-11	0.42	3.9E~09	0.83	1 4	350	j 30	70	10950	25
IRYSENE	5.32E-11	2.28E-11	0.30	3.9E09	0.83	4	350	30	70	10950	25
(2-ETHYLHEXYL)PHTHALATE	4.43E-11	1.90E-11	0.25	3.9E-09	0.83	4 *	350	30	70	10950	25
NZO(b)FLUORANTHENE	4.74E-11	2.03E-11	0.27	3.9E-09	0.83		350	30	70	10950	25
NZO(k)FLUORANTHENE	2.84E-11	1.22E-11			0.83		350	30			25
NZO(2)PYRENE	1.31E-10	5.635-11	0.74	3.9E-09	0.83	4	350	j 30	70	10950	
DENO(1,2,3-cd)PYRENE	6.74E-11	2.89E~11	0.38	3.9E-09	0.83	4	350	j 30	į 70	10950	25
NZO(g,h,i)PERYLENE	1.95E 10	8.36E-11	1,1		0.83		350	30			
PESTICIDES / PCB'S							l			1	
	0.075 40	4 445 44			1				70	10050	1
ROCLOR-1248	3.37E-10	1.44E10	1.9		0.83		350	30			25
ROCLOR-1254	2.04E 10	8.76E-11	1.2	3.9E-09	0.83		350	30			25
							350	1 00	70	10950	25
OCLOR - 1260	3.90E-12	1.67E-12	0.022		0.83			30			

TABLE A.5–4 CANCER RISK ESTIMATES SCENARIO 5 – Residential (Future)

	CHRONIC DAILY		NUMBER OF STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREE				CHEMICAL	TOTAL
II CHEMICAL	INTAKE ADULT	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPEC, RISK	PATHWAY TOTAL
I CHEMICAL	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	ADULT	RISK RISK
IEXPOSURE PATHWAY: DERMAL	CONTACT WITH	ISOUS					ADULT	1E-04 2E-04
••								
INORGANICS			1			1999 1997 1997 1997 1997 1997 1997 1997		
ARSENIC	0.0E+00	No	1.75E+00	A	Skin	IRIS	0E+00	
li i							1	
VOLATILE ORGANICS		j.	i			,	i i	1
TRICHLOROETHENE	0.0E+00	No	1.10E-02	B2	Liver	Gavage/HEAST	0E+00	1
BENZENE	0.0E+00	No	2.90E-02	i a i	Leukemia	Occupational/IRIS	0E+00	
TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	0E+00	l l
ii i		İ	İ			-	i i	
BASE NEUTRAL / ACIDS		Ì		1				
2,4-DINITROTOLUENE	0.0E+00	No	6.80E-01	B2	Liver, mammary gland	Diet/IRIS	0E+00	
PENTACHLOROPHENOL	0.0E+00	No	1.20E-01	B2	Hepatocellular adenoma, carcinomas, pheochromocytoma	Oral/IRIS) 0E+00	
BUTYLBENZYLPHTHALATE	0.0E+00) NA	C	Leukemia	Diet/IRIS	NA	1
BENZO(a)ANTHRACENE	0.0E+00	No	NA 🗸	B2	Liver, lung, skin	IRIS	NA	1
CHRYSENE	0.0E+00		NA	B2	Malignant lymphoma	IRIS	NA	
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00		1.40E-02	B2	Liver	IRIS	0E+00	
BENZO(b)FLUORANTHENE	0.0E+00		NA	B2	Lung, thorax, skin	I IRIS	NA	
BENZO(k)FLUORANTHENE	0.0E+00		I NA	82	Lung, thorax, skin	IRIS	NA	
BENZO(a)PYRENE	0.0E+00		NA	B2	Stomach, lung	IRIS	I NA	1
INDENO(1,2,3-cd)PYRENE	0.0E+00	No No	NA	B2	Lung, skin	IRIS	NA	11
PESTICIDES / PCB'S								
AROCLOR-1248	9.2E-06		7.70E+00				7E-05	
AROCLOR-1254	5.6E-06	No	7.70E+00				4E-05	
AROCLOR-1260	1.1E-07	No	7.70E+00	B2	Liver	Diet/IRIS	8E-07	
								I

TABLE A.5–5 CANCER RISK ESTIMATES SCENARIO 5 – Residential (Future)

		CHRONIC DAILY					NA ANA ANA ANA ANA ANA ANA ANA ANA ANA		CHEMICAL	TOTAL
II CHEMICAL	INTAKECHILD	INTAKE ADULT		SF	WEIGHT OF	TYPE OF	SF BASIS/			PATHWAY
	(mg/kg/day)	(mg/kg/day)	ABSORPTION			CANCER	SOURCE	CHILD	ADULT	RISK I
<u>iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii</u>		ย่าแบงโทยั้ยขั้ยเม่ย์ยอม						THUR HUR DUNNED I	E A A A A A A A A A A A A A A A A A A A	
1									ADULT	5E-05
	INCIDENTAL INGESTION								CHILD	9E-05
	NATIONAL STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF A STATEMENT OF		LE ENERTHINN AND ENTITED IN				N CLEAR AN AN AN AN AN AN AN AN AN AN AN AN AN	TINKI ALANDALI	THURSON AND A STATE	UNITER THE RECENT OF
INORGANICS	2.3E-06	1.2E-06	l No	1.75E+00		Skin	IRIS	4E-06	25-08	
ARSENIC BERYLLIUM	6.1E-06		j No I No	4.30E+00	A B2	gross tumors, all sites combined	Water/IRIS	4E-06 3E-05	26-06 1E-05	
LEAD	6.4E05			4.30E+00	B2	Renal tumors	Oral/IRIS	NA I	NA I	
ILEAD	0.42-00	1 3.32-03			02	Kena tumors				
U VOLATILE ORGANI	cs i	1	1				Ì			
TRICHLOROETHENE	4.0E-09	2.1E09	No	1.10E-02	B2	Liver	Gavage/HEAST	4E-11	2E-11	
BENZENE	1.7E-07	8.8E-08	No	2.90E-02	Ā	Leukemia	Occupational/IRIS	5E-09	3E-09	
TETRACHLOROBTHENE	4.1E-09	2.1E09	No	5.10E-02	B2	Liver	Gavage/HEAST	2E-10	1E-10	
1	1	1	1	1			1 -		l II	•
BASE NEUTRAL / AC								_		
2,4-DINITROTOLUENE	1.2E-07	6.5E-08	No	6.80E-01	82	Liver, mammary gland	Diet/IRIS	8E-08	4E08	
PENTACHLOROPHENOL	3.2E-06		No	1.20E-01	B2	Hepatocellular adenoma, carcinomaspheochromocytoma	Oral/IRIS	4E-07	2E-07	
BUTYLBENZYLPHTHALA			No	NA	C	Leukemia	Diet/IRIS	NA	NA	
BENZO(1)ANTHRACENE	4.8E-07		No No	1.15E+01 1.15E+01	· B2 B2	Liver, lung, skin Malignant lymp homa	IRIS IRIS	5E-06 4E-06	3E-06	
CHRYSENE			I No	1.15E+01	B2 B2	Liver	IRIS	4E-08	2E-08	
BENZO(b)FLUORANTHEN			I No	1.402-02	B2	Lung, thorax, skin	IRIS	3E-08	2E-06	
BENZO(k)FLUORANTHEN			No No	1.15E+01	B2	Lung, thorax, skin	IRIS	2E-06	1E-08	
BENZO(A)PYRENE	8.4E07		No	1.15E+01	82	Stomach, lung	IRIS	1E-05	5E-06	
INDENO(1,2,3-cd)PYRENE			No	1.15E+01	B2	Lung, skin	IRIS	5E-06	3E-06	
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,									
PESTICIDES / PCB	s j	i		İ	i i				i i	
AROCLOR-1248	2.2E-06		No	7.70E+00	i i		Ì	2E-05	9E06	
AROCLOR-1254	1.3E-08		No	7.70E+00			1	1E-05	5E-06	
AROCLOR-1260	2.5E-08		No	7.70E+00	B2	Liver	Diet/IRIS	2E-07	1E-07	
		AN ATANAN NA KANANA NA KANTANA NA KANTANA NA KANTANA NA KANTANA NA KANTANA NA KANTANA NA KANTANA NA KANTANA NA	I FILLER FILLER						1	

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TABLE A.5-6 CANCER RISK ESTIMATES SCENARIO 5 - Residential (Future)

	CHRONIC DAILY	CDI					CHEMICAL	TOTAL
CHEMICAL	INTAKE ADULT	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/		PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE			ADULT	RISK
EXPOSURE PATHWAY: INHALA							ADULT	4E–08
ARSENIC	1.5E-10	No	5.00E+01	A	Respiratory Tract	Occupational/IRIS	8E-09	
BERYLLIUM	4.1E-10	No	8.40E+00	B2	Lung	Occupational/IRIS	3E09	
CADMIUM	7.2E-11	No	6.3	B1	Respiratory Tract	Occupational/IRIS	NA	
CHROMIUM VI	3.0E-10	No	4.20E+01	İ A	Lung	Occupational/IRIS	1E-08	
LEAD	4.3E09	No	NA	B2	j j	NA/IRIS	NA	
NICKEL	1.7E-08	No	8.40E-01	İ A	Lung and nasal tumors	Occupational/IRIS	1E-08	
 VOLATILE ORGANICS				1				
TRICHLOROETHENE	2.7E-13	No	1.70E-02	B2	Lung	HEAST	5E-15	
BENZENE	1.1E-11	No	2.90E-02	j A	Leukemia	Occupational/IRIS	3E-13	
TETRACHLOROETHENE	2.8E13	No	1.80E-03	B2	Leukemia, liver	HEAST	5E-16	
BASE NEUTRAL / ACIDS								
2,4-DINITROTOLUENE	8.4E-12	No	NA	B2	Liver, mammary	IRIS	I NA II	
PENTACHLOROPHENOL	2.1E-10	No	Í NA	B2		NA/IRIS	i na ii	
BUTYLBENZYLPHTHALATE	9.1E-12	No	Í NA	i c		NA/IRIS	i na ji	
BENZO(a)ANTHRACENE	3.2E-11	No	6.10E+00	B2	Liver, lung, skin	IRIS	2E-10	
CHRYSENE	2.3E-11	No	6.10E+00	B2	Malignant lymphoma	IRIS	1E-10	
bis(2-ETHYLHEXYL)PHTHALATE	1.9E-11	No	Í NA	B2		NA/IRIS	NA	
BENZO(b)FLUORANTHENE	2.0E-11	No	6.10E+00	B2	Lung, thorax, skin	IRIS	1E-10	
BENZO(k)FLUORANTHENE	1.2E-11	No	6.10E+00	B2	Lung, thorax, skin	IRIS	7E-11	
BENZO(a)PYRENE	5.6E-11	No	6.10E+00	B2	Respiratory tract, stomach	Inhalation/HEAST	3E-10	
INDENO(1,2,3-cd)PYRENE	2.9E-11	No	6.10E+00	B2	Lung, skin	IRIS	2E-10	
PESTICIDES / PCB'S						1		
AROCLOR-1248	1.4E-10	No	Í NA	Ì	İ	NA/IRIS	NA j	
AROCLOR-1254	8.8E-11	· No	Í NA		İ	NA/IRIS	I NA I	
AROCLOR-1260	1.7E-12	No	Í NA	İ	Ì	NA/IRIS	NA	
iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii								

TABLE A.5-7 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 5 - Residential (Future)

			NANNAKARAN NANNA NA							REALIZATION (ARE ARE ARE ARE ARE ARE ARE ARE ARE ARE
CHEMICAL	CHRONIC DAILY		RFD	CONFIDENCE	CRITICAL	RFD BASIS/	RFD UNCERTAINTY	MODIFYING	HAZARD QUOTIENT	PATHWAY TOTAL HAZARD HAZARD
	(mg/kg/day)	ABSORPTION	$(\equiv g/kg/d_2y)$	LEVEL	EFFECT	SOURCE	ADJUSTMENTS	FACTORS	ADULT	INDEX (HI) INDEX (HI)
			HUNDINGCOLOLUGUIDEU				£11.66.00.000.000.000.000.000.000.000		CHILD	NA 3E+00
EXPOSURE PATHWAY: DERMA	L CONTACT WITH	+ CHEMICALS IN	SOIL						ADULT	2E-03 4E-01
			ALERKER TITLE AND A ALER A	MININA ANA ANA ANA ANA ANA ANA ANA ANA AN		L <u>e</u> fa len de de le faction de la faction de	<u>INTERNET I I I I I I I I I I I I I I I I I I I</u>			INCONTRACTOR INCOMPANY INCOME
INORGANICS	I NA	No	I NA		· · ·	NA/IRIS			NA NA	
ALUMINUM ANTIMONY	INA	No	4.00E-04	Low	Longevity, blood glucose and cholesterol	Water/IRIS	1000	1	NA	
ARSENIC	NA	No	1.00E-03	i i	Keratosis and hyperpigmentation	Diet/HEAST	1 1	1	NA	
BARIUM	NA	No	7.00E-02		None observed	Water/IRIS	3	!!!	NA	
BERYLLIUM	NA 1.8E-06	No No	5.00E-03 1.00E-03	Low High	None observed Proteinuria	Water/IRIS Diet/IRIS	100		NA 2E-03	
CADMIUM CHROMIUM III	NA	No No	1.00E+00	Low	Hepatotoxicity	IRIS	1000	· ·	NA	
CHROMIUM VI	NA	No	5.00E-03		No effects observed	Water/IRIS	500	1	NA	
COBALT	NA	No	NA	1		NA/IRIS	ļ	l i	NA	
COPPER	NA	No	4.00E-02	!	Local GI irritation	NAHEAST			NA NA	
LEAD MANGANESE	INA INA	No No	NA 1.00E-01	Medium	Neurobehavioral effects CNS effects	NAARIS Diet/IRIS		•	NA NA	
MERCURY	INA	No	3.00E-04		Kidney effects	Oral/HEAST	1000	i '	NA	
NICKEL	NA	No	NA	1		NAJRIS	i	1	NA	
SELENIUM	NA	No	5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	1 1	NA	
SILVER	ÍNA ÍNA	No No	3.00E-03 7.00E-03	Medium	Argyria None observed	Oral/IRIS Water/HEAST	2 100	1	NA NA	
VANADIUM ZINC	I NA I NA	I No	2.00E-03		Anemia	Therap./HEAST	10	1	NA	
BORON	INA	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	i 1	NA	ĺ
NIOBIUM	NA	No	NA NA			ŇA/IRIS	i	l	I NA	
STRONTIUM	INA	No	I NA			NAARIS	1		NA NA	
TITANIUM	INA INA	l No No	I NA NA			NAARIS	}		NA NA	
ZIRCONIUM			NA			INAVIRIO	ł			
VOLATILE ORGANICS		i		i		i i	i		i	
ACETONE	NA	No	1.000-01	Low	Increased liver and kidney weight	Gavage/IRIS	1000	1 1	NA	
CARBON DISULFIDE	NA	No	1.00E-01	Medium	Fetal toxicity	Inhal./IRIS	100	1	NA NA	
2-DICHLORETHENE (total)	INA INA) No I No	1.00E-02 5.00E-02	Medum	Decreased hematocrit and hemoglobin Fetotoxicity	Gavage/HEAST	3000	}	I NA I NA	
-BUTANONE IRICHLOROETHENE	INA	i No	5.00E-02	Madourn	Petotoketty	NAARIS		1	NA	
BENZENE	NA	No	NA			NAARIS	i	i	Í NA	i
TETRACHLOROETHENE	NA	No	1.00E-02	Medium	Hepstotoxicity, weight gain	Gavage/IRIS	100	1 1	NA NA	l ·
TOLUENE	NA	No	2.00E-01	Medium	Changes in liver and kidney weights	Gavage/IRIS	1000	1	NA NA	
ETHYLBENZENE KYLENE (total)	NA NA	No No	1.00E-01 2.00E+00	Low Medum	Liver and kidney toxicity Hyperactivity,docreased body weight, increased	Oral/IRIS Gavage/IRIS	1000	1 1	NA NA	
CILENE (IVII)		1	2.002700	modum	Tiple activity, doctoasou bouy woight, interacte	Ganagonicio	100	i .	i	
BASE NEUTRAL / ACIDS	i	I		l i			1	1		
PHENOL	INA	No No	6.00E-01	Low	Reduced fetal body weight	Gavage/IRIS	100		NA	
BENZOIC ACID NAPHTHALENB	INA INA	No No	4.00E+00 4.00E-03	Medium	Decreased body weight gain	Oral/IRIS Gavage/HEAST	1 10000	1 1	I NA	}
I-NITROPHENOL	INA INA	No	4.00E-03		Decreased ond weight Bain	NA/IRIS	10000	1	NA NA	
A-DINITROTOLUENE	NA	No	NA	i i		NAARIS	i	i	I NA	ĺ
ENTACHLOROPHENOL	NA	No	3.00E-02	Medium	Liver and kidney pathology	Diet/IRIS	100	1 1	NA	ļ
HENANTHRENE	NA NA	No	NA NA	1 1 1 1 1	No sheered offers	NA/IRIS	2000	1	NA NA	
ANTHRACENE DI-S-BUTYLPHALATE	INA INA	l No I No	3.00E-01	Low	No observed effects Increased mortality	Gavage/IRIS Diet/IRIS	3000 10000		NA NA	
FLUORANTHENE		No	4.00E-02		Nephropathy, changes in liver weight, hematology	Gavage/IRIS	3000		NA NA	1
PYRENE	NA	No	3.00E-02		Kidney effects	Gavage/IRIS	3000	1 1	Í NA	i
BUTYLBENZYLPHTHALATE	NA	No	2.00E-01	Low	Effects on body weight gain, testes, liver, kidney	Diet/IRIS	10000	1 1	NA	ļ
BENZO(1)ANTHRACENE	INA .	No	NA NA			NAARIS			I NA	Į.
CHRYSENE 50(2-ETHYLHEXYL)PHTHALATE	NA	No No	NA 2.00E-02	Medium	Increased relative liver weight	NA/IRIS Diet/IRIS	1 1000	1	I NA I NA	
BENZO(b)FLUORANTHENE	INA INA	No	1 2.00E-02	Meduli	The cased Lengthe liver weight	NAARIS	1000	· ·	NA NA	
BENZO(k)FLUORANTHENB	NA	No	NA I	i i		NAARIS	i	i i	Í NA	i
BENZO(a)PYRENE	NA	No	I NA	(NA/IRIS	1	ļ	Í NA	1
NDENO(1,2,3-cd)PYRENE	NA.	No	I NA	i 1		NAARIS	ļ	1	NA	
BENZO(& A, i)PERYLENE	INA	No	NA NA			NA/IRIS	· ·	1	NA NA	
PESTICIDES / PCB'S	1	1								1
AROCLOR-1248	2.1E-05	No	NA	1		NAARIS	j	j i	NA	j
AROCLOR-1254	1.3E05	No	I NA	į i		NA/IR1S	Ì	Į	Í NA	1
AROCLOR-1260	2.5E-07	No	I NA			NA/IRIS	[NA	1
	81111177756686888797108666	011110000000000000000000000000000000000	199199999999999999999999999999999999999	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN		I FREEFENEREN IN TIM	******			8

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TABLE A.S-8 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 5 - Residential (Future)

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					HAZARD	
CHEMICAL CHRONIC DAILY CDI CHEMICAL INTAKE CHILD INTAKE ADULT ADJUSTED FOR RFD CONFIDENCE CRITICAL	RFD BASIS/		MODIFYING	QUOTIENT		HAZARD
(mg/kg/day) (mg/kg/day) ABSORPTION (mg/kg/day) LEVEL EFFECT	SOURCE .	ADJUSTMEN	FACTORS	CHILD	ADULT	INDEX (HI)
						3E-01
II IIEXPOSURE PATHWAY: INCIDENTAL INGESTION OF CHEMICALS IN SOILS					CHILD	3E+00
				I AL ANALY KANDDOLDA		ANNORRANIA I
INORGANICS	1		!	1		ll i
	NAARIS WaterARIS	1000	1. 1	NA 2E-01	NA 2E-02	
	Diet/HEAST	1	1 [.] '	3E-02		
	Water/IRIS	3	1 1			Ï
BERYLLIUM 7.2E-05 7.4E-06 No 5.00E-03 Low None observed N	Water/IRIS	100	1 1			1
	DietARIS	10	ļ · 1	1E-02		[
CHROMIUM III 3.2E-03 3.3E-04 No 1.00E+00 Low Hepatotoxicity I CHROMIUM VI 5.3E-05 5.5E-06 No 5.00E-03 Low No effects observed No	IRIS Water/IRIS	1000 500	1 1	3E-03 1E-02		15 14
	NAARIS	500	! '	I NA		//
	NAMEAST		i	5E-03		ii
	NAARIS		I	Í NA	NA NA	1
	Diet/IRIS	1	1 1			N.
	Oral/HEAST NA/IRIS	1000	1	6E-03 NA	6E-04	4
	Diet/IRIS	3	1 1			1
	Oral/IRIS	2	; i			ii
VANADIUM 2.0E-02 2.1E-03 No 7.00E-03 None observed W	Nater/HEAST	100	i	1 3E+00		ĺĺ .
	herap./HEAST	10	1	5E-03		li –
	ccupational/IR	100	1	5E-03	5E-04 NA	!!
NIOBIUM 8.7E-04 9.0E-05 No NA 1 ISTRONTIUM 5.5E-04 5.7E-05 No NA 1	NAARIS NAARIS		}	I NA	NA	
	NAARIS	-	1	NA NA	I NA	ii
	NAARIS			NA	I NA	ii.
VOLATILE ORGANICS	Gavage/RIS	1000		1E-05	1E-06	N .
	Inhai./IRIS	1000				ll H
	avage/HEAST	3000	· ·	3E-06		
2-BUTANONE 8.1E-08 8.4E-09 No 5.00E-02 Medium Fetotoxidity 1	Inhal./IRIS	1000	i	2E-06		ii
	NAARIS		1	NA	I NA	1
	NAARIS	100		NA 5E-06	NA 5E-07	<u> </u>
	Gavage/IRIS Gavage/IRIS	100		1 2E-07		
ETHYLBENZENE 1.8E-07 1.9E-08 No 1.00E-01 Low Liver and kidney toxicity	Oral/IRIS	1000	1 1	2E-06		li
	Gavage/IRIS	100	1	3E-07	3E-08	
III BASE NEUTRAL / ACIDS IIII Description IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Garman (D10	100		4E-06	4E-07	
	Gavage/IRIS Oral/IRIS	100				
	avage/HEAST	10000	i '	4E-04		
+-NITROPHENOL 1.3E-05 1.4E-06 No NA	NAARIS		i	I NA	I NA	ii .
2,4-DINITROTOLUENE 1.5E-06 1.5E-07 No NA	NAARIS		1	j NA	NA	li .
	Diet/IRIS	100	1 1			li .
	NAARIS GavageARIS	3000	1 1	NA 4E-06	NA 4E-07	
	Diet/RIS	10000	1 1			
FLUORANTHENE 3.4E-06 3.5E-07 No 4.00E-02 Low Nephropathy, changes in liver weight, he mathology C	Gavage/IRIS	3000	į 1	9E-05	1 9E-08	ü
PYRENE 6.1E-07 6.3E-08 No 3.00E-02 Low Kidney effects C	Gavage/IRIS	3000	į 1			
	Diet/IRIS	10000	1 1			1
jjenzo(s)ANTHRACENE 5.6E-06 5.8E-07 No NA	NAARIS NAARIS		1	I NA	I NA	li li
	Diet/IRIS	1000	1 1	2E-04		í
BENZO(b)FLUORANTHENE 3.5E-08 3.7E-07 No NA	NAARIS		i	NA NA	I NA	ii
BENZO(K)FLUORANTHENE 2.1E-06 2.2E-07 No NA	NA/IRIS		1	Í NA	NA	1
BENZO(s)PYRENE 9.6E-06 1.0E-06 No NA	NAARIS		İ	I NA	I NA	ll.
	NAARIS		1.	NA	NA	1
	NAARIS			NA	NA I	
PESTICIDES / PCB'S			ļ			ï.
AROCLOR -1248 2.5E-05 2.6E-08 No NA III. INROCLOR -1254 1.5E-05 1.6E-08 No NA III.	NA/IRIS		-	Í NA I NA	I NA	H H
VACCLOR-1269 1.5E-03 1.5E-03 No NA	NAARIS			NA	I NA	N II
			riuuuuaaaad			li

TABLE A.5-9 CHRONIC HAZARD INDEX ESTIMATES SCENARIO 5 - Residential (Future)

	CHRONIC DAILY			51100000000000000000000000000000000000	a a dharan a dharan a dharan a dharan a dharan a dharan a dharan a dharan a dharan a dharan a dharan a dharan a A dharan a dharan a dharan a dharan a dharan a dharan a d	IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	RFD	NATIONAL AND ATHWAY	
CHEMICAL	INTAKE ADULT	ADJUSTED FOR	RFC	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY		QUOTIENT HAZARD
	(mg/kg/dey)	ABSORPTION	(<i>mg/xg/day</i>)	LEVEL	EFFBCT	SOURCE	ADJUSTMENTS	FACTORS	ADULT INDEX(H
	40.00006666661111111111111111111111	8.84311.0000			43 93 91 44 11 44 43 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44 11 44			111111111111111111111111111111111111111	CHILD NA
EXPOSURE PATHWAY: INHALA									ADULT 8E-0
	PLATERIA CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONT		in the second second second second second second second second second second second second second second second	NATION OF A STREET		UTTER CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRA			
INORGANICS	1.5E-06	l No	I NA	1	·	NA/IRIS			NA (
ANTIMONY	1.0E-09		4.00E04			in yini b			3E-06
ARSENIC	3.6E-10	No	1.00E-03					i i	4E-07
JBARIUM	1.4E08		1.00E-04		Fetotoxicity	HEAST	1000	1	1E-04
BERYLLIUM	9.6E~10		5.00E-03				[[]	25-07 [
CADMIUM	1.7E-10 4.3E-08		1.00E-03 5.71E-07		Nasai mucosa atrophy	HEAST	300		2E-07 8E-02
CHROMIUM III	7.1E-10	No No	5.71E-07		Nasal mucosa attophy	HEAST	300		1E-03
COBALT	7.7E-10		NA			NA/IRIS		i i	NA
COPPER	2.8E-09		NA	i		NA/IRIS		i i	NA
LEAD	9.9E-09		Í NA	İ	CNS effects	NA/IRIS	Ì		NA
MANGANESE	7.7E08		1.00E-04	Medium	Increased prevalance of respiratory disease and psycomotor disturbances		300	3	8E-04
MERCURY	2.3E-11 4.0E-08		9.00E-06	!	Neurotoxicity	Occupational/HEAST NA/IRIS	30	1	3E-06
SELENIUM	4.0E-08		I NA			NA/IRIS			NA
SILVER	2.1E-10		I NA			NA/IRIS			NA
VANADIUM	2.7E-07		7.00E-03				i ·	i	4E-05
ZINC	1.2E-08	No	2.00E-01	l			1	1	6E-08
BORON	6.0E~09	No	I NA	1		NA/IRIS	ļ .		NA I
NIOBIUM	1.2E-08	No	NA NA			NA/IRIS NA/IRIS	ļ		NA I
ISTRONTIUM	7.4E-09 2.6E-08	No No	I NA			NA/IRIS			NA
(ZIRCONIUM	1.6E~08	No	I NA	}		NA/IRIS			NA
							ì	i	
VOLATILE ORGANICS			j .			i i	i	i 1	l li
ACETONE	1.5E-11	No	I NA	1		NA/IRIS	1	1	NA
CARBON DISULFIDE	5.4E-13		3.00E-03	1	Fetaltoxicity	HEAST	1000	!	2E-10
1,2-DICHLORETHENE (total)	3.5E-13	No No	NA 9.00E-02	1	CNS	I NA/IRIS HEAST	1000		I 1E-11
TRICHLOROETHENE	6.2E-13		NA			NA/IRIS	1000	· ·	
BENZENE	2.7E-11		NA	i		NA/IRIS	i		NA
TETRACHLOROETHENB	6.4E-13) No	I NA	İ		NA/IRIS	j	i	NA I
TOLUENE	6.7E-13	No	6.00E-01		CNS effects, eyes and nose irritation	HEAST	100		1E-12
ETHYLBENZENE	2.4E-12		3.00E-01	Low	Developmental toxicity	IRIS	300	1	8E-12 1E-10
XYLENE (total)	9.0E-12	No	9.00E-02	1	CNS effects, eyes and nose irritation	HEAST	100		12-10
BASE NEUTRAL/ACIDS			ł	ł			i	1	
PHENOL	3.2E-11	No	NA	i	l	NA/IRIS	i	i	NA I
BENZOICACID	2.7E-11		NA ·	I	1	NA/IRIS	I	1	NA
NAPHTHALENE	2.3E-11		4.00E-03	!	1		•	ļ	6E-09
H-NITROPHENOL	1.8E−10 2.0E−11) NA NA	1	1	NA/IRIS NA/IRIS	1	1	NA I
2,4-DINITROTOLUENE	2.0E-11	No No	I NA	1		NA/IRIS		1	NA I
PHENANTHRENB	2.3E-11		I NA	i		NAJIRIS	i	i	NA
ANTHRACENE	1.5E-11	No	3.00E-01	i	ł		i	i	6E-11
DI-D-BUTYLPHALATE	1.6E-11	No	1.00E-01	1		1	l	1.1	2E-10
FLUORANTHENE	4.6E-11		4.00E-02	!		ļ	1	1	1E-09
PYRENE	8.2E-12		3.00E-02	!		1	!]	3E-10
BUTYLBENZYLPHTHALATE	2.1E-11 7.4E-11		2.00E-01	1		NA/IRIS	1	ł	1E-10
CHRYSENE	6.3E-11		NA NA	1		NA/IRIS	1		NA
bu(2-ETHYLHEXYL)PHTHALATE			2.00E-02	1	1	1	i	i	2E-09
BENZO(b)FLUORANTHENE	4.7E-11		NA NA	i	· · · · · · · · · · · · · · · · · · ·	NA/IRIS	i	i	Í NA 🗓
BENZO(K)FLUORANTHENE	2.8E-11	No	NA	I	ļ	NA/IRIS	1	1	NA
BENZO()PYRENE	1.3E-10		NA NA	!	!	NA/IRIS	1	1	NA
INDENO(1,2,3- a)PYRENE	6.7E-11		NA NA	!		NA/IRIS	1	1	
BENZO(sh,i)PERYLENE	2.0E-10	No	NA			NA/IRIS	1	!	NA
PESTICIDES/PCB'S			1	1				1	
AROCLOR-124	3.4E-10	No	NA	1		NA/IRIS	ļ	1	NA II
AROCLOR-1254	2.0E-10	No	NA NA	i	i	NA/IRIS	i	i	NA I
AROCLOR-1260	3.9E-12		NA		[NA/IRIS		<u> </u>	NA I
UT NA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA KAANA ARAA K						I CARACTERISTICS IN CONTRACTOR IN C		H CORENAL CONTRACTOR	I E I E I I I I E E E E E E E E E E E E

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NA: Not Applicable

APPENDIX B

TOXICITY PROFILES

INORGANICS

<u>Aluminum</u>

Aluminum is one of the most abundant metals in the earth's crust, and it is ubiquitous in air, water and soil (Goyer, 1986). The toxicity of aluminum can be divided into three major categories: (1) the effect of aluminum compounds on the gastrointestinal tract; (2) the effect of inhalation of aluminum compounds; and (3) systemic toxicity of aluminum (Alfrey, 1981). Aluminum compounds can alter absorption of other elements in the gastrointestinal tract (i.e., fluoride, calcium, iron, cholesterol, phosphorus) and alter gastrointestinal tract motility by inhibition of acetylcholine-induced contractions. Inhalation of aluminum dusts can lead to the development of pulmonary fibrosis producing both restrictive and obstructive pulmonary disease (Schaver, 1948). A progressive fatal neurologic syndrome has been noted in patients on long-term intermittent hemodialysis treatment for chronic renal failure (Alfrey et al., 1972) and may be due to aluminum intoxication. Symptoms in these patients include a speech disorder followed by dementia, convulsions and myoclonus. Aluminum content of brain, muscle and bone tissues is increased in these patients. Sources of the excess aluminum may be from oral aluminum hydroxide commonly given to these patients or from aluminum in dialysis fluid derived from tap water used to prepare the dialysate fluid. Data has been evaluated and found to be inadequate for quantitative risk assessment (EPA, 1991a).

Antimony

The best characterized human health effect associated with the inhalation of antimony is myocardial damage. The suggested no-observed-adverse-effect-level (NOAEL) for antimony induced myocardial damage is 0.003 mg antimony/kg body weight (bw)/day (mg/kg/day). This

is based upon studies by Brieger et al. (1954). The chronic oral Reference Dose (RfD) for antimony is 4E-04 mg/kg/day (EPA, 1991), and is based on a chronic rat bioassay (Schroeder et al., 1970). Rats were administered 5 mg/kg (0.35 mg/kg bw/day) potassium antimony tartrate in drinking water for two years. The critical effects associated with this study are a decrease in longevity, a decrease in fasting blood glucose levels and an alteration in cholesterol levels. An uncertainty factor of 1,000 was applied to the lowest observed adverse effect level (LOAEL) of 0.35 mg/kg bw/day to obtain the RfD. The confidence level in this RfD is low since there was only 1 dose level of antimony used and no observed adverse effect level (NOAEL) was established.

This compound has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential (EPA, 1991).

Arsenic

Symptoms of arsenic intoxication consist of fever, anorexia, hepatomegaly, melanosis, and cardiac arrythmia. Other features include upper respiratory tract symptoms, peripheral neuropathy, and gastrointestinal, cardiovascular and hematopoietic effects. Liver injury is characteristic of longer term or chronic exposure (Goyer, 1986).

The chronic oral RfD is 1E-03 mg/kg/day (EPA, 1991a value pending current review). The critical effects associated with arsenic ingestion are keratosis and hyperpigmentation at a dose of 1 ug/kg/day in humans (Tseng et al., 1977).

The EPA weight of evidence classification for the carcinogenicity of this compound is "A" - a human carcinogen. Exposure to arsenic by the oral route is known to produce skin cancer, while inhalation will cause lung cancer. The slope factors for these carcinogenic effects are 5E-05 ug/l (1.75 mg/kg/day) (Tseng et al., 1977) and 4.3E-03 ug/m³ (5E+01 mg/kg/day) (Brown and Chu, 1983a, b, c; Lee-Feldstein, 1983; Higgins, 1982; Enterline and Marsh, 1982), respectively (EPA, 1991).

Barium

Symptoms of accidental poisoning from ingestion of soluble barium salts has resulted in gastroenteritis, muscular paralysis, decreased pulse rate, and ventricular fibrillation and extra-systoles (Goyer, 1986).

The chronic oral RfD for barium is 7E-2 mg/kg/day (EPA, 1991) and is based upon drinking water studies in humans (Wones et al., 1990; Brenniman and Levy, 1984) and various rodent studies (Perry et al., 1983; McCauley et al., 1985; Schroder and Mitchner, 1975a, b; Tardiff et al., 1980). Womes et al. (1990) administered barium (as barium chloride) in the drinking water of 0 mg/L for weeks 0-2; 5 mg/L for weeks 3-6; and 10 mg/L for weeks 7-10. A NOAEL of 10 mg/L was identified in this study which corresponds to 0.21 mg/kg/day. An uncertainty factor of 3 was applied to the NOAEL to obtain this RfD. The confidence level in this RfD is medium.

Occupational poisoning to barium is uncommon, but a benign pneumoconiosis (baritosis) may result from inhalation of barium sulfate dust and barium carbonate. It is not incapacitating and is usually reversible with cessation of exposure.

A chronic inhalation RfD for barium has been established as 1E-4 mg/kg/day (EPA, 1991a) on the basis of a chronic inhalation study in rats (Tarasenko et al., 1977). The LOAEL following barium inhalation was 1.15 mg $BaCO_3/m^3$ (0.80 mg/Ba/m³) 4 hours/day for 4 months

(corresponds to 0.14 mg BA/kg/day). The critical effect observed was fetotoxicity. An uncertainty factor of 1,000 was applied to the LOAEL to obtain the RfD.

Barium has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential (EPA, 1991).

<u>Beryllium</u>

The major toxicologic effects of beryllium are on the lung. It may produce an acute chemical pneumonitis, hypersensitivity or chronic granulomatous pulmonary disease (berylliosis) (Goyer, 1986).

The chronic oral RfD for beryllium is 5E-03 mg/kg/day (EPA, 1991). This value is based upon a study by Schroeder and Mitchner (1975). Beryllium was administered to rats over their lifetime in their drinking water at a concentration of 5 mg/kg (0.54 mg/kg/day). There were no observed adverse effects. An uncertainty factor of 100 was applied to the NOAEL to obtain the RfD. The confidence level for this RfD is low.

Beryllium compounds have been shown to induce malignant tumors of the lung in rats and monkeys and osteogenic sarcoma in rabbits.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence). The oral slope factor for beryllium is 4.3 mg/kg/day⁻¹ (EPA, 1991) and is based on a study by Schroeder and Mitchner (1975). The inhalation slope factor for beryllium is 2.4E-3 ug/m^3 (8.4E+0 mg/kg/day) (EPA, 1991) and is based upon Wagoner et al. (1980).

Cadmium

Ingestion of cadmium results in nausea, vomiting and abdominal pain. Inhalation of cadmium fumes may result in an acute chemical pneumonitis and pulmonary edema (Goyer, 1986).

The chronic oral RfDs for cadmium are 5E-04 mg/kg/day (water) and 1E-03 mg/kg/day (food) (EPA, 1991). The critical effects associated with chronic ingestion of cadmium are proteinuria and renal damage in humans. An uncertainty factor of 10 was applied in order to determine the RfD. The confidence level for this RfD is high.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B1" - a probable human carcinogen (limited human evidence). The inhalation of cadmium has been shown to produce respiratory tract cancers and an inhalation slope factor of 1.8E-03 ug/m³ (6.3 mg/kg/day) has been established based on Thun et al. (1985) (EPA, 1991). There are no positive studies of orally ingested cadmium suitable for quantitation (EPA, 1991).

Chromium VI

Note: Total chromium only was measured on-site. Total chromium was broken down to Cr III and Cr VI based on a 7:1 ratio (7/8 of total chromium is Cr III; 1/8 of total chromium of Cr VI).

The chronic oral Rfd for chromium VI is 5E-03 mg/kg/day (EPA, 1991) and is based upon a study by MacKenzie et al. (1958) in which no adverse effects were observed in rats which received 0-11 mg/l or 25 mg/l chromium in drinking water for 1 year. No adverse effects were seen in humans drinking well water contaminated with 1 mg/l chromium VI for 3 years. An uncertainty factor of 500 was applied to the NOAEL to obtain the RfD. The confidence level in this RfD is low.

The chronic inhalation RfD for chromium VI has been established and verified as 2E-6 mg/m³ (EPA, 1991a). Workgroup concurrence on the final data base file and IRIS input are pending. This value is based upon inhalation exposure in humans (Lindberg and Hedenstierna, 1983). The LOAEL was 0.002 mg/m³ (as chromic acid) and the critical effect observed was nasal mucosa atrophy. An uncertainty factor of 300 was applied to the LOAEL to obtain the RfD.

The EPA weight of evidence classification for carcinogenicity of this compound by the inhalation route is "A" - a human carcinogen (EPA, 1991). Chromium VI produces lung tumors and an inhalation slope factor of $1.2E-02 \text{ ug/m}^3$ (4.2E+01 mg/kg/day) has been established based upon a study by Mancuso, 1975. There is insufficient evidence for carcinogenicity of this compound by the oral route.

<u>Cobalt</u>

Cobalt is essential as a component of Vitamin B12 which is required for the production of red blood cells. Cobalt is well absorbed orally, probably in the small intestine. Excessive cobalt intake is known to result in cardiomyopathy. One mg/kg cobalt was added to beer to enhance its foaming properties and the resultant signs and symptoms were those of congestive heart failure. Autopsy findings revealed a ten-fold increase in the cardiac levels of cobalt. Occupational exposure may result in respiratory symptoms (Goyer, 1986). No RfDs were found in either Integrated Risk Information Service (IRIS) (EPA, 1991) or Health Effects Assessment Summary Tables (HEAST) (EPA, 1991a).

B-6

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991a).

Copper

A single dose of 5.3 mg copper resulted in local gastrointestinal tract irritation in humans. A chronic oral RfD is reported as 1.3 mg/l, which is the current drinking water standard for copper (EPA, 1991a). The Drinking Water Criteria Document concluded toxicity data were inadequate for calculating an actual RfD for copper (U.S. EPA, 1987).

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

<u>Lead</u>

The health effects of lead have been well characterized through decades of medical and scientific observation. Some of these effects include cognitive and motor defects in children, lead induced anemias, increased susceptibility to viral infections and in chronic adult lead poisoning, peripheral neuropathies. It appears that some of these effects particularly the changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood lead levels so low as to be essentially without a threshold. Therefore the EPA has considered it inappropriate to develop an RfD for inorganic lead (Goyer, 1986; EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence). Lead has been shown to produce renal tumors (Azar et al., 1973; Kasprzak et al., 1985; Koller et al., 1986; Van Esch and Kroes, 1969), however due to the many uncertainties associated with quantifying lead's cancer risk, it has been recommended that a numerical estimate not be used (EPA, 1991).

Manganese

Exposure to manganese results in two types of toxicities. The first, the result of acute inhalation exposure, results in manganese pneumonitis. The second, and more serious of the two, results from chronic exposure to manganese either by the oral or inhalation routes. Chronic manganese poisoning results in a psychiatric disorder characterized by psychological and motor difficulties (Goyer, 1986). The chronic oral RfD has been set at 1E-01 mg/kg/day (EPA, 1991) in order to prevent the central nervous system effects. This value is based upon studies by WHO (1973), Schroeder et al. (1966) and NRC (1989). The chronic RfD for inhalation is 4E-4 mg/m³ (1E-04 mg/kg/day) (EPA, 1991) and is based upon a study by Roels et al. (1987). An uncertainty factor of 300 was applied to the LOAEL to obtain the RfD. The confidence level in these RfDs is medium.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991a).

Mercury

Exposure to mercury vapor may produce an acute, corrosive bronchitis and interstitial pneumonitis resulting in either death or symptoms of central nervous system effects such as tremor or increased excitability. Ingestion of mercuric salts results in corrosive ulceration, bleeding and necrosis of the gastrointestinal tract usually accompanied by shock and circulatory collapse. Renal failure occurs within 24 hours. Chronic mercury poisoning mainly affects the central nervous system. Characteristic symptoms include increased excitability, tremors, gingivitis, and increased salivation. There have been some instances of proteinuria and renal damage in persons chronically exposed to mercury vapors (Goyer, 1986). The chronic oral RfD for mercury is 3E-04 mg/kg/day (EPA, 1991a) (value pending current review), in order to prevent the critical effect of renal damage. This value is based upon the findings of several studies (Druet et al., 1978; Bernaudin et al., 1981; and Andres, 1984). An uncertainty factor of 1,000 was applied in order to determine the RfD.

The chronic RfD value for inhalation for mercury is 3E-4 mg/m³ (9E-06 mg/kg/day) (value pending current review) (EPA, 1991a) and is based upon several occupational studies (Fawer et al., 1983; Piikivi and Tolonen, 1989; Piikivi and Hanninen, 1989; Piikivi, 1989). Neurotoxicity was the critical effect following inhalation exposure. An uncertainty factor of 30 was applied to obtain the RfD.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

<u>Nickel</u>

Nickel is a common allergen which results in allergic contact dermatitis (Goyer, 1986). There is an inhalation RfD available for nickel; however, an oral RfD of 2E-02 mg/kg/day is available, but under consideration by EPA (EPA, 1991).

The EPA weight of evidence classification for carcinogenicity of this compound by the inhalation route is "A" - a human carcinogen. Nickel produces lung tumors and an inhalation slope factor of $2.4E-4 \text{ ug/m}^3$ (8.4E-01 mg/kg/day) has been established (EPA, 1991). This value

is based on Chovil et al. (1981), Enterline and Marsh (1982), Magnus et al. (1982), and Peto et al. (1983). There is insufficient evidence for carcinogenicity of this compound by the oral route.

<u>Selenium</u>

The availability as well as toxic potential of selenium is related to its chemical form. Selenates are readily absorbed from the gastrointestinal tract whereas elemental selenium is probably not absorbed. Acute selenium poisoning produces central nervous system effects including nervousness, drowsiness and sometimes convulsions. Eye and nasal irritation may occur from exposure to vapors. Signs of chronic selenium intoxication in humans may include discolored or decaying teeth, skin eruptions, gastrointestinal distress, lassitude and partial loss of hair and nails (Goyer, 1986). The chronic oral RfD for selenium is 5E-3 mg/kg/day (EPA, 1991) based upon studies by Yang et al. (1989). The critical effects associated with selenium exposure are chemical selenosis, including CNS abnormalities. An uncertainty factor of 3 was applied to the NOAEL in sensitive individuals to obtain the RfD. The confidence level in this RfD is medium. A chronic inhalation RfD is not available (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991a).

<u>Silver</u>

The major effect of excessive absorption of silver is local or generalized impregnation of the tissues where it remains as silver sulfide, which forms an insoluble complex in elastic fibers resulting in argyria (Goyer, 1986). The chronic oral RfD for silver is 3E-3 mg/kg/day (value may change pending current review) (EPA, 1991) and is based upon 1-3 year therapeutic treatments with silver in humans. In all studies argyria was the critical effect. In Gaul and Staud (1935), the LOAEL of 1.0 g (total dose) was established. The doses were administered iv over a 2 to 3 year period as silver arsphemamine. Blumberg and Carey (1934) estimated the total dose from a dosing schedule for silver nitrate taken orally for 1 year as 6.4 g. East et al., (1980) estimated the LOAEL to be 7.2 (total oral dose) in a subject who had ingested silver acetate over a period of 2.5 years. From these three studies, the LOAEL was calculated to be 0.0052 mg/kg/day. An uncertainty factor of 2 was applied to obtain the RfD. The confidence level in this RfD is medium.

The chronic inhalation RfD for silver is not available at this time (EPA, 1991).

The EPA weight of evidence classification of the human carcinogenic potential of silver is "D" - not classified as to human carcinogenicity (EPA, 1991).

Thallium

Thallium is one of the more toxic metals and can cause neural, hepatic and renal injury. It may also cause deafness and loss of vision. In some cases, deaths in humans have been reported as a result of long-term systemic thallium intake. These cases usually are caused by the contamination of food or the use of thallium as a depilatory (Browning, 1969; Fowler, 1982). The chronic oral RfD for thallium (soluble salts) is 7E-5 mg/kg/day (EPA, 1991a) and is based on a subchronic feeding study in rats (MRI, 1986). Administration of 0.20 mg thallium/kg/day for 90 days to rats produced increased SGOT levels and serum LDH levels and alopecia. An uncertainty factor of 3,000 was used to obtain this RfD. A chronic inhalation RfD for thallium is not available at this time (EPA, 1991a).

B-11

<u>Vanadium</u>

Vanadium is an ubiquitous element. Industrial exposure to vanadium may lead to bronchitis and bronchopneumonia. Vanadium overexposure may also cause skin and eye irritation, gastrointestinal distress, nausea, vomiting, abdominal pain, cardiac palpitation, tremor, nervous depression and kidney damage (Goyer, 1986). Ingestion of vanadium compounds may produce gastrointestinal disturbances, slight abnormalities of clinical chemistry related to renal function and nervous system effects. The chronic oral RfD for vanadium is 7E-3 mg/kg/day (under review by RfD/RfC Work Group) (EPA, 1991a) and is based on a chronic drinking water study in rats (Schroeder et al., 1970). No critical effects were observed in the rat following administration of 5 mg/kg vanadium from vanadyl sulfate in drinking water for lifetime (converted to 0.7 mg/kg/day). An uncertainty factor of 100 was applied to the NOEL to obtain this RfD.

Short term inhalation exposure to high levels of vanadium has been shown to produce toxic effects in the lung, kidney, liver, adrenals and bone marrow in experimental animals (Waters, 1977). A chronic inhalation RfD for vanadium is not available at this time (EPA, 1991a).

<u>Zinc</u>

Zinc is ubiquitous in the environment so that it is present in most food stuffs, water and air. About 20 to 30 percent of ingested zinc is absorbed. Acute toxicity from the ingestion of excessive zinc is uncommon (Goyer, 1986). The chronic oral RfD for zinc is 2E-01 mg/kg/day (EPA, 1991a) (value pending current review). This value is based on a therapeutic dosage of 2.14 mg/kg/day in man which resulted in anemia (Pories et al., 1967; Prasad et al., 1975). An uncertainty factor of 10 was applied to obtain the RfD.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Cyanide

The chronic oral RfD for cyanide is 2E-2 mg/kg/day (EPA, 1991) and is based upon a chronic oral feeding study in rats (Howard and Hanzal, 1955) and a subchronic to chronic oral bioassay in rats (Philbrick et al., 1979). The latter study showed decreased weight gain and thyroxin levels and myelin degeneration in rats at 30 mg/kg/day (established as the LOAEL). In the Howard and Hanzal 2 year dietary study (1955), rats were administered food fumigated with cyanide. At doses of 4.3 or 10.8 mg/kg/day, cyanide produced no treatment related effects on growth rate, no gross signs of toxicity and no histopathological lesions. An uncertainty factor of 100 and a modifying factor of 5 were supplied to the NOEL of 10.8 mg/kg/day to obtain the RfD. The confidence level in this RfD is medium.

The chronic inhalation RfD for cyanide is not available at this time (EPA, 1991).

The EPA weight of evidence classification for the human carcinogenic potential of this compound is "D" - not classifiable as a human carcinogen (EPA, 1991).

<u>Boron</u>

The major toxicologic effects of boron are on the lung. Through occupational exposure, boron has been shown to induce pulmonary edema and hemorrhage in the alveolus (Menzel and Amdur, 1986; Dixon, 1986). The chronic oral RfD for boron is 9E-2 mg/kg/day (EPA, 1991). This value is based upon a two year dietary study in dogs (Weir and Fisher, 1972). In this study, the NOAEL was established at 350 mg/kg (8.8 mg/kg/day). In an additional study, dogs were fed 1,170 mg/kg (29 mg/kg/day) for 38 weeks and severe testicular atrophy and spermatogenic arrest were observed. An uncertainty factor of 100 was applied to the NOAEL to obtain the RfD. The modifying factor was 1. The confidence level for this RfD is medium. The chronic inhalation RfD for boron has not been determined (EPA, 1991).

Boron has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

<u>Niobium</u>

No RfDs were found in either IRIS or HEAST (EPA, 1991).

Niobium has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

No critical effects were observed in the rat following administration of 5 ppm niobium from sodium niobate in drinking water for lifetime (converted to 0.7 mg/kg/day) (Schroeder, et al. 1970).

Strontium

Strontium, a metabolic analog of calcium, is readily absorbed from the gastrointestinal tract or the lungs into the bloodstream and is subsequently deposited in bone (Hobbs and McClellan, 1986). The adverse health effects associated with strontium exposure are currently

under review by an EPA work group (EPA, 1991) and consequently chronic oral and inhalation RfD values are not available at this time.

Strontium has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

<u>Titanium</u>

Titanium compounds have been found to exist in the oxidation state +4 (titanic), +3 (titanous) and +2, as well as in several organometallic compounds (Goyer, 1986). Titanium dioxide, the most frequently occurring compound, is present in urban airs, rivers and drinking water and is detectable in many foods. Occupational exposure to titanium may be heavy and is associated with hyperplasia of the bronchial epithelium and pulmonary fibrosis following inhalation exposure (Menzel and Amdur, 1986). No RfDs were found in either IRIS or HEAST.

Titanium has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

Zirconium

No RfDs were found in either IRIS or HEAST (EPA, 1991). No critical effects were observed in the rat following administration of 5 ppm zirconium from zirconium sulfate in drinking water for lifetime (converted to 0.7 mg/kg/day) (Schroeder, et al. 1970).

Zirconium has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

Fluoride

It is well recognized that small amounts of fluoride have a beneficial effect in the reduction of dental cares, especially in children. However, chronic intake of excessive fluoride over a long period of time has been shown to produce dental fluorosis and skeletal fluorosis (Menzer and Nelson, 1986).

The chronic oral RfD for fluoride is 6E-2 mg/kg/day. This value is based upon an epidemiologic study in children consuming fluoride (0-14 mg/kg) in their drinking water (Hodge, 1950). The LOAEL was 2 mg/kg and the critical effect observed was dental mottling (objectionable dental fluorosis, a cosmetic effect). An uncertainty factor of 1 was applied to the NOAEL (1 mg/kg converted to 0.06 mg/kg/day) to obtain the RfD. The confidence level in this RfD is high.

The chronic inhalation RfD has not been determined (EPA, 1991).

Fluoride has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

VOLATILE ORGANICS

Chloromethane

No RfDs were found in IRIS or HEAST.

Route-to-route extrapolation was used to establish an oral slope factor of 1.3E-2 mg/kg/day. An inhalation slope factor of 6.3E-3 mg/kg/day has been established for chloromethane (EPA, 1991a). These values are based on a 24-month inhalation study in mice where kidney tumors were induced following chloromethane (CIIT, 1981). The EPA weight of

evidence classification for the carcinogenicity of this compound is "C" - possible human carcinogen (inadequate human data, limited animal evidence) (EPA, 1991).

Methylene Chloride

The chronic oral RfD for methylene chloride is 6E-2 mg/kg/day (EPA, 1991) and is based on a drinking water bioassay in rats (National Coffee Association, 1982). Rats were given methylene chloride at doses of 5, 50, 125 or 250 mg/kg/day in drinking water for 2 years. The LOAEL was 52.58 and 58.32 mg/kg/day for males and females, respectively and the critical effect was liver toxicity. The NOAEL was 5.85 and 6.47 mg/kg/day for males and females, respectively and an uncertainty factor of 100 was applied to this NOAEL to obtain the RfD. The confidence level in this RfD is medium.

The chronic inhalation RfD for methylene chloride is $3E+0 \text{ mg/m}^3$ (9E-01 mg/kg/day) (work group concurrence on final data base file and IRIS input pending) (EPA, 1991a). This value is based upon a chronic inhalation study in rats (Nitschke et al., 1988). Rats were exposed to methylene chloride 6 hours/day, 5 days/week for 2 years. The NOAEL was 694.8 mg/m³ and an uncertainty factor of 100 was applied to obtain the RfD.

The EPA weight of evidence classification for human carcinogenicity is "B2" - probable human carcinogen. Methylene chloride has been shown to induce increased incidence of hepatocellular neoplasms and alveolar/bronchiolar neoplasms in male and female mice, and increased incidence of benign mammary tumors in both sexes of rats, salivary gland sarcomas in male rats and leukemia in female rats. An oral slope factor of 7.5E-3 mg/kg/day (EPA, 1991) calculated as the arithmetic mean of slope factors derived from an inhalation study (NTP, 1986) and an oral/drinking water study (NCA, 1983) has been established. An inhalation unit risk factor of 4.7E-7 ug/m³ (1.6E-03 mg/kg/day) (EPA, 1991) has been established based upon the induction of adenomas and carcinomas (liver and lung) in mice following inhalation exposure (NTP, 1986).

Acetone

The chronic oral RfD for acetone is 1E-1 mg/kg/day (EPA, 1991) and is based on a subchronic oral study in rats (U.S. EPA, 1986). Acetone was administered by gavage for 90 days to groups of albino rats of 0, 100, 500 or 2,500 mg/kg/day. The LOAEL was 500 mg/kg/day and the critical effects were increased liver and kidney weights and nephrotoxicity. An uncertainty factor of 1,000 was applied to the NOEL of 100 mg/kg/day to obtain the RfD. The confidence level in this RfD is low.

The chronic inhalation RfD for acetone is not available at this time (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Carbon Disulfide

Adverse effects of human exposure to carbon disulfide resulting from prolonged exposure to high levels of carbon disulfide include organic brain damage, peripheral nervous system decrements, neurobehavioral dysfunction and ocular and auditory effects. Adverse effects on the cardiovascular system have also been reported (Goyer, 1986).

The chronic oral RfD for carbon disulfide is 1E-1 mg/kg/day (EPA, 1991) (may change pending current review). This value is based on route-to-route extrapolation of data from a rabbit inhalation study (Hardin et al., 1981). Rabbits were exposed to 20 mg/kg or 40 mg/kg

of carbon disulfide for 34 weeks prior to breeding and during the entire length of the pregnancy period. The NOEL for this study was 40 mg/kg (converted to 22.0 mg/kg/day), but this value should not be used to estimate an RfD since Jones-Price et al. (1984a, b) found adverse effects in rabbit fetuses (malformations) following oral exposure of pregnant doses to 25 mg/kg. As a result, 11 mg/kg has been used as the most appropriate basis for an RfD derivation. An uncertainty factor of 100 was applied to the NOEL to obtain the RfD. The confidence level in this RfD is medium.

The chronic inhalation RfD for carbon disulfide is $1E-2 \text{ mg/m}^3$ ($3E-03 \text{ mg/kg/day$) (EPA, 1991a; verified; Workgroup concurrence on final data base file and IRIS input pending) and is based upon an inhalation study in rats (Tabacova et al., 1978, 1983). Rats were exposed to carbon disulfide at different concentrations for 8 hours/day during gestation. The NOAEL was 10 mg/m³ and the critical effect was fetal toxicity. An uncertainty factor of 1,000 was applied to obtain the RfD.

Carbon disulfide has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential.

1,2-Dichloroethene

The chronic oral RfD for 1,2-dichloroethene is 1E-2 mg/kg/day (verified; workgroup concurrence on final data base and IRIS input pending) and is based on a 90 day rat gavage study (EPA, 1991a). The LOAEL was 32 mg/kg/day and the critical effects observed were decreased hematocrit and hemoglobin. An uncertainty factor of 3000 was applied to the LOAEL to obtain the RfD. A chronic inhalation RfD for 1,2-dichloroethene is not available at this time (EPA, 1991a).

The EPA weight of evidence classification for the carcinogenicity of this compound was not found.

<u>Chloroform</u>

The chronic oral RfD for chloroform is 1E-2 mg/kg/day (EPA, 1991) and is based upon a chronic dog study (Heywood et al., 1979). Beagle dogs received chloroform orally in a toothpaste base by capsule at a dose of 15 or 30 mg/kg/day for 6 days/week for 7.5 years. The LOAEL was 15 mg/kg/day (converted to 12.9 mg/kg/day) and the critical effects observed were fatty cyst formation in the liver and an increase in serum SGPT and SGOT levels. An uncertainty factor of 1,000 was applied to the LOAEL to obtain the RfD. The confidence level in this RfD is medium.

A risk assessment to establish a chronic inhalation RfD for chloroform is under review by an EPA work group (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). Chloroform has been shown to produce kidney and/or hepatocellular tumors in rats, mice and beagle dogs (NCI, 1976; Jorgensen et al., 1985). An oral slope factor of 6.1E-3 mg/kg/day has been established (EPA, 1991) based upon the study by Jorgensen et al., 1985. An inhalation unit risk factor of 2.3E-5 ug/m³ (8.1E-02 mg/kg/day) was established (EPA, 1991) based upon the NCI, 1976 study.

B-20

2-Butanone

The chronic oral RfD for 2-butanone has been estimated at 5E-2 mg/kg/day (value may change pending current review) (EPA, 1991) and is based upon route to route extrapolation of a subchronic inhalation study in rats (LaBelle and Briegen, 1955). Rats were exposed to 235 mg/kg of methyl ethyl ketone for 7 hours/day, 5 days/week for 12 weeks. No effects were observed, but only a few parameters were measured. A NOAEL for methyl ethyl ketone was estimated at 130.5 mg/kg/day in a developmental toxicity study in rats (Schwetz et al., 1974). Fetotoxicity was the critical effect. This observed LOAEL was higher than the NOAEL of LaBelle and Brieger (1955) (235 mg/kg converted to 46 mg/kg/day). An uncertainty factor of 1,000 was applied to this NOAEL to obtain the RfD. The confidence level in this RfD is medium.

While currently under review by an EPA Work Group and, therefore, subject to future change (EPA, 1991a), the chronic inhalation RfD was previously established at 9E-2 mg/kg/day based upon the LaBelle and Brieger study (1955). An uncertainty factor of 1,000 was applied to the LOAEL of 92 mg/kg/day to obtain this RfD. CNS toxicity was the critical effect.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

1,1,1-Trichloroethane

The chronic oral RfD for 1,1,1-trichloroethane is 9E-2 mg/kg/day (EPA, 1991) (value pending current review) and is based upon two inhalation studies in guinea pigs. Torkelson et al. (1958) exposed guinea pigs to 1,1,1-trichloroethane at concentrations of 500, 1,000, 2,000 or 10,000 mg/kg. The NOAEL was 500 mg/kg (converted to 90 mg/kg/day) after exposure for

7 hours/day, 5 days/week for 6 months. Adams et al. (1950) exposed guinea pigs to 1,1,1-trichloroethane at a concentration of 650 mg/kg (converted to 120 mg/kg/day) for 7 hours/day, 5 days/week for 2-3 months. These animals exhibited slight growth retardation, thereby establishing to LOAEL of 650 mg/kg in guinea pigs. An uncertainty factor of 1,000 was applied to the NOAEL of 90 mg/kg/day to obtain the RfD. The confidence level in this RfD is medium to low.

The chronic inhalation RfD for 1,1,1-trichloroethane has been established at 3E-1 mg/kg/day (currently pending review by an EPA Work Group) (EPA, 1991a), on the basis of the inhalation study in guinea pigs mentioned above (Torkelson et al., 1958).

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Trichloroethene

A risk assessment for this chemical is under review by an EPA work group. Oral and inhalation RfDs have not been established (EPA, 1991).

The evidence of human carcinogenic potential of this compound is currently under review by a CRAVE Workgroup. The previously established oral slope factor value of 1.1E-2 mg/kg/day, based upon a mouse gavage study (liver tumors; NCI, 1976; NTP, 1983), has been removed from IRIS pending further review. New, verified values are pending input into IRIS. The previously established inhalation slope factor of 1.7E-2 mg/kg/day (EPA, 1991a) has also been removed from IRIS pending further review. It is based upon two inhalation studies in mice (Maltoni et al., 1986; Fukuda et al., 1983). Lung tumors were induced. The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - probable human carcinogen.

Benzene

The chronic oral and inhalation RfDs for benzene have not been established and are pending review by an EPA work group (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "A" - human carcinogen. Several studies have shown benzene to increase the incidence of nonlymphocytic leukemia in humans from occupational exposure (Rinsky et al., 1981; Ott et al., 1978; Wong et al., 1983). An oral slope factor of 2.9E-2 mg/kg/day and an inhalation unit risk factor of 8.3E-6 ug/m³ (2.9E-02 mg/kg/day) have been established (EPA, 1991) based upon these studies.

Tetrachloroethene

The chronic oral RfD for tetrachloroethene is 1E-2 mg/kg/day (EPA, 1991) and is based upon a gavage study in mice (Buben and O'Flaherty, 1985). Swiss-Cox mice were exposed to tetrachloroethene by gavage at doses of 0, 20, 100, 200, 500, 1500, and 2000 mg/kg/day, 5 days/week for 6 weeks. The LOAEL was 100 mg/kg/day (converted to 71 mg/kg/day) and the critical effects observed were increased liver triglycerides and increased liver weight/body weight ratios. An uncertainty factor of 1,000 was applied to the NOAEL of 20 mg/kg/day (converted to 14 mg/kg/day) to obtain the oral RfD. The confidence level in this RfD is medium. A chronic inhalation RfD for tetrachloroethene is not available at this time (EPA, 1991, 1991a). The evidence of human carcinogenic potential of this compound is currently under review by a CRAVE Workgroup. While this value may change pending the current review, the oral slope factor had previously been established at 5.1E-2 mg/kg/day on the basis of a mouse gavage study (NCI, 1977). Liver tumors were induced following tetrachloroethene administration. The inhalation slope factor has been established at 5.2E-7 ug/m³ (1.8E-03 mg/kg/day) (currently pending review) (EPA, 1991a) and is based upon an inhalation study in rats and mice. Leukemia and liver lesions were observed following tetrachloroethene exposure (NTP, 1986). The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" – probable human carcinogen.

<u>Toluene</u>

The chronic oral RfD for toluene is 2E-01 mg/kg/day (EPA, 1991) and is based on a subchronic oral gavage study in rats (NTP, 1989). F344 rats received oral doses of 0, 312, 625, 1250, 2500, or 5000 mg/kg/day for 5 days/week for 13 weeks. The LOAEL was 625 mg/kg/day and the critical effects observed were changes in liver and kidney weights. An uncertainty factor of 1,000 was applied to the NOAEL of 223 mg/kg/day (adjusted from 312 mg/kg/day to take into account 5/7 day exposure) to obtain the RfD. The confidence level in this RfD is medium. There were no adverse effects seen in human volunteers exposed to 100 mg/kg for twenty minutes. When exposed to 200 mg/kg for twenty minutes they exhibited incoordination, exhilaration, and prolonged reaction times.

The chronic inhalation RfD for toluene is $6E-01 \text{ mg/kg/day} (2E+0 \text{ mg/m}^3)$ (EPA, 1991a) and is based upon human exposure data (Anderson et al., 1983; CIIT, 1980). This value is currently under review by an EPA work group (EPA, 1991). Humans were exposed to toluene at a concentration of 40 mg/kg for 6 hours and the critical effects observed were CNS effects and eyes and nose irritation. An uncertainty factor of 100 was applied to the NOAEL of 151 mg/m³ to obtain this RfD.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Ethylbenzene

The chronic oral RfD for ethylbenzene is 1E-01 mg/kg/day (EPA, 1991) and is based on a oral subchronic rat bioassay (Wolf et al., 1956). Rats received oral doses of 13.6, 136, 408, or 680 mg/kg/day in olive oil for 26 weeks. The LOAEL was 408 mg/kg/day and the critical effects observed were liver and kidney toxicity. An uncertainty factor of 1,000 was applied to the NOAEL of 97.1 mg/kg/day (adjusted from 136 mg/kg/day to take into account 5/7 day exposure) to obtain the RfD. The confidence level in this RfD is low. There were no adverse effects seen in human volunteers exposed to 100 mg/kg (435 mg/cu.m) for eight hours.

The chronic inhalation RfD has been established and verified as $3E-01 \text{ mg/kg/day} (1E+0 \text{ mg/m}^3)$ (EPA, 1991) and is based upon inhalation studies in rats and rabbits (Andrew et al., 1981; Hardin et al., 1981). Rats were exposed to ethylbenzene on gestation days 1-19 and rabbits were exposed on gestation days 1-24. Exposures were for 6-7 hours/day. The NOAEL was 434 mg/m³ and the critical effect observed was developmental toxicity. An uncertainty factor of 300 was applied to the NOAEL. The confidence level in this RfD is low.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

B-25

Xylenes

The chronic oral RfD for toluene is 2E+00 mg/kg/day (EPA, 1991) and is based on a chronic oral gavage study in rats and mice (NTP, 1986). Rats and mice were given oral gavage doses of 0, 250 or 500 mg/kg/d (rats) and 0, 500 or 1,000 mg/kg/d (mice) for 5 days/week for 105 weeks. There was a dose-related increase in the mortality levels seen in male rats, as well as hyperactivity and decreased body weights. An uncertainty factor of 100 was applied to the NOAEL of 179 mg/kg/day (adjusted from 250 mg/kg/day to take into account 5/7 day exposure) to obtain the RfD. The confidence level in this RfD is medium.

The chronic inhalation RfD for xylene is 3E-1 ug/m³ (9E-02 mg/kg/day) (EPA, 1991a) and is based upon human exposure data (Hake et al., 1981; Carpenter et al., 1975). This value is currently pending review (EPA, 1991). Humans were exposed to xylenes at a concentration of 20 mg/kg for 7.5 hours/day for 5 days and the critical effects observed were CNS effects and nose and throat irritation. An uncertainty factor of 100 was applied to the NOAEL of 27 mg/m³ to obtain this RfD.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

BASE NEUTRAL/ACIDS

Phenol

The chronic oral RfD for phenol is 6E-1 mg/kg/day (EPA, 1991) and is based upon a developmental study in rats (NTP, 1983). Pregnant CD rats were administered phenol by gavage at doses of 0, 30, 60, and 120 mg/kg/day on gestational days 6 to 15. The LOAEL was 120 mg/kg/day and the critical effect observed was a highly significant reduction in fetal body

weights. An uncertainty factor of 100 was applied to the highest fetal NOAEL in this study (60 mg/kg/day) to obtain the RfD. The confidence level in this RfD is low to medium.

The health effects data for phenol have been reviewed by the U.S. EPA RfD/RfC Work Group and determined to be inadequate for derivation of an inhalation RfD (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

2-Chlorophenol

The chronic oral RfD for 2-chlorophenol is 5E-3 mg/kg/day (EPA, 1991) and is based upon a subchronic drinking water study in rats (Exon and Koller, 1982). Weanling female Sprague-Dawley rats were exposed to 0, 5, 50 or 500 mg/kg of 2-chlorophenol. The rats were bred after 10 weeks of treatment and treatment was continued during breeding, gestation and weaning. The LOAEL was 500 mg/kg and the critical effects were reproductive (an increase in the conception rate and in the number of stillborns as well as a decrease in the size of the litters). An uncertainty factor of 1,000 was applied to the NOAEL (50 mg/kg; converted to 5 mg/kg/day) to obtain the RfD. The confidence level in the RfD is low. The chronic inhalation RfD is not available at this time (EPA, 1991).

2-Chlorophenol has not been evaluated by U.S. EPA for evidence of human carcinogenic potential (EPA, 1991).

Benzoic Acid

The chronic oral RfD for benzoic acid is 4E+0 mg/kg/day (EPA, 1991) and is based on data regarding the amounts of benzoic acid and sodium benzoate produced as a food preservative

(FDA, 1973). The FDA estimated a daily per capita intake of 0.9-34 mg for benzoic acid and 34-328 mg for sodium benzoate. At these levels, there are no reports of toxic effects in humans. These compounds have Generally Recognized as Safe (GRAS) status by FDA. Therefore, the upper ranges can be considered NOAELs for benzoic acid and sodium benzoate. No uncertainty factors are applied and based on conversion factors, the RfD for benzoic acid has been established at 312 mg/day for a 70 kg human or 4 mg/kg/day. The confidence in this RfD is medium.

A chronic inhalation RfD is not available at this time (EPA, 1991).

The EPA weight of evidence classification for the human carcinogenicity of this compound is "D" (EPA, 1991).

2,4-Dichlorophenol

The chronic oral RfD for 2,4-dichlorophenol is 3E-3 mg/kg/day (EPA, 1991) and is based upon a subchronic to chronic drinking water study in rats (Exon and Koller, 1985). Female rats were exposed to 3, 30 or 300 mg/kg 2,4-dichlorophenol in drinking water from weaning age through breeding at 90 days, parturition and weaning of pups. The LOAEL was 30 mg/kg (converted to 3 mg/kg/day) and the critical effects were decreased delayed hypersensitivity response. The NOEL was 3 mg/kg (converted to 0.3 mg/kg/day). An UF of 100 was applied to the NOEL to obtain the RfD. The confidence level in this RfD is low.

The chronic inhalation RfD for 2,4-dichlorophenol is not available at this time (EPA, 1991).

This chemical has not been evaluated by the U.S. EPA for evidence of human carcinogenic potential (EPA, 1991).

Naphthalene

The chronic oral RfD for naphthalene is 4E-03 mg/kg/day (EPA, 1991a) (value pending current review) and is based on a subchronic gavage study in rats (NTP, 1980). An uncertainty factor of 10,000 was applied to the LOAEL of 35.7 mg/kg/day to obtain the RfD. The critical effect observed in this study was decreased body weight gain.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

4-Chloro-3-Methylphenol

The chronic oral and inhalation RfDs for this compound are under review by an EPA work group (EPA, 1991). A subchronic oral RfD has been established at 2E+0 mg/kg/day (EPA, 1991a) based upon a 28-day oral study (200 mg/kg/day) in rats (Madsen et al., 1986). The critical effect observed was a decrease in weight gain. An uncertainty factor of 100 was applied to obtain this RfD.

4-Chloro-3-Methylphenol has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

2,4,5-Trichlorophenol

The chronic oral RfD for 2,4,5-trichlorophenol is 1E-1 mg/kg/day (EPA, 1991) and is based upon a subchronic dietary rat study (McCollister et al., 1961). Rats were exposed to different levels (100 through 10,000 mg/kg) of 2,4,5-trichlorophenol for 98 days. The LOAEL was 300 mg/kg/day (3,000 mg/kg) and the critical effects observed were mild diuresis and slight degenerative changes in the liver and kidneys. An uncertainty factor of 1,000 was applied to the NOAEL of 100 mg/kg/day (1,000 mg/kg) to obtain the RfD. The confidence level in this RfD is low. The health effects for 2,4,5-trichlorophenol were reviewed by the U.S. EPA RfD/RfC workgroup and determined to be inadequate for derivation of an inhalation RfD.

This substance has been evaluated by the U.S. EPA for evidence of human carcinogenic potential. The evaluation is pending future review by an inter-office agency work group. A risk assessment summary will be included on IRIS when the review has been completed (EPA, 1991).

4-Nitrophenol

The chronic oral RfD for 4-nitrophenol is under review by an EPA work group (EPA, 1991). The health effects data for 4-nitrophenol were reviewed by the U.S. EPA RfD/RfC work group and determined to be inadequate for the derivation of an inhalation RfD (EPA, 1991).

4-Nitrophenol has not been evaluated by the U.S. EPA for evidence of carcinogenicity (EPA, 1991).

2,4-Dinitrotoluene

The health effects data for 2,4-dinitrotoluene were reviewed by the U.S. EPA RfD/RfC Work Group and determined to be inadequate for derivation of an RfD (EPA, 1991).

The EPA weight of evidence classification for the human carcinogenic potential of this compound is "B2" (EPA, 1991). A mixture of 2,4- and 2,6-dinitrotoluene isomers has been shown to induce liver and mammary gland tumors in a 2 year dietary study in rats (Ellis et al., 1979). An oral slope factor of 6.8E-1 mg/kg/day has been established based on this study.

Quantitative estimate of carcinogenic risk from inhalation exposure to 2,4-dinitrotoluene is not available (EPA, 1991).

Pentachlorophenol

The chronic oral RfD for this compound is 3E-2 mg/kg/day (EPA, 1991) and is based on a chronic dietary study in rats (Schwetz et al., 1978). Rats were administered pentachlorophenol at doses of 3, 10 or 30 mg/kg/day in the diet for 2 years. The LOAEL was 10 mg/kg/day based on liver and kidney toxicity. An uncertainty factor of 100 was applied to the NOAEL of 3 mg/kg/day to obtain the RfD. The confidence level in this RfD is medium. The chronic inhalation RfD is under review by an EPA work group (EPA, 1991).

The EPA weight of evidence classification for the human carcinogenicity of this compound is "B2" - probable human carcinogen (EPA, 1991) and is based on an increase in hepatocellular adenomas and carcinomas, adrenal medulla pheochromocytomas and malignant pheochromocytomas and/or hemangiosarcomas and hemangiomas in mice. An oral slope factor of 1.2E-1 mg/kg/day (EPA, 1991) was established based on an increase in the tumor types listed previously in female mice following administration of pentachlorophenol (NTP, 1989). Quantitative estimate of carcinogenic risk from inhalation exposure is not available (EPA, 1991).

Phenanthrene

Data has been determined to be inadequate for quantitative risk assessment (EPA, 1991). The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Anthracene

The chronic oral RfD for anthracene is 3E-01 mg/kg/day (EPA, 1991) and is based on a subchronic gavage study in mice (U.S. EPA, 1989). Mice received 0, 250, 500, or 1,000 mg/kg/day anthracene by oral gavage for 90 days. No treatment related effects on survival, clinical signs or body weight changes were observed. An uncertainty factor of 3000 was applied to the NOAEL of 1,000 mg/kg/day to obtain the RfD. The confidence level in this RfD is low.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Di-n-butylphthalate

The chronic oral RfD for di-n-butylphthalate is 1E-01 mg/kg/day (EPA, 1991) and is based on a subchronic feeding study in rats (Smith, 1953). Rats received 0, 0.01, 0.05, 0.25 and 1.25 percent di-n-butylphthalate in their diet for 1 year. The LOAEL was 600 mg/kg/day (1.25%) and the critical effect observed was an increase in mortality. No changes in behavior or other clinical signs of toxicity were observed. An uncertainty factor of 1,000 was applied to the NOAEL of 125 mg/kg/day (0.25%) to obtain the RfD. The confidence level in this RfD is low.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Fluoranthene

The chronic oral RfD for fluoranthene is 4E-02 mg/kg/day (EPA, 1991) and is based on a subchronic gavage study in mice (U.S. EPA, 1988). Mice received 0, 125, 250, or 500 mg/kg/day fluoranthene by oral gavage for 13 weeks. The LOAEL was 250 mg/kg/day and the critical effects seen were neuropathy, increased salivation and increased liver enzymes. An uncertainty factor of 3000 was applied to the NOAEL of 125 mg/kg/day to obtain the RfD. The confidence level in this RfD is low.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

<u>Pyrene</u>

The chronic oral RfD for pyrene is 3E-02 mg/kg/day (EPA, 1991) and is based on a subchronic gavage study in mice (U.S. EPA, 1989). Mice received 0, 75, 125, or 250 mg/kg/day pyrene by oral gavage for 13 weeks. The LOAEL was 125 mg/kg/day and the critical effects seen were toxic effects to the kidney including changes to the renal tubular pathology and decreased kidney weight. An uncertainty factor of 3000 was applied to the NOAEL of 75 mg/kg/day to obtain the RfD. The confidence level in this RfD is low.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

Butylbenzylphthalate

The chronic oral RfD for butylbenzylphthalate is 2E-01 mg/kg/day (EPA, 1991) and is based on a subchronic feeding study in rats (NTP, 1985). Rats received 0, 17, 51, 159, 470, 1417 mg/kg/day butylbenzylphthalate in their diet for 26 weeks. The LOAEL was 470 mg/kg/day and the critical effects observed were a decrease in body weight, decreased testes' size, decreased organ weights and hematological effects. An uncertainty factor of 1,000 was applied to the NOAEL of 159 mg/kg/day to obtain the RfD. The confidence level in this RfD is medium.

The EPA weight of evidence classification for the carcinogenicity of this compound is "C" - a possible human carcinogen (EPA, 1991) based upon an increase in mononuclear cell leukemia in female rats fed butyl benzyl phthalate at doses of 0.6000 or 12,000 mg/kg (NTP, 1982). A quantitative estimate of carcinogenic risk from oral exposure is not available (EPA, 1991).

Benzo(a)anthracene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence). No oral slope factor for benzo(a)anthracene has been established (EPA, 1991), however this compound has been shown to produce liver, lung and skin cancer in animal models (Klein, 1963; IARC, 1973; Steiner and Faulk, 1951; Steiner and Edgecomb, 1952 and Wislocki et al., 1986). Current EPA guidance suggests the use of an oral slope factor of 11.5 mg/kg/day⁻¹ and an inhalation slope factor of 6.1 mg/kg/day⁻¹. These values are derived from experimental data utilizing benzo(a)pyrene as the test compound.

<u>Chrysene</u>

Data has been determined to be inadequate for quantitative risk assessment (EPA, 1991b). The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). No oral slope factor for chrysene has been established, however this compound has been shown to produce carcinomas, and malignant lymphomas in mice (Wislocki et al., 1986; Buening et al., 1979). Current EPA guidance suggests the use of an oral slope factor of 11.5 mg/kg/day⁻¹ and an inhalation slope factor of 6.1 mg/kg/day⁻¹. These values are derived from experimental data utilizing benzo(a)pyrene as the test compound.

Bis(2-ethylhexyl)phthalate

The chronic oral RfD for Bis(2-ethylhexyl)phthalate (BEHP) is 2E-02 mg/kg/day (EPA, 1991) and is based on a subchronic feeding study in guinea pigs (Carpenter et al., 1953). Guinea pigs received 19 or 64 mg/kg/day BEHP in their food for 1 year. There were no treatment related toxic effects, however both dose groups had increased liver weights. An uncertainty factor of 1,000 was applied to the LOAEL of 19 mg/kg/day to obtain the RfD. The confidence level in this RfD is medium. The chronic inhalation RfD for this compound is not available at this time (EPA, 1991).

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence). The oral slope factor for BEHP is 1.4E-2 mg/kg/day⁻¹ (EPA, 1991), and has been shown to produce liver tumors in an animal model (NTP, 1982). A quantitative estimate of carcinogenic risk from inhalation exposure is not available (EPA, 1991).

Benzo(b)fluoranthene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). No oral slope factor for benzo(b)fluoranthene has been established, however this compound has been shown to produce lung and thorax carcinomas, lung adenomas and skin tumors in animal models (Deutsch-Wenzel et al., 1983; LaVoie et al., 1987; Lacassagne et al., 1963). Current EPA guidance suggests the use of an oral slope factor of 11.5 mg/kg/day⁻¹ and an inhalation slope factor of 6.1 mg/kg/day⁻¹. These values are derived from experimental data utilizing benzo(a)pyrene as the test compound.

Benzo(k)fluoranthene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). No oral slope factor for benzo(k)fluoranthene has been established, however this compound has been shown to produce lung and thorax carcinomas, lung adenomas and skin tumors in animal models (Deutsch-Wenzel et al., 1983; LaVoie et al., 1982, 1987; Van Duuren et al., 1966). Current EPA guidance suggests the use of an oral slope factor of 11.5 mg/kg/day⁻¹ and an inhalation slope factor of 6.1 mg/kg/day⁻¹. These values are derived from experimental data utilizing benzo(a)pyrene as the test compound.

Benzo(a)pyrene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). Benzo(a)pyrene has been shown to produce lung and stomach cancer in animal models (Neal and Rigdon, 1967; Feron et al., 1973; Kobayashi, 1975; Rigdon and Neal, 1966, 1969; Thyssen et al., 1981). The oral and inhalation slope factors for benzo(a)pyrene have been withdrawn by EPA. As an interim measure, the withdrawn values have been recommended for use by EPA. These values are 11.5 and 6.1 mg/kg/day⁻¹ for the oral and inhalation routes, respectively.

Indeno(1,2,3-cd)pyrene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence) (EPA, 1991). No oral slope factor for indeno(1,2,3-cd)pyrene has been established, however this compound has been shown to produce lung and skin tumors in animal models (Deutsch-Wenzel et al., 1983; Lacassagne et al., 1963; Hoffman and Wynder, 1966; Rice et al., 1985a, 1986). Current EPA guidance suggests the use of an oral slope factor of 11.5 mg/kg/day⁻¹ and an inhalation slope factor of 6.1 mg/kg/day⁻¹. These values are derived from experimental data utilizing benzo(a)pyrene as the test compound.

Benzo(ghi)perylene

No RfDs were found in either IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "D" - not classifiable as to human carcinogenicity (EPA, 1991).

PESTICIDES/PCBs

<u>4,4'-DDT</u>

The chronic oral RfD for 4,4'-DDT is 5E-04 mg/kg/day (EPA, 1991) and is based on a subchronic feeding study in rats (Laug et al., 1950). Rats received 0, 1, 5, 10, or 50 mg/kg 4,4'-DDT in their food for 15 - 27 weeks. The LOAEL was 0.25 mg/kg/day (5 mg/kg diet) and the critical effects seen were histopathological effects to the liver. An uncertainty factor of 100 was applied to the NOAEL of 0.05 mg/kg/day (1 mg/kg diet) to obtain the RfD. The confidence level in this RfD is medium.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - a probable human carcinogen (sufficient animal evidence, inadequate/no human evidence). This compound has been shown to produce liver tumors in mice and rats. The oral slope factor for 4,4'-DDT is 3.4E-01 mg/kg/d⁻¹ (EPA, 1991) and is based upon studies by Turusov et al., 1973; Terracini et al., 1973; Thorpe and Walker, 1973; Tomatis and Turusov, 1975; Cabral et al., 1982; and Rossi et al., 1977. On the basis of route-to-route extrapolation, the inhalation slope factor for 4,4'-DDT has been set at 3.4E-01 mg/kg/day (9.7E-5 ug/m³) (EPA, 1991a).

PCBs

No RfD was found in IRIS or HEAST.

The EPA weight of evidence classification for the carcinogenicity of this compound is "B2" - probable human carcinogen (sufficient animal evidence, inadequate/no human evidence (EPA, 1991). PCBs have been shown to produce liver tumors in rats and mice (Kimbrough et al., 1975; NCI, 1978; Norback and Weltman, 1985; Ito et al., 1973). An oral slope factor of 7.7 mg/kg/day has been established (EPA, 1990) based on the study by Norback and Weltman (1985). A quantitative estimate of carcinogenic risk from inhalation exposure is not available (EPA, 1991).

APPENDIX B REFERENCES

INORGANICS

Aluminum

Alfrey, A.C., J.M. Mishell, J. Burks, S.R. Contiguglia, H. Rudolph, E. Lewin and J.H. Holmes. 1972. Syndrome of dyspraxia and multifocal seizures associated with chronic hemodialysis. Trans. Am. Soc. Artif. Intern. Organs. 18:257-261.

Alfrey, A.C. 1981. Aluminum and Tin. In: Disorders of Mineral Metabolism. F. Bronner and J.W. Coburn, Eds., Academic Press, Inc., New York. pp. 353-369.

Goyer, R.A. 1986. Toxic effect of metals. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 582-635.

Schaver, C.G. 1948. Pulmonary changes encountered in employees engaged in the manufacture of aluminum abrasives: chemical and roetgenologic aspects. Occup. Med. 5:718-728.

Antimony

Brieger, H., C.W. Semisch, III, J. Stasney and D.A. Platnek. 1954. Industrial antimony poisoning. Ind. Med. Surg. 23:521.

Schroeder, H.A., M. Mitchner and A.P. Nason. 1970. Zirconium, niobium, antimony, vanadium and lead in rats: Life term studies. J. Nutri. 100(1): 59-68.

<u>Arsenic</u>

Brown, C.C. and K.C. Chu. 1983a. Approaches to epidemiologic analysis of prospective and retrospective studies: Example of lung cancer and exposure to arsenic. In: Risk Assessment Proc. S1MS Conf. on Environ. Epidemiol. June 28 - July 2, 1982, Alta, VT. S1AM Publication.

Brown, C.C. and K.C. Chu. 1983b. Implications of the multistage theory of carcinogenesis applied to occupational arsenic exposure. J. Natl. Cancer Inst. 70:455-463.

Brown, C.C. and K.C. Chu. 1983c. A new method for the analysis of cohort studies, implications of the multistage theory of carcinogenesis applied to occupational arsenic exposure. Environ. Health Perspect. 50:293-308.

Higgins, I. 1982. Arsenic and respiratory cancer among a sample of Anaconda smelter workers. Report submitted to the Occupational Safety and Health Administration in the

comments of the Kennecott Minerals Company on the inorganic arsenic rulemaking. (Exhibit 203-5).

Lee-Feldstein, A. 1983. Arsenic and respiratory cancer in man: Follow-up of an occupational study. In: Arsenic: Industrial, Biomedical, and Environmental Perspectives, W. Lederer and R. Fensterheim, Ed. Van Nostrand Reinhold, New York.

Tseng, W.P. 1977. Effects and dose response relationships of skin cancer and blackfoot disease with arsenic. Environ. Health Perspect. 19:109-119.

<u>Barium</u>

Brenniman, G.R. and P.S. Levy. 1984. High barium levels in public drinking water and its association with elevated blood pressure. In: Advances in Modern Toxicology IX, E.J. Calabrese, Ed. Princeton Scientific Publications, Princeton, NJ. P. 231-249.

McCauley, P.T., B.H. Douglas, R.D. Laurie and R.J. Bull. 1985. Investigations into the effect of drinking water barium on rats. Environ. Health Perspect. Vol. IX, E.J. Calabrese, Ed. Princeton Scientific Publications. Princeton, NJ. p. 197-210.

Perry, H.M., S.J. Kopp, M.W. Erlanger and E.F. Perry. 1983. Cardiovascular effects of chronic barium ingestion. In: Trace Substances in Environmental Health, XVII, D.D. Hemphill, Ed. Proc. Univ. Missouri's 17th Ann. Conf. on Trace Substances in Environmental Health. University of Missouri Press, Columbia, MO.

Schroeder, H.A. and M. Mitchener. 1975a. Life-term effects of mercury, methyl mercury and nine other trace metals on mice. J. Nutr. 105:452-458.

Schroeder, H.A. and M. Mitchner. 1975b. Life-term studies in rats: Effect of aluminum, barium, beryllium and tungsten. J. Nutr. 105:421-427.

Tardiff, R.G., M. Robinson and N.S. Ulmer. 1980. Subchronic oral toxicity of $BaCl_2$ in rats. J. Environ. Pathol. Toxicol. 4:267-275.

Wones, R.G., B.L. Stadler and L.A. Frohman. 1990. Lack of effect of drinking water barium on cardiovascular risk factor. Environ. Health Perspect. 85:1-13.

<u>Beryllium</u>

Schroeder, H.A. and M. Mitchner. 1975. Lifetime studies in rats: Effects of aluminum, barium, beryllium and tungsten. J. Nutr. 105:421-427.

Wagoner, J.K., P.F. Infante and D.L. Bayliss. 1980. Beryllium: An etiologic agent in the induction of lung cancer, non-neoplastic respiratory disease and heart disease among industrially exposed workers. Environ. Res. 21:15-34.

<u>Cadmium</u>

EPA. 1985. Drinking Water Criteria Document on Cadmium. Office of Drinking Water, Washington, D.C. (Final Draft).

Ivankovic, S. and R. Preussmann. 1975. Absence of toxic and carcinogenic effects after administration of high doses of chronic oxide pigment in subacute and long-term feeding experiments in rats. Food Cosmet. Toxicol. 13:347-351.

Thun, M.J., T.M. Schnorr, A.B. Smith and W.E. Halperin. 1985. Mortality among a cohort of U.S. cadmium production workers: An update. J. Natl. Cancer Inst. 74(2):325-333.

Chromium VI

Lindberg, E. and G. Hedenstierna. 1983. Chrome plating: Symptoms, findings in the upper airways, and effects on lung function. Arch. Environ. Health. 38:367-374.

MacKenzie, R.D., R.U. Byerrum, C.F. Decker, C.A. Hoppert and R.F. Langham. 1958. Chronic toxicity studies. II. Hexavalent and trivalent chromium administered in drinking water to rats. Am. Med. Assoc. Arch. Ind. Health. 18:232-234.

Mancuso, T.F. 1975. Consideration of chromium as an industrial carcinogen. International Conference on Heavy Metals in the Environment, Toronto, Ontario, Canada. October 27-31. p. 343-356.

<u>Cobalt</u>

Goyer, R.A. 1986. Toxic effect of metals. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 582-635.

Copper

U.S. EPA. 1987. Drinking Water Criteria Document for Copper. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, D.C. ECAO-CIN 417.

Lead

Azar, A., H.J. Trochimowicz and M.E. Maxfield. 1973. Review of lead studies in animals carried out at Haskill Laboratory - two year feeding study and response to hemorrhage study. In: Barth D., A. Berlin, R. Engel, P. Recht and J. Smeets, Ed. Environmental health aspects of lead: Proceedings International Symposium; October 1972; Amsterdam, The Netherlands. Commission of the European Communities, Luxenberg. p. 199-208.

Kasprzak, K.S., K.L. Hoover and L.A. Poirier. 1985. Effects of dietary calcium acetate on lead subacetate carcinogenicity in kidneys of male Sprague-Dawley rats. Carcinogenesis. 6(2):279-282.

Koller, L.D., N.I. Kerkuliet and J.H. Exon. 1986. Neoplasia induced in male rats fed lead acetate, ethyl urea and sodium nitrate. Toxicol. Pathol. 13:50-57.

Van Esch, G.J. and R. Kroes. 1969. The induction of renal tumors by feeding of basic lead acetate to mice and hamsters. Br. J. Cancer. 23:265-271.

Manganese

NRC (National Research Council). 1989. Recommended Dietary Allowances, 10th ed. Food and Nutrition Board, National Research Council, National Academy Press, Washington, D.C. p.230-235.

Roels, H., R. Lauwerys, J.P. Buchet, et al. 1987. Epidemiological survey among workers exposed to manganese: Effects on lung, central nervous system, and some biological indices. Am. J. Ind. Med. 11(3):307-328.

Schroeder, H.A., D.D. Balassa and I.H. Tipton. 1966. Essential trace metals in man: Manganese, a study in homeostasis. J. Chron. Dis. 19:545-571.

WHO (World Health Organization). 1973. Trace elements in human nutrition: Manganese. Report of a WHO Expert Committee. Technical Report Service, 532, WHO, Geneva, Switzerland.

Mercury

Andres, P. 1984. IgA-IgG disease in the intestine of Brown Norway rats ingesting mercuric chloride. Clin. Immunol. Immunopathol. 20:488-494.

Bernaudin, J.F., E. Druet, P. Druet and R. Masse. 1981. Inhalation or ingestion of organic or inorganic mercurials produces autoimmune disease in rats. Clin. Immunol. Immunopathol. 20:129-135.

Druet, P., E. Druet, F. Potdevin and C. Sapin. 1978. Immune type glomerulonephritis induced by $HgC1_2$ in the Brown Norway rat. Ann. Immunol. 129C:777-792.

Nickel

Chovil A., R.B. Sutherland and M. Halliday. 1981. Respiratory cancer in a cohort of sinter plant workers. Br. J. Ind. Med. 38:327-333.

Enterline, P.E. and G.M. Marsh. 1982. Mortality among workers in a nickel refinery and alloy manufacturing plant in West Virginia. J. Natl. Cancer Inst. 68:925-933.

Magnus, K., A. Andersen and A. Hogetveit. 1982. Cancer of respiratory organs among workers at a nickel refinery in Norway. Int. J. Cancer. 30:681-685.

Peto, J., H. Cuckle, R. Doll, C. Hermon and L.G. Morgan. 1984. Respiratory cancer mortality of Welsh nickel refinery workers. In: Nickel in the Human Environment: Proceedings of a Joint Symposium, March, 1983. IARC Scientific Publ. No. 53. International Agency for Research on Cancer, Lyon, France. p. 34-46.

<u>Selenium</u>

Yang, G., S. Yin, R. Zhou, et al. 1989. Studies of safe maximal daily dietary Se-intake in a seleniferous area in China. II. Relation between Se-intake and the manifestation of clinical signs and certain biochemical alterations in blood and urine. J. Trace Elem. Electrolytes Health Dis. 3(2):123-130.

<u>Silver</u>

Blumberg H. and T. Carey. 1934. Argyremia: Detection of unsuspected and obscure argyria by the spectrophotometric demonstration of high blood silver. J. Am. Med. Assoc. 103:1521-1524.

East, B.W., K. Boddy, E.D. Williams, D. MacIntyre and A.L.C. McLay. 1980. Silver retention, total body silver and tissue silver concentrations in argyria associated with exposure to an anti-smoking remedy containing silver acetate. Clin. Exp. Dermatol. 5:305-311.

Gaul, L.E. and A.N. Stoud. 1935. Clinical spectroscopy. Seventy cases of generalized argyria following organic and colloidal silver medication. J. Am. Med. Assoc. 104:1387-1390.

Thallium

Browning, E. 1969. Toxicity of industrial metals, 2nd ed., Butterworth, London.

Fowler, B.A. 1982. Indium and thallium in health. In: Trace metals in human health. J. Rose, Ed., Butterworth, London.

MRI (Midwest Research Institute). 1986. Subchronic (90-day) toxicity study of thallium sulfate in Sprague-Dawley rats. Office of Solid Waste, U.S. EPA, Washington, D.C.

<u>Vanadium</u>

Schroeder, J.A., M. Mitchener and A.P. Nason. 1970. Zirconium, niobium, antium, antimony, vanadium and lead in rats: Life term studies. J. Nutr. 100(1):59-68.

Waters, M.D. 1977. Toxicology of vanadium. In: Toxicology of trace metals. R.A. Goyer and M.A. Mehlman, Eds., John Wiley and Sons, New York. pp. 147-189.

<u>Zinc</u>

Pories, W.J., J.H. Henzel, C.G. Rob and W.H. Strain. 1967. Acceleration of wound healing in man with zinc sulfate given by mouth. Lancet. 1:121-124.

Prasad, A.S., E.B. Schoomaker, J. Ortega, et al. 1975. Zinc deficiency in sickle cell disease. Clin. Chem. 21:582-587.

Cyanide

Howard, J.W. and R.F. Hanzal. 1955. Chronic toxicity to rats of food treated with hydrogen cyanide. J. Agric. Food Chem. 3:325-329.

Philbrick, D.J., J.B. Hopkins, D.C. Hill, J.C. Alexander and R.G. Thomson. 1979. Effects of prolonged cyanide and thiocyanate feeding in rats. J. Toxicol. Environ. Health. 5:579-592.

<u>Boron</u>

Weir, R.J., Jr., and R.S. Fisher. 1972. Toxicologic studies on borax and boric acid. Toxicol. Appl. Pharmacol. <u>23</u>:351-364.

Menzel, D.B. and M.O. Amdur. 1986. Toxic responses of the respiratory system. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaassen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 330-358.

Dixon, R.L. 1986. Toxic responses of the reproductive system. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaassen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 432-477.

Strontium

Hobbs, C.H. and R.O. McClellan. 1986. Toxic effects of radiation and radioactive materials. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 669-705.

<u>Titanium</u>

Menzel, D.B. and M.O. Amdur. 1986. Toxic responses of the respiratory system. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaassen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 330-358.

Goyer, R.A. 1986. Toxic effects of metals. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 582-635.

<u>Fluoride</u>

Menzer, R.E. and J.O. Nelson. 1986. Water and Soil Pollutants. In: Casarett and Doull's Toxicology. The Basic Science of Poisons, C.D. Klaasen, M.O. Amdur and J. Doull, Eds., Macmillan Publishing Company, New York, pp. 825-853.

Hodge, H.C. 1950. The concentration of fluorides in drinking water to give the point of minimum caries with maximum safety. J. Am. Dent. Assoc. <u>40</u>:436.

VOLATILE ORGANICS

Chloromethane

CIIT (Chemical Industry Institute of Toxicology). 1981. Final report on 24-month inhalation study on methyl chloride. Prepared by Batelle-Columbus Laboratories, Columbus, OH. December 31.

Methylene Chloride

National Coffee Association. 1982. Twenty-four month chronic toxicity and oncogenicity study of methylene chloride in rats. Final Report. Prepared by Hazelton Laboratories America, Inc., Vienna, VA.

NCA (National Coffee Association). 1983. Twenty-four month oncogenicity study of methylene chloride in mice. Final Report. Prepared by Hazelton Laboratories, America, Inc., Vienna, VA.

Nitschke, K.D., J.D. Bured, T.J. Bell et al. 1988. Methylene chloride: A 2-year inhalation toxicity and oncogenicity study in rats. Fundam. Appl. Toxicol. (In Press).

NTP (National Toxicology Program). 1986. Toxicology and carcinogenesis studies of dichloromethane (methylene chloride) in F344/N and B6C3F1 mice (inhalation studies). NTP-TRS-306.

Acetone

U.S. EPA. 1986. Ninety-day gavage study in albino rats using acetone. Office of Solid Waste, Washington, D.C.

Carbon Disulfide

Hardin, B.D., G.P. Bond, M.R. Sikor, F.D. Andrew, R.P. Beliles and R.W. Niemeir. 1981. Testing of selected workplace chemicals for teratogenic potential. Scand. J. Work Environ. Health 7(Suppl4):66-75.

Jones, C., R.W. Tyl, M.C. Marr and C.A. Kimmel. 1984a. Teratologic Evaluation of Carbon Disulfide (CAS No. 75-15-0) administered to CD rats on gestational days 6 through 15. National Center for Toxicological Research, Jefferson AR, Govt. Reports Announcements and Index, Issue 15. NTIS PB 84-192343.

Jones-Price, C., R.W. Tyl, M.C. Marr and C.A. Kimmel. 1984b. Teratologic evaluation of carbon disulfide (CAS No. 75-15-0) administered to New Zealand white rabbits on gestational days 6 through 15. National Center for Toxicological Research, Jefferson, A.R. Gout Reports Announcements and Index, Issue 15. NTIS PB 84-192350.

Tabacova, S., L.A. Hinkova and L. Balabaeva. 1978. Carbon disulfide teratogenicity and postnatal effects in rat. Toxicol. Lett. 2:129-133.

1,2-Dichloroethene (cis)

McCauley, P.T., M. Robinson, L.W. Condie and M. Parvell. n.d. The effects of subacute and subchronic oral exposure to cis-1,2-chloroethylene in rats. Health Effects Research Laboratory. U.S. EPA, Cincinnati, OH.

Chloroform

Heywood, R., R.J. Sortwell, PRB Noell, et al. 1979. Safety evaluation of toothpaste containing chloroform. III. Long-term study in beagle dogs. J. Environ. Pathol. Toxicol. 2:835-851.

Jorgenson, T.A., E.F. Meierhenry, C.J. Rushbrook et al. 1985. Carcinogenicity of chloroform in drinking water to male Osborne-Mendel rats and female B6C3F1 mice. Fundam. Appl. Toxicol. (USA). 5(4):760-769.

NCI (National Cancer Institute). 1976. Report on Carcinogenesis Bioassay on Chloroform. National Cancer Institute, Washington, D.C. NTIS PB264018.

2-Butanone

LaBelle, W. and H. Brieger. 1955. The vapor toxicity of a composite solvent and its principal components. Am. Med. Assoc. Arch. Ind. Health. 12:623-627.

Schwetz, B.A., B.K.J. Leong and P.J. Gehring. 1974. Embryo and fetotoxicity of inhaled carbon tetrachloride, 1,1-dichloroethane and methyl ethyl ketone in rats. Toxicol. Appl. Pharmacol. 28(3):452-464.

<u>1,1,1-Trichloroethane</u>

Adams, E.M., H.C. Spencer, V.K. Rowe and D.D. Irish. 1950. Vapor toxicity of 1,1,1-trichloroethane (methyl chloroform) determined by experiments on laboratory animals. Arch Ind Hyg Occup Med. 1:225-236.

Torkelson, T.R., F. Oyen, D.D. McCollister and V.K. Rowe. 1958. Toxicity of 1,1,1-trichloroethane as determined on laboratory animals and human subjects. Am. Ind. Hyg. Assoc. J. 19:353-362.

Trichloroethene

Fukuda, K., K. Takemoto and H. Tsurota. 1983. Inhalation carcinogenicity of trichloroethylene in mice and rats. Ind. Health. 21:243-254.

Maltoni, C., G. Lefemine and G. Cotti. 1986. Experimental Research on Trichloroethylene Carcinogenesis. Arch. Res. Industrial Carcinogenesis Series, C. Maltoni and M.A. Mehlman, Ed., Vol. V. Princeton Scientific Publishing Co., Inc., Princeton, NJ. p. 393.

NCI (National Cancer Institute). 1976. Carcinogenesis bioassay of trichloroethylene. NCI Carcinogenesis Tech. Rep. Ser. No. 2, DHEW No. (NIH) 76-802.

NTP (National Toxicology Program). 1983. Carcinogenesis bioassay of trichloroethylene. NTP Tech. Rep. Ser. No. 243. NIH 83-1799

<u>Benzene</u>

OH MG, J.C. Townsend, W.A. Fishbeck and R.A. Langner. 1978. Mortality among individuals occupationally exposed to benzene. Arch. Environ. Health. 33:3-10.

Rinsky, R.A., R.J. Young and A.B. Smith. 1981. Leukemia in benzene workers. Am. J. Ind. Med. 2:217-245.

Wong, O., R.W. Morgan and M.D. Whorton. 1983. Comments on the NIOSH study of leukemia in benzene workers. Technical report submitted to Gulf Canada, Ltd., by Environmental Health Associates.

Tetrachloroethene

Buben, J.A. and E.J. O'Flaherty. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: a dose-effect study. Toxicol. Appl. Pharmacol. 78:105-122.

NCI (National Cancer Institute). 1977. Bioassay of tetrachloroethylene (CAS No. 127-18-4) for possible carcinogenicity. NCI Carcinogenesis Tech. Rep. Ser. No. 13, DHEW No. (NIH) 78-813.

NTP (National Toxicology Program). 1986. Carcinogenesis bioassay of tetrachloroethylene (perchloroethylene) (CAS No. 127-18-4) in F344 rats and B6C3F1 mice (inhalation study). NTP Tech. Report. Ser. No. 311.

<u>Toluene</u>

Andersen, I., G.R. Lundquist, L. Molhave, O.F. Pedersen, D.F. Proctor, M. Veath and P.P. Wyon. 1983. Human response to controlled levels of toluene in six-hour exposure. Scand. J. Work Environ. Health 9:405-418.

CIIT (Chemical Industry Institute of Toxicology). 1980. A twenty-four month inhalation toxicology study in Fischer-344 rats exposed to atmospheric toluene. Executive Summary and Data Tables. October 15, 1980. (Cited in U.S. EPA 1985).

NTP (National Toxicology Program). 1989. Toxicology and Carcinogenesis Studies of toluene in F344/N rats and B6C3F1 mice. Technical Report Series No. 371 Research Triangle Park, NC.

Ethylbenzene

Andrew, F.D., R.L. Buschbom, W.C. Cannon et al. 1981. Teratologic assessment of ethylbenzene and 2-ethoxyethanol. Batelle Pacific Northwest Laboratory, Richmond, WA. NTIS PB83-208074. p. 108.

Hardin, B.D., G.P. Bond, M.R. Sikov, F.D. Andrew, R.P. Beliles and R.W. Niemier. 1981. Testing of selected workplace chemicals for teratogenic potential. Scand. J. Work Environ. Health 7 (suppl. 4):66-75.

Wolf, M.A., V.K. Rowe, D.D. McCollister, R.L. Hollingsworth and F. Oyen. 1956. Toxicological studies of certain alkylated benzenes and benzene. Arch. Ind. Hlth. 14:387-398.

<u>Xylenes</u>

Carpenter, C.P., E.R. Kinhead, D.L. Geary et al. 1975. Petroleum hydrocarbon toxicity studies. V. Animal and human response to vapors of mixed xylenes. Toxicol. Appl. Pharmacol. 33(3):543-558.

Hake, C.L., R.D. Steward, A. Wu et al. 1981. Development of a biologic standard for the industrial worker by breath analysis. NIOSH-MCOW-ENUM-XY-77-3. NTIS PB82-152844.

NTP (National Toxicology Program). 1986. NTP Technical Report on the Toxicology and Carcinogenesis of xylenes (mixed) (60.2% m-xylene, 13.6% p-xylene, 17.0 ethylbenzene and 9.1% o-xylene) (CAS No. 1330-20-7) in F344/N rats and B6C3F1 mice (gavage studies). U.S. DHHS, PHS, NIH, NTP, Research Triangle Park, NC. NTP TR 327, NIH Publ. No. 86-2583.

BASE NEUTRAL/ACIDS

Phenol

NTP (National Toxicology Program). 1983. Teratologic evaluation of phenol in CD rats and mice. Report prepared by Research Triangle Institute, Research Triangle Park, NC. NTIS PB83-247726. Gov. Rep. Announce. Index. 83(25):6247.

2-Chlorophenol

Exon, J.H. and L.D. Koller. 1982. Effects of transplacental exposure to chlorinated phenols. Environ. Health Perspect. <u>46</u>:137-140.

Benzoic Acid

FDA (Food and Drug Administration). 1973. Evaluation of the Health Aspects of Benzoic Acid and Sodium Benzoate as Food Ingredients. DHEW, Washington, D.C. Rep. No. SCOGS-7. NTIS-PB-2238387/6.

2,4-Dichlorophenol

Exon, J.H. and L.D. Koller. 1985. Toxicity of 2-chlorophenol, 2,4-dichlorophenol and 2,4,6-trichlorophenol. In: Water Chlorination: Chemistry, Environmental Impact and Health Effects, Jolley et al., Ed. Vol. 5.

Naphthalene

NTP (National Toxicology Program). 1980. Unpublished subchronic toxicity study: Naphthalene (C52904), Fischer 344 rats. Prepared by Batelle's Columbus Laboratories under Subcontract No. 76-34-106002.

4-Chloro-3-Methylphenol

Madsen, C., P.H. Andersen, O. Meyer and G. Wurtzen. 1986. 4-Chloromethylphenol: Salmonella/mammalian - microsome mutagenicity test and subacute toxicity tests in rats. Bull. Environ. Contam. Toxicol. <u>37(5)</u>:651-654.

2,4,5-Trichlorophenol

McCollister, D.D., D.T. Lockwood and V.K. Rowe. 1961. Toxicologic information on 2,4,5-trichlorophenol. Toxicol. Appl. Pharmacol. 3:63-70.

2,4-Dinitrotoluene

Ellis, H.V., S.H. Hageusen, J.R. Jodgson, J.L. Minor and C.B. Hong. 1979. Mammalian toxicity of munition compounds. Phase III. Effects of Lifetime Exposure. Part 1. 2,4-Dinitrotoluene. NTIS AD-A077692. p. 281.

Pentachlorophenol

NTP (National Toxicology Program). 1989. Technical report on the toxicology and carcinogenesis studies of pentachlorophenol (CAS No. 87-86-5) in B6C3F1 mice (feed studies). NTP Tech. Rep. Ser. No. 349. NIH Publ. No. 89-2804.

Schwetz, B.A., J.F. Quast, P.A. Keelev, C.G. Humiston and R.J. Kociba. 1978. Results of 2-year toxicity and reproduction studies on pentachlorophenol in rats. In: Pentachlorophenol: Chemistry, pharmacology, and environmental toxicology, K.R. Rao, Ed. Plenum Press, NY. p. 301.

Anthracene

U.S. EPA. 1989. Subchronic toxicity study in mice with anthracene. Final Report. Hazelton Laboratories, Inc. Prepared for the Office of Solid Waste, Washington, D.C.

<u>Di-n-butylphthalate</u>

Smith, C.C. 1953. Toxicity of butyl stearate, dibutyl sebacate, dibutyl phthalate and methoxyethyl oleate. Arch. Hyg. Occup. Med. 7:310-318.

<u>Fluoranthene</u>

U.S. EPA. 1988. Thirteen week mouse oral subchronic toxicity study with fluoranthene. Prepared by Toxicity Research Laboratories, Ltd., Muskegon, MI for the Office of Solid Waste, Washington, D.C.

Pyrene

U.S. EPA. 1989. Mouse oral subchronic toxicity study of pyrene. Study conducted by Toxicity Research Laboratories, Muskegon, MI for the Office of Solid Waste, Washington, D.C.

Butylbenzylphthalate

NTP (National Toxicology Program). 1985. Twenty-six week subchronic study and modified mating trial in F344 rats. Butyl benzyl phthalate. Final Report. Project No. 12307-02, -03. Hazelton Laboratories America, Inc. Unpublished study.

NTP (National Toxicology Program). 1982. Carcinogenesis Bioassay of Butyl Benzyl Phthalate (CAS No. 85-68-7) in F344 rats and B6C3F1 mice (Feed Study). NTP Tech. Rep. Ser. TR No. 213, NTP, Research Triangle Park, NC. p. 98.

Benzo(a)anthracene

Klein, M. 1963. Susceptibility of strain B6AF/J hybrid infant mice to tumorigenesis with 1,2-benzanthracene, deoxycholic acid and 3-methylcholanthrene. Cancer Res. 23:1701-1707.

Steiner, P.E. and H.L. Falk. 1951. Summation and inhibition effects of weak and strong carcinogenic hydrocarbons: 1,2-Benzanthracene, chrysene, 1:2:5:6-dibenzanthracene and 20-methylcholanthrene. Cancer Res. 11:56-63.

Steiner, P.E. and J.H. Edgecomb. 1952. Carcinogenicity of 1,2-benzanthracene. Cancer Res. 12:657-659.

Wislocki, P.G., E.S. Bagan, AYH Lu et al. 1986. Tumorigenicity of nitrated derivatives of pyrene, benz(a)anthracene, chrysene and benzo(a)pyrene in the newborn mouse assay. Carcinogenesis. 7(8):1317-1322.

<u>Chrysene</u>

Buening, M.K., W. Levin, J.M. Karle, H. Yagi, D.M. Jarina and A.H. Conney. 1979. Tumorigenicity of bay-region epoxides and other derivatives of chrysene and phenanthrene in newborn mice. Cancer Res. 39:5063-5068.

Wislocki, A.W., E.S. Bagan, AYH Lu et al. 1986. Tumorigenicity of nitrated derivatives of pyrene, benz(a)anthracene, chrysene and benzo(a)pyrene in the newborn mouse assay. Carcinogenesis. 7(8):1317-1322.

Bis(2-ethylhexyl)phthalate

Carpenter, C.P., C.S. Weil and H.F. Smyth. 1953. Chronic oral toxicity of di(2-ethylhexyl)phthalate for rats and guinea pigs. Arch. Indust. Hyg. Occup. Med. 8:219-226.

NTP (National Toxicology Program). 1982. Carcinogenesis bioassay of di-(2-ethylhexyl)-phthalate (CAS No. 117-81-7) in F344 rats and B6C3F1 mice (feed study). NTP Tech. Rep. Ser. TR No. 217, NTP, Research Triangle Park, NC.

Benzo(b)fluoranthene

Deutsch-Wenzel, R., H. Brune, G. Grimmer, G. Dettbarn and J. Misfeld. 1983. Experimental studies in rat lungs on the carcinogenicity and dose-response relationships of eight frequently occurring environmental polycyclic aromatic hydrocarbons. J. Natl. Cancer Inst. 71(3):539-543.

Lacassagne, A., N.P. Buu-Hoi, F. Zajdela, D. Lavit-Lamy and O. Chalvet. 1963. Activite cancerogene d' hydrocarbures aromatigues polycycliques a noyau fluoranthene. Un. Int. Cancer Acta. 19(3-4):490-496.

Benzo(k)fluoranthene

Deutsch-Wenzel, R., H. Brune, G. Grimmer, G. Dettbarn and J. Misfeld. 1983. Experimental studies in rat lungs on the carcinogenicity and dose-response relationships of eight frequently occurring environmental polycyclic aromatic hydrocarbons. J. Natl. Cancer Inst. 71(3):539-543.

LaVoie, E.J., J. Braley, J.E. Rice and A. Rivenson. 1987. Tumorigenic activity for non-alternant polynuclear aromatic hydrocarbons in newborn mice. Cancer Lett. 34:15-20.

LaVoie, E.J., S. Amin, S.S. Hecht, K. Furuya and D. Hoffman. 1982. Tumor initiating activity of dihydrodiols of benzo(b)fluoranthene, benzo(j)fluoranthene and benzo(k)fluoranthene. Carcinogenesis 3(1):49-52.

Van Duuren, B.L., A. Sivak, A. Segal, L. Orris and L. Langseth. 1966. The tumor-promoting agents of tobacco leaf and tobacco smoke condensate. J. Natl. Cancer Inst. 37(4):519-526.

Benzo(a)pyrene

Feron, V.J., D. Jong and P. Emmelot. 1973. Dose-response correlation for the induction of respiratory tract tumors in Syrian golden hamsters by intratracheal installations of benzo(a)pyrene. Eur. J. Cancer. 9:387.

Kobayashi, N. 1975. Production of respiratory tract tumors in hamsters by benzo(a)pyrene. Gann. 66:311.

Neal, J. and R.H. Rigdon. 1967. Gastric tumors in mice fed benzo(a)pyrene: A quantitative study. Texas Rep. Biol. Med. 25:533.

Rigdon, R.H. and J. Neal. 1966. Gastric carcinomas and pulmonary adenomas in mice fed benzo(a)pyrene. Tex. Rep. Biol. Med. 24:195.

Rigdon, R.H. and J. Neal. 1969. Relationship of leukemia to lung and stomach tumors in mice fed benzo(a)pyrene. Proc. Soc. Exp. Biol. 130:146.

Thyssen, J., J. Althoff, G. Kimmerle and U. Mohr. 1981. Inhalation studies with benzo(a)pyrene in Syrian golden hamsters. J. Natl. Cancer Inst. 66(3):575-577.

Indeno(1,2,3-cd)pyrene

Deutsch-Wenzel, R., H. Brune, G. Grimmer, G. Dettbarn and J. Misfeld. 1983. Experimental studies in rat lungs on the carcinogenicity and dose-response relationships of eight frequently occurring environmental polycyclic aromatic hydrocarbons. J. Natl. Cancer Inst. 71(3):539-543.

Hoffman, D. and E.L. Wynder. 1966. Contribution on the carcinogenic effect of dibenzopyrenes. Z. Krebsforsch. 68(2):137-149.

Lacassagne, A., N.P. Buu-Hoi, F. Zajdela, D. Lavit-Lamy and O. Chalvet. 1963. Activite cancerogene d' hydrocarbures aromatigues polycycliques a noyau fluoranthene. Un. Int. Cancer Acta. 19(3-4):490-496.

Rice, J.E., D.T. Coleman, T.J. Hosted, E.J. LaVoie, D.J. McCaustland and J.C. Wiley. 1985a. On the metabolism, mutagenicity and tumor-initiating activity of indeno(1,2,3-cd)pyrene. In: Polynuclear Aromatic Hydrocarbons: Mechanism, Methods and Metabolism, M. Cooke and A.J. Dennis, Ed. Batelle Press, Columbus, OH. p. 1097-1109.

Rice, J.E., T.J. Hosted, Jr., M.C. DeFloria, E.J. LaVoie, D.L. Fischer and J.C. Wiley, Jr. 1986. Tumor-initiating activity of major in vivo metabolites of indeno(1,2,3-cd)pyrene on mouse skin. Carcinogenesis. 7(10):1761-1764.

Pesticides/PCBs

<u>4,4'-DDT</u>

Cabral, J.R.P., R.H. Hall, L. Rossi, S.A. Bronczyk and P. Shubik. 1982. Effects of long-term intake of DDT on rats. Tumorigenesis. 68:11-17.

Laug, E.P., A.A. Nelson, O.G. Fitzhugh and F.M. Kunze. 1950. Liver cell alteration and DDT storage in the fat of the rat induced by dietary levels of 1-50 mg/kg DDT. J. Pharmacol. Exp. Therap. 98:268-273.

Rossi, L., M. Ravera, G. Repetti and L. Santi. 1977. Long-term administration of DDT or phenobarbitol-Na in Wistar rats. Int. J. Cancer. 19:179-185.

Terracini, B., M.C. Testa, J.R. Cabral and N. Day. 1973. The effects of long-term feeding of DDT to BALB/c mice. Int. J. Cancer. 11:747-764.

Thorpe, E. and A.I.T. Walker. 1973. The toxicology of dieldrin (HEOD). II. Comparative long-term oral toxicity studies in mice with dieldrin, DDT, phenobarbitone, beta-BHC and gamma-BHC. Food Cosmet. Toxicil. 11:433-442.

Tomatis L. and V. Turusov. 1975. Studies on the carcinogenicity of DDT. Gann Monograph Cancer Res. 17:219-241.

Turusov, V.S., N.E. Day, L. Tomatis, E. Gati and R.T. Charles. 1973. Tumors of CF-1 mice exposed for six consecutive generations to DDT. J. Natl. Cancer Inst. 51:983-988.

PCBs

Ito, N., H. Nagasaki, M. Arai, S. Makiura, S. Sugihara and K. Hirao. 1973. Histopathologic studies on liver tumorigenesis induced in mice by technical polychlorinated biphenyls and its promoting effect on liver tumors induced by benzene hexachloride. J. Natl. Cancer Inst. 51(5):1637-1646.

Kimbrough, R.D., R.A. Squire, R.E. Linder, J.D. Strandberg, R.J. Montali and V.W. Burse. 1975. Induction of liver tumors in Sherman strain female rats by polychlorinated biphenyl Aroclor 1260. J. Natl. Cancer Inst. 55(6):1453-1459.

Norback, D.H. and R.H. Weltman. 1985. Polychlorinated biphenyl induction of hepatocellular carcinoma in the Sprague-Dawley rat. Environ. Health Persp. 60:97-105.

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TABLE B.1-1 SUMMARY OF TOXICITY VALUES ASSOCIATED WITH NONCARCINOGENIC-SUBCHRONIC EFFECTS: ORAL

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ANADUM 77:-03 Noce observed Water/HEAST UF=100 CANIDE 2E-02 Weight loss, thyroid effects, myelin degeneration Dist/HEAST UF=100 DRON 8E-02 Weight loss, thyroid effects, myelin degeneration Dist/HEAST UF=100 DRON NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RONTIDM NA NA NA NA NA RECONNUM NA Effects NA NA NA RECONNUM SE-02 Increased liver and kidney weight NA NA READADDEDER SE-01 Increased liver and kidney weight Cavae/HEAST UF=100 RUDRONGTHANE SE-01 Hepatotaxicity NA NA RUDRONGTHANE<		,		In manual SCOT and annum I DU Invalantan		
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HLORADORM 1E-02 Liverleinos HEAST UF=100 BUTANONE 5E-01 Fetotoxicity HEAST UF=100 N.ITRICHLOROETHANE 9E-01 Hepatotoxicity NAHEAST UF=100 NACENCE NA NAHEAST NAHEAST UF=100 NACENCE 1E-01 Hepatotoxicity Gavage/HEAST UF=100 NAHEAST UF=100 Changes in liver and kidney weight HEAST UF=100 NAHEAST UF=100 Changes in liver and kidney weight HEAST UF=100 LORNO 1E+00 Hepatotoxicity, apphrotoxicity Oral/HEAST UF=100 BASE NEUTRAL / ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 BASE NEUTRAL / ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 NZOIC ACID 4E+00 Irritation, malaise Diet/HEAST UF=100 NZOIC ACID 4E+00 Irritation, malaise Diet/HEAST UF=100 NZOIC ACID 4E+00 Lorereased body weight gain Gavage/HEAST UF=100 NATHEAST UF=100 Decreased body weight gain Gavage/HEAST UF=100 NATHEAST UF=100 Decreased body weight gain Gavage/HEAST UF=100 </td <td>ARBON DISULFIDE</td> <td>1E-01</td> <td></td> <td>Fetal toxicity, malformation</td> <td>Inhalation/HEAST</td> <td>UF=100</td>	ARBON DISULFIDE	1E-01		Fetal toxicity, malformation	Inhalation/HEAST	UF=100
HLORDORM 1E-02 Liverleisons HEAST UF=100 BUTANONS 5E-01 Fetotoxicity HEAST UF=100 NA HEAST UF=100 NAHEAST UF=100 INCHLOROETHANE 9E-01 Hepatotoxicity HEAST UF=100 NAHEAST NAHEAST NAHEAST UF=100 SNZENE NA NAHEAST UF=100 DUENE 1E-01 Hepatotoxicity, aphotoxicity Gavage/HEAST UF=100 DUENE 1E+00 Hepatotoxicy, aphotoxicity Oral/HEAST UF=100 DUENE 1E+00 Reproductive effects Water/HEAST UF=100 BASE NEUTRAL / ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 NON cockard 1E=03 Immuse function Water/HEAST UF=100 NOCICACID 4E+00 Irritation, malaise Diet/HEAST UF=100 NATE/HEAST UF=100 Irritation, malaise Diet/HEAST UF=100 NATOR/HENOL 1E+00 Irritation, malaise Diet/HEAST UF=100 NATOR/HENOL 1E+00 Hepatotoxiciy and kidney effects Diet/HEAST UF=100 NATROPHENOL 1E+00 Hepatotoxicy and kidney effects Diet/HEAST	2-DICHLORETHENE (total)	1E-01		Decreased hematocrit and hemoglobin	Gavage/HEAST	UF=300
BUTANONE 5E-01 Ferotoxicity HEAST UF=100 ITRICHCROETHANE 9E-01 Hepatotoxicity NAHEAST UF=100 RICHLOROETHENE 1E-01 Hepatotoxicity Gavage/HEAST UF=100 SNZENE NA Hepatotoxicity Gavage/HEAST UF=100 DLUENE 2E+00 Changes in liver and kichey weight HEAST UF=100 DLUENE 2E+00 Hepatotoxicity, nephrotoxicity Oral/HEAST UF=100 BASE NEUTRAL / ACIDS IE+00 Hepatotoxicity, nephrotoxicity Oral/HEAST UF=100 BASE NEUTRAL / ACIDS IE+00 Refuced fetal body weight Gavage/HEAST UF=100 BASE NEUTRAL / ACIDS IE+00 Initation, malaise Dist/HEAST UF=100 BASE NEUTRAL / ACIDS IE+00 Initation, malaise Dist/HEAST UF=100 CHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 CACIDO 4E+00 Decrease body weight gain Gavage/HEAST UF=100 CHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 NATHEAST 2E+00 Decrease body weight gain Gavage/HEAST UF=100 NATHEAST 3E-02 Petotoxicity Gavage/HEAST		1E-02				UF=1000
h_1-TRICHLOROETHANE 9E-01 Hepstotoxicity HEAST UF=100 RCHLD ROETHENE NA NA/HEAST NA/HEAST NA/HEAST ENZENE 1E-01 Hepstotoxicity Gavage/IEAST UF=100 DUENE 2E+00 Changes in liver and kidey weight HEAST UF=100 THYLEBNZENE 1E+00 Hepstotoxicity, nephotoxicity Oral/HEAST UF=100 BASE NEUTRAL/ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHLOROPHENOL 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 ENZOLACID 4E+00 Irritation, makine Diet/HEAST UF=100 CHLOROPHENOL 3E-03 Lamune function Water/HEAST UF=100 APHTHALENE 4E+00 Irritation, makine Diet/HEAST UF=100 CHLOROPHENOL 3E-03 Decrease dody weight gain Gavage/HEAST UF=100 APHTHALENE XA VF=100 Hepstotoxicity and kidey effects Na/HEAST UF=100 APHTHALENE NA No Gavage/HEAST UF=100 VF=100 APHTHALENE NA Na Na/HEAST UF=100 NATHEAST 1E+00 Hepstotoxicity and kidey effects Diet/IEAST						UF=100
NACHLOROETHENE NA NA/HEAST BYZENE NA Hepatotoxicity NA/HEAST DUENE 2E+00 Changes in liver and kidney weight Gavage/HEAST UF=100 DUENE 1E+00 Hepatotoxicity, nephrotoxicity Oral/HEAST UF=100 BASE NEUTRAL/ACIDS 1E+00 None observed HEAST UF=100 BASE NEUTRAL/ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHLOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=100 CHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 CHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 CHLOROPHENOL 2E+00 Decreased body weight gain Gavage/HEAST UF=100 -CHLOROPHENOL 2E+00 Decreased body weight gain Oral/? UF=100 -NITROPHENOL 2E+00 Hepatotoxicity and kidney effects Diet/HEAST UF=100 -NITROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 -NITROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=300 UORANTHENE AE-01 Nohtesreed effects Gavage/HEAST UF=300 UORANTHENE AE-01 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
ENZENE NA NA/HEAST ETRACHLOROFTHENE 1E-01 Hepatotoxicity Gavage/HEAST UF=100 DULUENE 2E+00 Hepatotoxicity Oral/HEAST UF=100 TYLENE (trail) 4E+00 Hepatotoxicity Oral/HEAST UF=100 BASE NEUTRAL/ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHLOROPHENOL 5E-03 Reproductive effects WaterHEAST UF=100 CHLOROPHENOL 4E-00 Inmaune function WaterHEAST UF=100 CHLOROPHENOL 4E-02 Decreased body weight gain Gavage/HEAST UF=100 CHLOROPHENOL 4E-02 Decreased body weight gain Gavage/HEAST UF=100 CHLORO-3-METHYLPHENOL 2E+00 Decreased body weight gain Gavage/HEAST UF=100 CHLORO-3-METHYLPHENOL 1E+00 Hepatotoxicity and kidney effects Diet/HEAST UF=100 NATHEAENE NA NA NA/HEAST UF=100 NATHEAENE NA NA NA/HEAST UF=100 NATHACTIOROPHENOL 3E-02 Petotoxicity and kidney effects Diet/HEAST UF=100 NATHEAST UF=100 NA/HEAST UF=100 NA/HEAST UF=100 NTRACIBL				i inclusion in the second second		
ETRACHLOROETHENE IE-01 Hepatoxicity Gavage/HEAST UF=100 DLUENE 2E+00 Changes in liver and kidney weight HEAST UF=100 DLUENE 1E+00 Hepatoxicity, nephrotoxicity Oral/HEAST UF=100 BASE NEUTRAL/ACIDS 4E+00 None observed HEAST UF=100 BASE NEUTRAL/ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=100 AZOIC ACID 4E+00 Immune function Water/HEAST UF=100 1-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 2-01CHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 4-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 0-CHLORO-3-METHYLPHENOL 2E+00 Decrease in weight gain Orar/? UF=100 45-TRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/HEAST UF=100 -DITIROFOLUENE NA NA/HEAST UF=100 NA/HEAST UF=100 -DITIROFORMENOL 3E-02 Fetotoxicity Na/HEAST UF=100 UNCALOROPHENOL 3E-03 No observed effects<						
OLUDRE2E+00Changes in liver and tidney weightHEASTUF=100THYLBENZENE1E+00Hepatotxicity, nephrotoxicityOral/HEASTUF=100TLENE (tota)4E+00None observedHEASTUF=100BASE NEUTRAL / ACIDS6E-01Reduced fetal body weightGavage/HEASTUF=100CHLOROPHENOL5E-03Reproductive effectsWater/HEASTUF=100ENZOLC ACID4E+00Irritation, malaiseDiet/HEASTUF=100CHLOROPHENOL3E-03Immune functionWater/HEASTUF=100CHLOROPHENOL2E+00Decrease in weight gainGavage/HEASTUF=100CHLOROPHENOL1E+00Hepatotxicity and kidney effectsDiet/HEASTUF=100APHTHALENENANocleave in weight gainGavage/HEASTUF=100ASTRICHLOROPHENOL1E+00Hepatotxicity and kidney effectsDiet/HEASTUF=100NITHRACENENANobserved effectsGavage/HEASTUF=100NTHRACENENANobserved effectsGavage/HEASTUF=100UDENATTIRENENANobserved effectsGavage/HEASTUF=300UTVLBRATTPHENENANobserved effectsGavage/HEASTUF=300UDANTHENEXE-01Nephropathy, liver weight gain,testes,liverDiet/HEASTUF=100UTVLBRATTPHENENANANA/HEASTUF=100NUDENCLUPHTHALATE2E+00Effects on body weight gain,testes,liverGavage/HEASTUF=300UTVLBRATTPHENENANANA/HEAST<						115 400
THYLERZENE 1 E+00 Hepatotoxiciy, nephrotoxicity Oral/HEAST UF=100 BASE NEUTRAL / ACIDS 4E+00 None observed HEAST UF=100 BASE NEUTRAL / ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHLOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=100 4-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 4-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 4-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 6-DICHORO-3-METHYLPHENOL 2E+00 Decreased body weight gain Gavage/HEAST UF=100 4-DITROTOLUSNE NA Hepatotoxiciy and kidney effects Diet/HEAST UF=100 4-DITROTOLUSNE NA Non observed effects Gavage/HEAST UF=100 1-n-BUTYLPHALATE 1E+00 No observed effects Gavage/HEAST UF=100 1-n-BUTYLPHALATE 1E+00 No observed effects Gavage/HEAST UF=100 1/1-n-BUTYLPHALATE 1E+00 No observed effects Gavage/HEAST UF=100 1/1-n-BUTYLPHALATE 1E+00 No observed effects Gavage/HEAST UF=100 1/1-n-BUTYLPHALATE <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
YLENE (total) 4E+00 None observed HEAST UF=100 BASE NEUTRAL / ACIDS 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 CHLO ROPHENOL 5E-03 Reproductive effects Water/HEAST UF=100 CHLO ROPHENOL 3E-03 Immune function Water/HEAST UF=100 APHTHALENE c 4E-02 Decreased body weight gain Gavage/HEAST UF=100 APHTHALENE c 4E-02 Decreased body weight gain Gavage/HEAST UF=100 APHTHALENE c 4E-02 Decreased body weight gain Gavage/HEAST UF=100 AS-TRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS UF=100 NTROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NTRACENE 3E+00 No observed effects Gavage/HEAST UF=300 In-n=DUTY.PHALATE 1E+00 No observed effects Gavage/HEAST UF=300 Increased relative liver weight damages. Gavage/HEAST UF=300 NA/HEAST UVRABURYLIPHHALATE 1E+00 No observed effects Gavage/HEAST UF=300 UVRABURYLIPHALATE 1E+00 Nortality Diet/HEAST UF=300 VTMUBRAVLIPHENE 4E-01 Nephropath				Changes in liver and kidney weight		
BASE NEUTRAL / ACIDS GE-01 Reduced fetal body weight Gavage/HEAST UF=100 -CHLOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=100 A-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 A-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 APHTHALENE c 4E-02 Decrease id body weight gain Gavage/HEAST UF=100 APHTHALENE c 4E-02 Decrease id body weight gain Gavage/HEAST UF=100 45-TRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IEAST UF=100 4-DINTROTOLUENE NA YF=100 NA/HEAST UF=100 4-DINTROTOLUENE NA NA/HEAST UF=100 HENANTRHENE NA No observed effects Diet/HEAST UF=100 LUORANTHENE 4E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 LUORANTHENE 4E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 LUORANTHENE 1E+00 Nephropathy, liver weight changes, Gavage/HEAST UF=100 LUORANTHENE NA NA/HEAST UF=100 NA/HEAST LUORANTHENE NA NA NA/HEAST UF=1000/MF=1	FH YLBENZENE	1E+00] Oral/HEAST	
HENOL 6E-01 Reduced fetal body weight Gavage/HEAST UF=100 -CHLOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=1000 APDCHLOROPHENOL 3E-03 Inritation, makise Diet/HEAST UF=1 4-DICHLOROPHENOL 3E-03 Inritation, makise Diet/HEAST UF=1 4-DICHLOROPHENOL 3E-02 Decreased hody weight gain Gavage/HEAST UF=100 -CHLORO-3-METHYLPHENOL 2E+00 Decrease in weight gain Oral/? UF=100 -CHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS UF=100 -CHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS UF=100 -STACHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 +DINTROTOLUENE NA No MA/HEAST UF=100 NTRACHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=300 NTRACHLOROPHENOL 3E-02 No observed effects Gavage/HEAST UF=300 NUPANTHRENE NA No No/HEAST UF=300 No/HEAST UPRENE/YLPHALATE 2E+00 Effects on body weight gain, testes,liver Diet/HEAST UF=1000(MF=300) NZO(a)ANTHENE NA	YLENE (Lotal)	4E+00		None observed	HEAST	UF=100
HENOL6E-01Reduced fetal body weightGavage/(HEASTUF=100-CHLOROPHENOL5E-03Reproductive effectsWater/HEASTUF=1000NZOIC ACID4E+00Irritation, makiseDiet/IHEASTUF=1DICHLOROPHENOL3E-03Immune functionWater/HEASTUF=100DICHLOROPHENOL3E-03Immune functionWater/HEASTUF=100DICHLOROPHENOL2E+00Decreased hody weight gainOral/?UF=100-CHLORO-3-METHYLPHENOL2E+00Decrease in weight gainOral/?UF=100-CHLOROPHENOL1E+00Hepatotoxiciy and kidney effectsDiet/IRISUF=100NITROPHENOL3E-02FetotoxicityGavage/HEASTUF=100+-DINTROTOLUENENANANA/HEASTUF=100NTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF=100+-DINTROTOLUENENANANo observed effectsGavage/HEASTUF=300NTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF=300NTRACHENCNANo observed effectsGavage/HEASTUF=300NOANTHENEAE-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF=300NZO(A)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACEN		i i			1	i
HENOL6E-01Reduced fetal body weightGavage/(HEASTUF=100-CHLOROPHENOL5E-03Reproductive effectsWater/HEASTUF=1000NZOIC ACID4E+00Irritation, makiseDiet/IHEASTUF=1DICHLOROPHENOL3E-03Immune functionWater/HEASTUF=100DICHLOROPHENOL3E-03Immune functionWater/HEASTUF=100DICHLOROPHENOL2E+00Decreased hody weight gainOral/?UF=100-CHLORO-3-METHYLPHENOL2E+00Decrease in weight gainOral/?UF=100-CHLOROPHENOL1E+00Hepatotoxiciy and kidney effectsDiet/IRISUF=100NITROPHENOL3E-02FetotoxicityGavage/HEASTUF=100+-DINTROTOLUENENANANA/HEASTUF=100NTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF=100+-DINTROTOLUENENANANo observed effectsGavage/HEASTUF=300NTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF=300NTRACHENCNANo observed effectsGavage/HEASTUF=300NOANTHENEAE-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF=300NZO(A)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACENENANANA/HEASTUF=100C/MF=1NZO(a)ANTHRACEN	BASENEUTRAL/ACIDS	i i			Ì	i
CHLOROPHENOL 5E-03 Reproductive effects Water/HEAST UF=1000 SNZOIC ACID 4E+00 Irritation, malaise Diet/HEAST UF=1 SNZOIC ACID 4E+00 Irritation, malaise Diet/HEAST UF=100 APHTHALENE c 4E-02 Decreased body weight gain Gavage/HEAST UF=100 CHLORO-3-METHYLPHENOL 2E+00 Decrease in weight gain Oral/? UF=100 SNTACHLOROPHENOL 1E+00 Hepatotoxicity and kidney effects Diet/HEAST UF=100 NTROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NATHEAST NA/HEAST UF=100 NA/HEAST UF=100 NTRACHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=300 In-n=DUTV.PHALATE 1E+00 No observed effects Gavage/HEAST UF=300 In-n=DUTV.PHALATE 1E+00 Mortality Diet/HEAST UF=300 I.ORANTHENE 4E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 I.NZO(a)ANTHENE 4E-01 Na/HEAST UF=100 NZO(a)ANTHENE NA NA/HEAST UF=100 NZO(a)ANTHENE AE-01 Reanal effects Gavage/HEAST UF=300 NZO(a)ANTHENE NA		6E_01		Peduced fetal body weight	Gavage/HEAST	UE-100
ENZOIC ACID 4 E+00 Infration_malaise Diet/IEAST UF=1 4-DICHLOROPHENOL 3E-03 Immune function Water/HEAST UF=100 AHTTHALENE c 4E-02 Decreased body weight gain Gravge/HEAST UF=100 CHLORO-3-METHYLPHENOL 2E+00 Decreased body weight gain Oral/? UF=100 SoTRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IEIS UF=100 NITROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NATRICHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NATRACENE NA NA/HEAST UF=100 NA/HEAST UF=100 NTHRACENE NA NA/HEAST UF=100 NA/HEAST UF=100 JUORANTHENE NA Na/HEAST UF=100 NA/HEAST UF=100 JUORANTHENE 4E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 JUORANTHENE 4E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 UTYLBENZYLPHTHALATE 2E+00 Effects on body weight gain,testes,liver Diet/HEAST UF=100 NAZOLOPANTHENE NA NA/HEAST UF=1000 NA/HEAST NA/HEAST MAZOLOPL						1
I-DICHLOROPHENOL3E-03Immune functionWater/HEASTUF=100APHTHALENE c4E-02Decreased body weight gainGavage/HEASTUF=1000CHLORO-3-METHYLPHENOL1E+00Hepatotoxiciy and kidney effectsDiet/IRISUF=100NITROPHENOL1E+00Hepatotoxiciy and kidney effectsDiet/IRISUF=100NITROPHENOL3E-02FetotoxicityGavage/HEASTUF=100NITROPHENOL3E-02No observed effectsGavage/HEASTUF=300NTHACENENANo observed effectsGavage/HEASTUF=300LongANTHENE1E+00MotalityDiet/IEASTUF=300LongANTHENE3E-01Reanal effectsGavage/HEASTUF=300VIRCALENT2E+00Effects on body weight gain, testes, liverDiet/HEASTUF=300VIRCALANTHACENENANANA/HEASTUF=100NACOLORANTHENEXANANA/HEASTUF=300VIRCALANTHACENEXANANA/HEASTUF=100NEQUSALUDARANTHENENANANA/HEASTUF=100NZO(a)ANTHRACENENANANA/HEASTUF=1000,MF=1NZO(a)ANTHRACENENANANA/HEASTUF=1000,MF=1NZO(a)ANTHRACENENANANA/HEASTUF=1000,MF=1NZO(a)PTRENENANANA/HEASTUF=1000,MF=1NZO(a)PTRENENANANA/HEASTUF=1000,MF=1NZO(a)PTRENENANANA/HEASTNA/HEASTPESTICIDES/ PCFSFE-04						
APHTHALENE c 4E-02 Decreased body weight gain Gavage/HEAST UF=1000 CHLORO-3-METHYLPHENOL 2E+00 Decrease in weight gain Oral/? UF=100 S-TRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS UF=100 -NITROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NTACHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=300 NAMHEAST NA No observed effects Gavage/HEAST UF=300 NORANTHENE 1E+00 Mortality Diet/IRAST UF=300 JUORANTHENE 4E-01 No observed effects Gavage/HEAST UF=300 JUORANTHENE 4E-01 No observed effects Gavage/HEAST UF=300 NZOROJANTHRACENE 3E-01 Nephropathy, liver weight changes, Gavage/HEAST UF=300 NZOGAJANTHRACENE NA Effects on body weight gain,testes,liver NA/HEAST UF=1000',MF=100' NZOGO/ANTHRACENE NA Increased relative liver weight NA/HEAST UF=100' NZOGO/SUC/FUORANTHENE NA Increased relative liver weight NA/HEAST NA/HEAST NZOGO/SPRENE NA NA/HEAST NA/HEAST NA/HEAST NZOGO/SPRENE NA </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
CHLORO-3-METHYLPHENOL 2E+00 Decrease in weight gain Öral/? UF=100 15-TRICHLOROPHENOL 1E+00 Hepatotoxicity and kidney effects Diet/IRIS UF=100 1-DINTROTOLUENE NA SE-02 Fetotoxicity NA/HEAST UF=100 1-DINTROTOLUENE NA SE-02 Fetotoxicity NA/HEAST UF=100 1-DINTROTOLUENE NA NA No observed effects Gavage/HEAST UF=100 1-n-BUTYLPHALATE 1E+00 Mortality Diet/TEAST UF=300 1-n-BUTYLPHALATE 1E+00 Mortality Diet/HEAST UF=300 1-n-BUTYLPHALATE 2E+00 Reanal effects Gavage/HEAST UF=300 17TLBENZYLPHTHALATE 2E+00 Effects on body weight gain,testes,liver Diet/HEAST UF=100 NZO(a)ANTHRACENE NA Increased relative liver weight NA/HEAST NA/HEAST NZO(s)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST NZO(s)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST NZO(s)AUPRENE NA NA NA/HEAST NA/HEAST NZO(s)AUPRENE NA NA/HEAST NA/HEAST NZO(s)AUPRENE NA NA/HEAST NA/HEAST <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td>						•
45-TRICHLOROPHENOL 1E+00 Hepatotoxiciy and kidney effects Diet/IRIS UF=100 NTROPHENOL 3E-02 Fetotoxicity and kidney effects NA/HEAST UF=100 SNTACHLOROPHENOL 3E-02 Fetotoxicity Gavage/HEAST UF=100 NNTRACENE NA No observed effects Gavage/HEAST UF=300 IENANTHRENE 1E+00 Mortality Diet/IRIS UF=300 In-BUTYLPHALATE 1E+00 Mortality Diet/HEAST UF=300 UORANTHENE 4E-01 Nephropathy, liver weight changes, Reanal effects Gavage/HEAST UF=300 UTYLBENZYLPHTHALATE 2E+00 Effects on body weight gain,testes, liver Diet/HEAST UF=100 NAZO(a)ANTHRACENE NA Increased relative liver weight NA/HEAST UF=1000;MF=1 NZO(a)ANTHRACENE NA Increased relative liver weight NA/HEAST UF=1000;MF=1 NZO(a)ANTHENE NA NA NA/HEAST UF=1000;MF=1 NZO(a)ANTHENE NA Increased relative liver weight Na/HEAST UF=1000;MF=1 NZO(a)PTYLENE NA NA NA/HEAST NA/HEAST NA/HEAST NZO(a)PTYLENE NA NA NA/HEAST NA/HEAST NA/HEAST NZO(a)PT						
-NITROPHENOL DINITROTOLUENE NA DINITROTOLUENE NA H-DINITROTOLUENE NA INTGRUENCU 3E-02 HENANTHRENE NA NA IL-n-BUTYLPHALATE 1E+00 UORANTHENE 4E-01 UORANTHENE 4E-01 Nephropathy, liver weight changes, Reanal effects Gavage/HEAST UF =300 Mortality Dist/HEAST UF =300 Nephropathy, liver weight changes, Gavage/HEAST UF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =300 IF =100 NA/HEAST UF =300 IF =100 NA/HEAST UF =100 NA/HEAST IVF =100 NA/HEAST IVF =1000;MF =1 NA/HEAST NA						
h-DINITROTOLUENE NA INTACHLOROPHENOL 3E-02 INTACHLOROPHENOL 3E-02 INTACHLOROPHENOL 3E-02 IENANTHRENE NA INTACHLOROPHENOL 3E-02 IENANTHRENE NA INTACENE 3E+00 No observed effects Gavage/HEAST UF = 100 Mortality JUORANTHENE 4E-01 NORMUTHENE 4E-01 NEENZYLPHALATE 2E+00 REAND Reanal effects Gavage/HEAST UF = 300 JUORANTHRACENE 3E-01 Reanal effects Gavage/HEAST UF = 300 Reanal effects Gavage/HEAST UF = 300 JTYL BENZYLPHTHALATE 2E+00 ENZO(a)ANTHRACENE NA NA Effects on body weight gain,testes,liver NA/HEAST UF = 1000;MF = 1 NA/HEAST NA/HEAST Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA Stocolopicuoranthene NA		1E+00		Hepatotoxiciy and kidney effects	Diet/IRIS	UF=100
ENTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF = 100HENANTHRENENANANA/HEASTNA/HEASTUF = 300HENANTHRENE3E+00No observed effectsGavage/HEASTUF = 300I-n-BUTYLPHALATE1E+00MortalityDiet/HEASTUF = 300UORANTHENE4E-01Nephropathy, liver weight changes, RENEGavage/HEASTUF = 300JUORANTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 300INZO(a)ANTHRACENENAEffects on body weight gain, testes, liverDiet/HEASTUF = 100NAZO(a)ANTHRACENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1NZO(b)FLUORANTHENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1ENZO(a)PYRENENANANA/HEASTNA/HEASTNEXO(b)FLUORANTHENENANA/HEASTNA/HEASTIncreased relative liver weightPESTICIDES / PCB'SNANA/HEASTNA/HEASTN-DDT5E-04NANA/HEASTNA/HEASTNACLOR-1288NANANA/HEASTNA/HEASTNACLOR-1284NANANA/HEASTNA/HEAST	NITROPHENOL	l i		1	J	1
ENTACHLOROPHENOL3E-02FetotoxicityGavage/HEASTUF = 100HENANTHRENENANANA/HEASTNA/HEASTUF = 300HENANTHRENE3E+00No observed effectsGavage/HEASTUF = 300I-n-BUTYLPHALATE1E+00MortalityDiet/HEASTUF = 300UORANTHENE4E-01Nephropathy, liver weight changes, RENEGavage/HEASTUF = 300JUORANTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 300ITYLBENZYLPHTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 100NZO(a)ANTHRACENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1NZO(b)FLUORANTHENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1ENZO(a)PYRENENANANA/HEASTNA/HEASTNEXO(b)FLUORANTHENENANANA/HEASTNA/HEASTNEXO(g,h,i)PERYLENENANANA/HEASTNA/HEASTPESTICIDES / PCB'SNANA/HEASTNA/HEASTNA/HEASTNOCLOR - 128NANANA/HEASTNA/HEASTROCLOR - 1284NANANA/HEASTNA/HEAST		NA I		İ	NA/HEAST	1
HENANTHRENENANANTHRACENE3E+00No observed effectsGavage/HEASTUF = 300I-n-BUTYLPHALATE1E+00MortalityDiet/HEASTUF = 300UORANTHENE4E-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF = 300YRENE3E-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF = 300JTYLBENZYLPHTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 100NAZO(a)ANTHRACENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1NZO(a)ANTHENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1NZO(b)FLUORANTHENENANANA/HEASTNA/HEASTNZO(a)PYRENENANANA/HEASTNA/HEASTNZO(a)PYRENENANANA/HEASTNA/HEASTNZO(g,b,i)PERYLENENANANA/HEASTNA/HEASTPESTICIDES / PCB'SIncreasedNANA/HEASTNA/HEASTNACLOR -1236NANANA/HEASTNA/HEASTNANANANA/HEASTNA/HEASTNANANANA/HEASTNA/HEAST				Fetotoxicity		ÚF=100
NTHRACENE3E+00No observed effectsGavage/HEASTUF = 300n-BUTYLPHALATE1E+00MortalityDiet/HEASTUF = 100JUORANTHENE4E-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF = 300JUORANTHENE3E-01Reanal effectsGavage/HEASTUF = 300JTYLBENZYLPHTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 100INZO(a)ANTHRACENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1INZO(b)FLUORANTHENENAIncreased relative liver weightDiet/HEASTUF = 1000; MF = 1INZO(a)PYRENENAIncreased relative liver weightNA/HEASTUF = 1000; MF = 1INZO(a)PYRENENANANA/HEASTNA/HEASTINZO(a)PYRENENANANA/HEASTNA/HEASTINZO(g, h, i)PERYLENENANANA/HEASTNA/HEASTPESTICIDES/ PCFSIncreasedNANA/HEASTNA/HEASTI-DDT5E-04NANA/HEASTNA/HEASTROCLOR-1234NANANA/HEASTNA/HEAST						
ImportImportImportDiet/HEASTUF = 100UURANTHENE4E-01Nephropathy, liver weight changes, Reanal effectsGavage/HEASTUF = 300VRENE3E-01Reanal effectsGavage/HEASTUF = 300ITYLBENZYLPHTHALATE2E+00Effects on body weight gain,testes,liverDiet/HEASTUF = 100NXZO(a)ANTHRACENENAIncreased relative liver weightDiet/HEASTUF = 1000;MF = 1NZO(b)FLUORANTHENENAIncreased relative liver weightDiet/HEASTUF = 1000;MF = 1NZO(c)PTRENENAIncreased relative liver weightNA/HEASTUF = 1000;MF = 1NZO(a)PTRENENANA/HEASTNA/HEASTIncreased relative liver weightNA/HEASTNZO(a)PTRENENANANA/HEASTNA/HEASTPESTICIDES / PCB'SIncreased NANA/HEASTNA/HEASTI-DDT5E-04NANA/HEASTNA/HEASTROCLOR-1254NANA/HEASTNA/HEAST				No observed effects		UF=300
LUORANTHENE4E-01Nephropathy, liver weight changes, RENEGavage/HEASTUF = 300 Gavage/HEASTTYLBENZYLPHTHALATE2E+00Effects on body weight gain, testes, liverDiet/HEASTUF = 100NZO(a)ANTHRACENENAEffects on body weight gain, testes, liverDiet/HEASTUF = 100NA/HEASTNAIncreased relative liver weightDiet/HEASTUF = 1000; MF = 1NZO(b)FLUORANTHENENAIncreased relative liver weightDiet/HEASTUF = 1000; MF = 1NZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTNZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTNZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTNZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTNZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTNZO(g, h, i) PENTICIDES / PCB'SSE-04NANA/HEASTPESTICIDES / PCB'SIncreased NANA/HEASTNA/HEASTNZO(C)(F-1248NANANA/HEASTNA/HEASTNANA/HEASTNA/HEASTNANA/HEASTNA/HEASTNA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/HEASTNANA/H						
KENE3E-01Reanal effectsGavage/HEASTUF = 300UTYLBENZYLPHTHALATE2E+00Effects on body weight gain,testes,liverDiet/HEASTUF = 100ENZO(a)ANTHRACENENANA/HEASTNA/HEASTNA/HEASTINYSENENAIncreased relative liver weightDiet/HEASTUF = 1000;MF = 1(2-ETHYLHEXYL)PHTHALATE2E-02Increased relative liver weightDiet/HEASTUF = 1000;MF = 1ENZO(b)FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTENZO(c)(FLUORANTHENENANA/HEASTNA/HEASTNA/HEASTENZO(c)(1,2,3-cd)PYRENENANA/HEASTNA/HEASTIncreased relative liver weightNA/HEASTENZO(g,h,i)PERYLENENANA/HEASTNA/HEASTIncreased relative liver weightNA/HEASTENZO(g,h,i)PERYLENENANA/HEASTNA/HEASTIncreased relative liver weightNA/HEASTENZO(g,h,i)PERYLENENANA/HEASTNA/HEASTIncreased relative liver weightNA/HEASTPESTICIDES / PCB'SIncreased relative liverNA/HEASTNA/HEASTIncreased relative liverI-DDT5E-04NANA/HEASTNA/HEASTROCLOR-1248NANANA/HEASTIncreased relative liverROCLOR-1254NANA/HEASTNA/HEAST						
JTYLBENZYLPHTHALATE 2E+00 Effects on body weight gain,testes,liver Diet/HEAST UF=100 INZO(a)ANTHRACENE NA NA/HEAST NA/HEAST IRYSENE NA Increased relative liver weight Na/HEAST UC-ETHYLHEXYL)PHTHALATE 2E-02 Increased relative liver weight Na/HEAST ENZO(b)FLUORANTHENE NA NA/HEAST UF=1000;MF=1 ENZO(a)PYRENE NA NA/HEAST UF=1000;MF=1 ENZO(a)PYRENE NA NA/HEAST NA/HEAST DENO(1,2,3-cd)PYRENE NA NA/HEAST NA/HEAST NZO(g,b,i)PERYLENE NA NA/HEAST NA/HEAST PESTICIDES/ PCB'S Increased relative NA/HEAST I-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST				Nephropainy, liver weight changes,		
ENZO(a)ANTHRACENE NA IRYSENE NA IRYSENE NA I(2-ETHYLHEXYL)PHTHALATE 2E-02 INCO(b)FLUORANTHENE NA ENZO(b)FLUORANTHENE NA ENZO(a)PYRENE NA ENZO(a)PYRENE NA DENO(12,3-cd)PYRENE NA DENO(12,3-cd)PYRENE NA PESTICIDES / PCB'S NA I-DDT 5E-04 ROCLOR-1248 NA ROCLOR-1254 NA						
IRYSENE NA NA/HEAST (2-ETHYLHEXYL)PHTHALATE 2E-02 Increased relative liver weight Diet/HEAST UF = 1000;MF = 1 INZO(b)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST SNZO(a)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST IDENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST				Effects on body weight gain, testes, liver		UF=100
(2-ETHYLHEXYL)PHTHALATE 2E-02 Increased relative liver weight Diet/HEAST UF = 1000;MF = 1 ENZO(b)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST ENZO(a)PYRENE NA NA/HEAST NA/HEAST DENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST ENZO(a),i)PERYLENE NA NA/HEAST NA/HEAST ENZO(a,b,i)PERYLENE NA NA/HEAST NA/HEAST I-DDT 5E-04 NA/HEAST NA/HEAST ROCLOR-1248 NA NA/HEAST NA/HEAST		NA		1	NA/HEAST	
(2-ETHYLHEXYL)PHTHALATE 2E-02 Increased relative liver weight Diet/HEAST UF = 1000;MF = 1 ENZO(b)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST ENZO(a)PYRENE NA NA/HEAST NA/HEAST DENO(12,3-cd)PYRENE NA NA/HEAST NA/HEAST ENZO(a),i)PERYLENE NA NA/HEAST NA/HEAST ENZO(a,b,i)PERYLENE NA NA/HEAST NA/HEAST I-DDT 5E-04 NA/HEAST NA/HEAST ROCLOR-1248 NA NA/HEAST NA/HEAST	IRYSENE	NA				1
NZO(b)FLUORANTHENE NA NA/HEAST NZO(c)FLUORANTHENE NA NA/HEAST NA/HEAST NA/HEAST NA/HEAST NA/HEAST NA/HEAST NA/HEAST NZO(g,b,i)PERYLENE NA NA PESTICIDES/ PCB'S I-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA NA/HEAST				Increased relative liver weight		UF=1000:MF=1
ENZO(b)FLUORANTHENE NA NA/HEAST ENZO(a)PYRENE NA NA/HEAST DENO(1,2,3d)PYRENE NA NA/HEAST ENZO(g,b,i)PERYLENE NA NA/HEAST PESTICIDES/ PCB'S I-DDT SE-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST						
ENZO(a)PYRENE NA NA/HEAST DENO(1,2,3-cd)PYRENE NA NA/HEAST ENZO(g,h,i)PERYLENE NA NA/HEAST PESTICIDES/ PCB'S NA NA/HEAST I-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST						j
IDENO(12,3-cd)PYRENE NA NA/HEAST ENZO(g,h,i)PERYLENE NA NA/HEAST PESTICIDES/PCB'S I-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA NA/HEAST ROCLOR-1254 NA NA/HEAST						
ENZO(g,h,i)PERYLENE NA NA/HEAST PESTICIDES/PCB'S Image: constraint of the second secon				,		1
PESTICIDES/PCB'S A-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST				1		
J-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST	ENZO(g,h,i)PERYLENE	NA			NA/HEAST	
J-DDT 5E-04 NA/HEAST ROCLOR-1248 NA NA/HEAST ROCLOR-1254 NA NA/HEAST						
ROCLOR - 1248 NA NA/HEAST ROCLOR - 1254 NA NA/HEAST	PESTICIDES / PCB'S	Í			1	1
ROCLOR - 1248 NA NA/HEAST ROCLOR - 1254 NA NA/HEAST		5E04		İ	NA/HEAST	
ROCLOR-1254 NA DI NA/HEAST						j
				1		

NA:Not available

TABLE 8.1-2 SUMMARY OF TOXICITY VALUES ASSOCIATED WITH NONCARCINOGENIC-SUBCHRONIC EFFECTS: INHALATION

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COMPOUND NAME	SUBCHRONIC RFC (INHALATION)	CONFIDENCE	CRITICAL	INHALATION RFD BASIS/	UNCERTAINTY AND
-	(mo/ko/dav)	LEVEL	EFFECT	SOURCE	MODIFYING FACTORS
	NAME AND ADDRESS OF A DRESS OF A DRESS OF A DRESS OF A DRESS OF A DRESS OF A DRESS OF A DRESS OF A DRESS OF A D			, ATTACCOLOGICA CONTRACTORIA CONTRACTORIA CONTRACTORIA CONTRACTORIA CONTRACTORIA CONTRACTORIA CONTRACTORIA CONT	LANDAN MALAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTAN MALANTA
INORGANICS	NA			NA/HEAST	
ALUMINUM	4.00E-04				
ARSENIC (1)	1.00E-03				
BARIUM	1.00E-03		Fetotoxicity	HEAST	UF=100
(BERYLLIUM (a)	5.00E03 1.00E03				
CADMIUM (a)	NA				
CHROMUM II	5.71E-06		Nasai mucosa atrophy	HEAST	UF ≕ 30
CHROMUM VI	5.71E-06		Nasal mucosa atrophy	HEAST	UF=30
COBALT	NA			NA/HEAST	
COPPER	NA NA			NA/HEAST	
LEAD MANGANESE	1.00E-04		f Increased prevalance of respiratory disease and psycomotor disturbances		UF≕900
MERCURY	9.00E-06	İ	Neurotoxicity	Occupational/HEAST	UF=30
NICKEL ()	2.00E-02	1			
SELENIUM	NA	1		NA/HEAST	
SILVER) NA I NA	}		NA/HEAST	
THALLIUM VANADIUM (a)	7.00E-03	1		i inglianal	
ZINC (a)	2.00E-01	İ		İ	
CYANIDE (a)	2.00E-02	i	Myelin degeneration		ĺ
BORON	NA	ļ		NA/HEAST	
NIOBIUM	NA NA	1		NA/HEAST	
STRONTIUM	NA NA	ł	, ,	NA/HEAST	
ZIRCONIUM	NA	i		NA/HEAST	
FLUORIDE	NA	ļ		NA/HEAST	
VOLATILE ORGANICS		[•		
CHLOROMETHANE	NA			NA/HEAST	
METHYLENS CHLORIDE	9.00E-01	j		HEAST	UF=100
ACETONE	NA	İ		NA/HEAST	
CARBON DISULFIDE	3.00E-03	1	Fetal toxicity	HEAST	UF=1000
1,2-DICHLORETHENE (total)) NA	1		NA/HEAST	
CHLOROFORM	NA 9.00E-01	1	CNS	HEAST	UF=100
1,1,1-TRICHLOROETHANE	3.00E+00	ĺ	Hepatotoxicity	HEAST	UF=100
TRICHLOROETHENE	NA NA	i	· · · · · · · · · · · · · · · · · · ·	NA/HEAST	
BENZENB	NA	ļ		NA/HEAST	
TETRACHLOROETHENE	NA NA	ļ		NA/HEAST	UF=100
^I TOLUENE STHYLBENZENE	6.00E-01 3.00E-01		CNS effects, eyes and nose irritation Developmental toxicity	HEAST HEAST	UF=300
XYLENE (total)	9.00E-02		CNS effects, eyes and nose irritation	HEAST	UF=100
-1	1	1		İ	
BASE NEUTRAL / ACIDS	NA	1		NA/HEAST	
2-CHLOROPHENOL	NA NA	1		NA/HEAST	
BENZOICACID	NA NA	Í		NA/HEAST	1
24- DICHLOROPHENOL	NA	i	İ	NA/HEAST	
NAPHTHALENE (a,b)	4.00E-02	1			
4-CHLORO-3-METHYLPHENOL 2,4,5-TRICHLOROPHENOL	NA NA	 \$	1	NA/HEAST NA/HEAST	
4-NITROPHENOL	NA NA	i		NA/HEAST	
1,4- DINITROTOLUENE	NA	i		NA/HEAST	
PENTACHLOROPHENOL	NA	1		NA/HEAST	
PHENANTHRENE ANTHRACENE (+)	NA 3.00E+00			NA/HEAST	
DI-B-BUTYLPHALATE (a)	1.00E+00	1		1	
FLUORANTHENE (a)	4.00E-01	İ		1	
PYRENE (a)	3.00E-01	1	Ì	i	
BUTYLBENZYLPHTHALATE (*)	2.00E+00				
BENZO(1)ANTHRACENE	NA NA	1		NA/HEAST	
bis(2-ETH YLHEXYL)PHTHALATE (a)		1		NA/HEAST	1
BENZO(b)FLUORANTHENE	NA	i		NA/HEAST	
BENZO(L)FLUORANTHENE	NA	1	1	NA/HEAST	
BENZO(a)PYRENE	NA			NA/HEAST	
(INDENO(1,2,3-od)PYRENE	NA NA	ł.		NA/HEAST	
BENZO(g,b,i)PERYLENE 	NA (1		NA/HEAST	
PESTICIDES / PCB'S				i 1	
4,4-DDT	5.00E-04	ļ	Liver lesions	NA/IRIS	100
AROCLOR - 1248 AROCLOR - 1254	NA NA	{ 1		NA/HEAST	
AROCLOR - 1254	NA NA	1		NA/HEAST	l
		Manana manana manana manana mana Manana manana manana manana manana mana ma			

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NA: Not Available a: The oral RId was used when an inhalation value was not available Inhalation RFC for Chromium VI is used for Chromium III

TABLE B.1-3 SUMMARY OF TOXICITY VALUES ASSOCIATED WITH NONCARCINOGENIC-CHRONIC EFFECTS: ORAL

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	CHRONICRFD (ORAL)	CONFIDENCE	CRITICAL	ORAL RFD BASIS/	UNCERTAINTY	MODIFY
COMPOUND NAME	(mg/kg/day)	LEVEL	EFFECT	SOURCE	FACTORS	FACTO
INORGANICS		~		*===*=*		
	NA			NA/IRIS,		
LUMINUM					4000	
NTIMONY	4.00E-04	Law	Longevity,blood glucose and cholesterol	Water/IRIS,	1000	. 1
RSENIC	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST	1	
ARIUM	7.00E-02	Medium	None observed	Water/IRIS	3 1	1
ERYLLIUM	5.00E-03	Low	None observed	Water/IRIS	100	1
			Proteinuria	Diet/IRIS,	10	-
ADMIUM	1.00E-03	High	Froemuria	DIEGINIS	(¹⁰)	1
HROMIUM (total)	NA				l	
HROMIUM III	1.00E+00	Low	Hepatotoxicity	IRIS	1000	
HROMIUM VI	5.00E-03	Low	No effects observed	Water/IRIS	- 500	.1
OBALT	NA			NA/IRIS.	j j	
	4.00E-02		Local GI irritation	NA/HEAST	[
OPPER					! !	
EAD	NA		Neurobehavioral effects	NA/IRIS,	(
ANGANESE	1.00E-01	Medium	CNS effects	Diet/IRIS,	1	1
ERCURY	3.00E-04		Kidney effects	Oral/HEAST	1000	
ICKEL	2.00E-02		Reduced body and organ weight	Diet/HEAST	300	
		L Londium.	Clinical color and or gain weight	Diet/IRIS	3	
ELENIUM	5.00E-03	Medium	Clinical selenosis			1
ILVER	3.00E-03	Medium	Argyria	Oral/IRIS,	2	1
HALLIUM	7.00E-05		Increased SGOT and serum LDH levels, alopecia	Diet/HEAST	3000	
ANADIUM	7.00E-03		None observed	Water/HEAST	100	
LINC	2.00E-01		Anemía	Therap./HEAST	10	
		Master				_
YANIDE	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5
ORON	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	16100.00	1
IIOBIUM	I NA I			NA/ĪRIS,	i i	
TRONTIUM	NA		i i i i i i i i i i i i i i i i i i i	NA/IRIS,	j l	
TTANIUM	NA			NA/IRIS,	ļ l	
LIRCONIUM	NA			NA/IRIS,	1	
LUORIDE	6.00E-02	High	Dental and skeletal fluorosis	Water/IRIS	1	1
	1 1	-				
VOLATILE ORGANICS	1 1					
CHLOROMETHANE	NA			NA (ID IC')		
				NA/IRIS,		
ETHYLENE CHLORIDE	6.00E-02	Medium	Liver toxicity	Water/IRIS	100	1
CETONE	1.00E-01	Low	Increased liver and kidney weight	Gavage/IRIS	1000	1
ARBON DISULFIDE	1.00E-01	Medium	Fetal toxicity	Inhal/IRIS	100	1
2-DICHLORETHENE (total)	1.00E-02		Decreased hematocrit and hemoglobin	Gavage/HEAST	3000	•
CHLOROFORM						
	1.00E-02	Medium	Fatty cysts formation in liver	Oral/IRIS	1000	1
-BUTANONE	5.00E-02	Medium	Fetotoxicity	Inhal/IRIS	1000	
,1,1-TRICHLOROETHANE	9.00E-02	Medium	No adverse effect	Inhal/IRIS	1000	1
RICHLOROETHENE	NA			NA/IRIS		•
			,		{ }	
ENZENE	NA			NA/IRIS		
ETRACHLOROETHENE	1.00E-02	Medium	Hepatotoxicity, weight gain	Gavage/IRIS	100	1
OLUENE	2.00E-01	Medium	Changes in liver and kidney weights	Gavage/IRIS	1000	1
THYLBENZENE	1.00E-01	Low	Liver and kidney toxicity	Oral/IRIS,	1000	1
(YLENE (Lotal)	2.00E+00	Medium	Hyperactivity, decreased body weight, increased	Gavage/IRIS	100	1
]				1	
BASE NEUTRAL / ACIDS			ļ ((i	
HENOL	6.00E-01	Low	Reduced fetal body weight	Gavage/IRIS	100	1
-CHLOROPHENOL	5.00E-03	Low		IRIS		
			Reproductive effects		1000	•
ENZOICACID	4.00E+00	Medium	· · · · · · · · · · · · · · · · · · ·	Oral/IRIS,	1	1
4-DICHLOROPHENOL	3.00E-03	Low	Changed hypersensitivity response	Water/IRIS	100	1
IAPHTHALENE	4.00E-03		Decreased body weight gain	Gavage/HEAST	10000	
-CHLORO-3-METHYLPHENOL	NA			NA/IRIS.	1	
4.5-TRICHLOROPHENOL	1.00E-01	1 mur	Lines and bids		4000	
		Low	Liver and kidney pathology	Diet/IRIS	1000	1
-NITROPHENOL	NA			NA/IRIS,		
4-DINITROTOLUENE	NA			NA/IRIS.	ļ İ	
ENTACHLOROPHENOL	3.00E-02	Medium	Liver and kidney pathology	Diet/IRIS	100	1
HENANTHRENE	NA		Survey and surgeral Furthered	NA/IRIS.		I
			NT1	INTUINIO,		
NTHRACENE	3.00E-01	Low	No observed effects	Gavage/IRIS	3000	1
DI-n-BUTYLPHALATE	1.00E-01	Low	Increased mortality	Diet/IRIS	1000	1
LUORANTHENE	4.00E-02	Low	Nephropathy, changes in liver weight, hematology	Gavage/IRIS	3000	1
YRENE	3.00E-02	Low	Kidney effects	Gavage/IRIS	3000	1
UTYLBENZYLPHTHALATE	2.00E-01	Low	Effects on body weight gain, testes, liver, kidney	Diet/IRIS		
		LOW	mace to one overy wergan gain, testes, iver, kioney		1000	1
ENZO(a)ANTHRACENE	NA			NA/IRIS		
HRYSENE	NA	1		NA/IRIS,	i 1	
s(2-ETHYLHEXYL)PHTHALATE	2.00E-02	Medium	Increased relative liver weight	Diet/IRIS,	1000	1
ENZO(b)FLUORANTHENE		Hourdin	THELEADER LEIGTAE HALL MCIRIE	NIA (ID IC)	1000	1
	NA			NA/IRIS		
ENZO(k)FLUORANTHENE	NA			INDU INIO,	J	
ENZO(a)PYRENE	NA			NA/IRIS,		
DENO(1,2,3-cd)PYRENE	NA	-				
		ļ		NA/IRIS,		
ENZO(g.b.i)PER YLENE	NA			NA/IRIS,		
	1 1				1	
PESTICIDES/PCB'S	i i	i			i i	
4'-DDT	5.00E-04	Medium	Liver lesions	Diet/IRIS	100	4
		weardin	LIVE ICEOIIS			1
ROCLOR-1248	NA			NA/IRIS,		
ROCLOR-1254	NA		ļ į	NA/IRIS,		
ROCLOR-1260	NA			NA/IRIS,		

.

NA:Not available

(a) - Value derived from data for Gamma - Chlordane.
 (b) - Value derived from data for Endosulfan (a mixture of Endosulfan I and II).

TABLE B.1-4 OXICITY VALUES ASSOCIATED WITH NONCARGINGENIC - CHRONIC EFFECTS: INHALATION ----

.

		SUMMARY OF TO	OXICITY VALL	UES ASSOCIATED WITH NONCARCINOGENIC - CHRONIC EFFECTS: IT			
		**********				NINININININININININI I	111111111111111111111111111111111111111
-					RFD BASIS/		
	11	in the second se	ONFIDENCE	CRITICAL		FACTORS	FACTORS
i	1	(mg/kg/day)	LEVEL		VELTA LEADER DE LE DE LE DE LE DE LE DE LE D		
			100000000000000000000000000000000000000		NA/IRIS		, i i i i i i i i i i i i i i i i i i i
	INORGANICS	NA	i			ı İ	ii.
	ANTIMONY (*)	4.00E-04	ļ		İ		. 1
	ARSENIC (a)	1.00E-03	ļ	Fetotoxicity	HEAST	1000	
	BARIUM	1.00E-04	ļ		ļ		
	BERYLLIUM(=)	5.00E-03	Ĩ		1	•	
		NA I	i	and the second sec	HEAST	300	i II
	CHROMIUM (total)	5.71E-07		Nasal mucosa atrophy Nasal mucosa atrophy	HEAST	300	i
	CHROMUM VI	5.71E-07	ļ	Masat mintose enviraj	NA/IRIS	Į į	: 1
	COBALT	NA I	1		NA/IRIS		
	COPPER	NA NA	!	CNS effects	NA/IRIS, Occupational/IRIS	300	3
	LEAD	1.00E-04	Medium	Increased prevalance of respiratory disease and psycomotor disturbances	Occupational/HEAST		i ii
	MANGANESE	9.00E-06		Neurotoxicity	NA/IRIS,		i U
	NICKEL	NA I		!	NA/IRIS	1	! !!
	SELENIUM	NA			NA/IRIS	1	
	SILVER	NA NA			NA/IRIS		i . ii
	THALLIUM	7.00E-03		· •			1 11
	VANADIUM (a)	2.00E-01		bit it to an another	1	l	1
	CYANIDE (a)	2.00E-02		Myelin degeneration	NA/IRIS,	i	(<u> </u>
	BORON	NA I			NA/IRIS,	1	1
	NIOBIUM	NA NA			NA/IRIS,		
	STRONTIUM	I NA I		i i i i i i i i i i i i i i i i i i i	NA/IRIS,		i ii
	ZIRCONIUM	NA			NA/IRIS,		1 1
	FLUORIDE	NA			••••	1	
	1	!				1	
	VOLATILE ORGANICS		i		NA/IRIS, HEAST	1 100	1 1
	CHLOROMETHANE	9.00E-01	I	None observed	NA/IRIS,		i ii
	ACETONE	NA I	l j		HEAST	1000	j
	CARBON DISULFIDE	3.00E-03	!	Fetaltoxicity	NA/IRIS	i	(
	1,2-DICHLORETHENE (1014)		1		NA/IRIS		1
	CHLOROFORM	NA 9.00E02		CNS	HEAST	1000	
	2-BUTANONE	3.00E-01	i	Hepatotoxicity	HEAST	1 ,000	ł ii
	TRICHLOROETHENE	NA	İ	İ	NA/IRIS		i 1
	BENZENE	NA I	Į	1	NA/IRIS,	1	i
	TETRACHLOROETHENE		ļ	CNS effects, eyes and nose irritation	HEAST	1 100	1
	TOLUENE	6.00E-01 3.00E-01	Low	Developmental toxicity	IRIS	j 300 i 100	
	ETHYLBENZENE	9.00E-02		CNS effects, eyes and nose irritation	HEAST		i ji
	XYLENE (total)	1	i	1		l l	i II
_	BASE NEUTRAL / ACIDS	i	!		NA/IRIS,	i	1 1
	PHENOL	I NA I	ł		NA/IRIS,	Į	1 1
	2-CHLOROPHENOL	I NA I NA	ļ		NA/IRIS,	ļ	
	BENZOIC ACID	NA NA	ł		NA/IRIS	1	1 11
	INAPHTHALENE (a)	4.00E-03	i		NA/IRIS	i	i u
	4-CHLORO-3-METHYLPHENOL	NA	İ		NA/IRIS,	1	1 1
	2,4,5-TRICHLOROPHENOL	I NA			NA/IRIS,		1 11
	4-NITROPHENOL	I NA I NA			NA/IRIS		
	24-DINITROTOLUENE	NA NA			NA/IRIS,		1 1
	PHENANTHRENE	NA	1		INAVIALO,	1	i 11
	ANTHRACENE (a)	3.00E-01	ļ			ł	i ‼
	DI-n-BUTYLPHALATE (a)	1.00E-01				ĺ	
	FLUORANTHENE (*)	4.00E-02		1		ļ	
	PYRENE (a) BUTYLBENZYLPHTHALATE (a)	2.00E-01			NA/IRIS. '		i ii
	BENZO()ANTHRACENE	NA	i		NA/IRIS,	i	1 1
	CHRYSENE	NA NA	ļ			i	
	bis(2-ETHYLHEXYL)PHTHALATE (a) 2.00E-02	1		NA/IRIS,	ļ	1 1
	BENZO(b)FLUORANTHENE	NA NA			NA/IRIS,		
	BENZO(K)FLUORANTHENE BENZO(A)PYRENE	NA NA	ł		NA/IRIS, NA/IRIS,	1	i ii
	INDENC(1,2,3-od)PYRENE	NA	1	i	NA/IRIS		i i
	BENZO(g,b,i)PERYLENE	NA	i		MARINIS		i 1
		1	ļ			i	1
	PESTICIDES / PCB'S	5.00E-04	t 1	Liver lesions	NA/IRIS	1 100	
	4,4- DDT AROCLOR-1248	NA			NA/IRIS NA/IRIS,		i i
	Upport OR - 1254	i NA	l l]	I NATRIS	i	í í
	AROCLOR-1260	Í NA			an in the termination of termination of terminati		
	A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	71111111111111111111111111111111111111	. 111 111 111 111 111 111 111				

NA: Not Available a : The oral Rid was used when an inhalation value was not available Inhaltion RFC for Chromium VI used for Chromium (total)

TABLE B.1-5 SUMMARY OF TOXICITY VALUES ASSOCIATED WITH CARCINOGENIC EFFECTS: ORAL

.

	SLOPE FACTOR	WEIGHT-OF EVIDENCE	TYPE OF	SF BASIS/ SOURCE
COMPOUND NAME	(mg/kg/day)-1	CLASS	CANŒR	SOURCE
INORGANICS		D		NA/IRIS
	NA NA			NA/IRIS IRIS
ANTIMONY	1.75E+00	A	Skin	NA/IRIS
BARIUM	NA	-	gross tumors, all sites combined	Water/IRIS
BERYLLIUM	4.30E+00 NA	B2	gross minors, an mas comente	NA/IRIS
CADMIUM CHROMIUM (total)	NA			NF/IRIS NA/IRIS
CHROMIUM III	NA			NF/IRIS
CHROMIUM VI	NA		İ	NA/IRIS.
COBALT	NA NA	Ď		NA/IRIS
COPPER	NA	B2	Renal tumors	Oral/IRIS NA/IRIS
MANGANESE	NA	D		NAJIRIS
MERCURY	NA	D		NA/IRIS
NICKEL	NA NA	D		NA/IRIS
SELENIUM SILVER	NA	D		NA/IRIS NA/IRIS
THALLIUM	NA			NA/IRIS
VANADIUM	NA			NA/IRIS
ZINC CYANIDE	NA	ס		NA/IRIS NA/IRIS
BORON	NA			NA/IRIS
NIOBIUM	NA			NA/IRIS.
STRONTIUM	NA NA			NA/IRIS NA/IRIS
TITANIUM ZIRCONIUM	NA			NA/IRIS
FLUORIDE	NA			10,000
VOLATILE ORGANICS				
CHLOROMETHANE	1.30E-02	c	Kidney	Inhalation/HEAST Water/IRIS
METHYLENE CHLORIDE	7.50E-03	B2	Heptacellular carcinomas, neoplastic nodules	NA/IRIS
ACETONE	NA	D		NA/IRIS
CARBON DISULFIDE 1.2-DICHLORETHENE (total)	NA NA			NA/IRIS Oral/IRIS
CHLOROFORM	6.10E-03	B2	Kidney tumors	NA/IRIS
2-BUTANONE	NA	D		NA/IRIS
1,1,1-TRICHLOROETHANE	NA 1.10E-02	D B2	Liver	Gavage/HEAST
TRICHLOROETHENE	2.90E-02		Leukemia	Occupational/IRIS Gavage/HEAST
TETRACHLOROETHENE	5.10E-02	B2	Liver	NA/IRIS
TOLUENE	NA			NA/IRIS
ETHYLBENZENE	NA NA			NA/IRIS
XYLENE (total)		1 -		
BASE NEUTRAL/ACIDS		р		NA/IRIS
PHENOL	I NA NA			NA/IRIS
2-CHLOROPHENOL BENZOIC ACID	NA			NA/IRIS. NA/IRIS.
2,4-DICHLOROPHENOL	NA			NA/IRIS
NAPHTHALENE	NA NA	D		NAJIRIS
4-CHLORO-3-METHYLPHENOL 2,4,5-TRICHLOROPHENOL	NA NA			NA/IRIS NA/IRIS
4-NITROPHENOL	NA		Liver, mammary gland	Diet/IRIS
2,4-DINITROTOLUENE	6.80E-0		Hepatocellular adenoma, carcinomas, pheochromocytoma	Oral/IRIS
PENTACHLOROPHENOL	1.20E-0"			NA/IRIS
PHENANTHRENE ANTHRACENE	NA	D		NA/IRIS NA/IRIS
DI-n-BUTYLPHALATE	NA	D		NA/IRIS
FLUORANTHENE	NA NA			NA/IRIS
PYRENE BUTYLBENZYLPHTHALATE	I NA	C	Leukemia	Diet/IRIS
BENZO(a)ANTHRACENE (a)	1.15E+0	1 B2	Liver, lung, skin	IRIS IRIS
CHRYSENE (a)	1.15E+0		Malignant lymphoma Liver	IRIS
bis(2-ETHYLHEXYL)PHTHALAT	3 1.40E-0 1.15E+0		Lung, thorax, skin	IRIS
BENZO(b)FLUORANTHENE (a) BENZO(k)FLUORANTHENE (a)	1.15E+0	1 B2	Lung, thorax, skin	IRIS IRIS
BENZO(a)PYRENE	1.15E+0	1 B2	Stomach, lung Lung, skin	IRIS
INDENO(1,2,3-cd)PYRENE (a)	1.15E+0	1 B2 D		NA/IRIS
IBENZO(g.h,i)PER YLENE	NA			1
PESTICIDES/PCB'S	i	į	T have been an	Diet/IRIS
4,4-DDT	3.40E-0		Liver tumor	
AROCLOR-1248 (b)	7.70E+0			
AROCLOR-1254 (b) AROCLOR-1260				Diet/IRIS
In a could a serve	and a manufacture in the			

NA:Not available (a) – Value derived from data for benzo(a)pyrene. (b) – Value derived from data for Aroclor-1260.

		TABLE B.1-6	ARCINOGENIC EFFECTS: INHALATIC	DN
COMPOUND NAME	INHALATION	EVIDENCE	TYPE OF	SF BASIS/ SOURCE
		CLASSIFICATION		
ALUMINUM	NA NA	ľ		NA/IRIS NA/IRIS
ANTIMONY ARSENIC	5.00E+01	A	Respiratory Tract	Occupational/IRIS
BARIUM BERYLLIUM	8.40E+00 6.3	82 81	Lung Respiratory Tract	Occupational/IRIS Occupational/IRIS
CADMIUM CHROMIUM (total)	NA		-	NA/IRIS
CHROMIUM III CHROMIUM VI	4.20E+01	A D	Lung	Occupational/IRIS NA/IRIS
COBALT COPPER	NA	D B2		NA/IRIS NA/IRIS
LEAD MANGANESE	NA NA	D		NA/IRIS NA/IRIS
MERCURY	NA 8.40E-01	D A	Lung and nasal tumors	Occupational/IRIS NA/IRIS
SELENIUM	NA NA	D	,	NA/IRIS NA/IRIS
THALLIUM	NA NA		:	NA/IRIS NA/IRIS
ZINC	NA NA	D		NA/IRIS
BORON	NA NA			NA/IRIS NA/IRIS
STRONTIUM	NA NA		,	NA/IRIS NA/IRIS
ITTANIUM ZIRCONIUM IFLUORIDE	NA NA			NA/IRIS NA/IRIS
VOLATILE ORGANICS			Kidney	Inhalation/HEAST
CHLOROMETHANE	6.00E-03 1.60E-03	C B2	Combined adenomas and carcinomas	IRIS NA/IRIS
ACETONE CARBON DISULFIDE	NA NA	D		NA/IRIS NA/IRIS
1,2-DICHLORETHENE (total)	NA 8.10E-02	82	Liver	IRis
2-BUTANONE 1,1,1,1-TRICHLOROETHANE	NA NA	D D		NA/IRIS NA/IRIS
ITRICHLOROETHENE	1.70E-02 2.90E-02	B2 A	Lung Leukemia	HEAST Occupational/IRIS
TETRACHLOROETHENE	1.80E-03	B2 D	Leukemia, liver	HEAST NA/IRIS
TOLUENE ETHYLBENZENE	NA NA			NA/IRIS NA/IRIS
XYLENE (total) BASE NEUTRAL/ACIDS	101			
PHENOL	NA NA	D		NA/IRIS NA/IRIS
2-CHLOROPHENOL BENZOIC ACID	NA NA	D		NA/IRIS NA/IRIS
2,4-DICHLOROPHENOL	NA NA	D		NA/IRIS, NA/IRIS,
4-CHLORO-3-METHYLPHENOL	NA			NA/IRIS NA/IRIS
4-NITROPHENOL 2,4-DINITROTOLUENE	NA NA	B2 B2	Liver, mammary	IRIS NA/IRIS
PENTACHLOROPHENOL PHENANTHRENE	NA NA	D		NA/IRIS NA/IRIS
ANTHRACENE DI-n-BUTYLPHALATE	NA NA	DD		NA/IRIS NA/IRIS
FLUORANTHENE	NA NA	DD		NA/IRI NA/IRIS
BUTYLBENZYLPHTHALATE BENZO(a)ANTHRACENE (a)	NA 6.10E+00		Liver, lung, skin	IRIS IRIS
CHRYSENE (a)	6.10E+00	B2	Malignant lymphoma	NA/IRIS IRIS
BENZO(b)FLUORANTHENE (a)	6.10E+00 6.10E+00	B2	Lung, thorax, skin Lung, thorax, skin	IRIS
BENZO(a)PYRENE INDENO(12,3-cd)PYRENE (a)	6.10E+00 6.10E+00) B2	Respiratory tract, stomach Lung, skin	Inhalation/HEAST IRIS
BENZO(gh,i)PERYLENE	NA	D		NA/IRIS
PESTICIDES/PCB'S	NA	B2		IRIS,HEAST
TOOT-LE				
4,4-DDT AR OCLOR-1248 AR OCLOR-1254	NA NA			NA/IRIS NA/IRIS NA/IRIS

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NA: Not Available a : The oral Rfd was used when an inhalation value was not available

APPENDIX C

UNCERTAINTY ASSESSMENT

TABLE C.1–1 UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN SURFACE WATER SCENARIO 1 – Trespassing (Current)

			CONC. IN		EXPOSURE		EXPOSURE	BODY		
II II CHEMICAL				RATE	TIME	FREQUENCY	DURATION		(NONCANCER)	
II CHEMICAL	(NONCANCER)		WATER	(ml/hr)	(hr/day)	(days/year)	(years)		(days)	(days)
	(mg/kg/day)	(mg/kg/day)	(mg/L)	(шиш)	(nr/day)	(uays/year)	(years)	(kg)	(uays)	(uays)
INORGANICS										
ALUMINUM	8.8E-04	7.5E-05	44.80	0.05	1	• 7	6	49	2190	25550
ANTIMONY	3.0E-06	2.5E-07	0.15	0.05	1	7	6	49	2190	25550
ARSENIC	6.8E-07	5.8E-08	0.035	0.05	1	7	6	49	2190	25550
BARIUM	5.7E-06	4.9E-07	0.29	0.05	1	j 7 '	6	49	2190	25550
BERYLLIUM	4.9E07	4.2E08	0.025	0.05	1	7	6	49	2190	25550
CADMIUM	1.5E-07	1.3E-08	0.0076	0.05	1	7	6	49	2190	25550
CHROMIUM III	1.7E-04	1.4E-05	8.52	0.05	1	j 7	6	49	2190	25550
CHROMIUM VI	1.1E-09	9.1E-11	0.000054	0.05	1	7	6	49	2190	25550
COBALT	1.2E-06	1.0E-07	0.062	0.05	1	7	6	49	j 2190	25550
COPPER	8.5E-06	7.2E-07	0.43	0.05	1	7	• 6	49	2190	25550
LEAD	1.3E-06	1.1E-07	0.065	0.05	1	7	6	49	2190	25550 jj
MANGANESE	5.1E05	4.3E06	2.59	0.05	1	j 7	6	49	2190	25550
MERCURY	4.2E-07	3.6E-08	0.021	0.05	1	• 7	6	49	2190	25550
NICKEL	1.2E-05	1.0E-06	0.62	0.05	1	7	6	49	2190	25550
VANADIUM	1.1E-04	9.6E-06	5.70	0.05	1	7	6	49	2190	25550
ZINC	2.1E-05	1.8E-06	1.07	0.05	1	į 7	6	49	2190	25550
CYANIDE	2.1E07	1.8E-08	0.011	0.05	1	j 7	6	49	2190	25550
BORON	1.6E-05	1.4E-06	0.83	0.05	j 1	j 7	6	49	2190	25550
FLUORIDE	2.0E-08	1.7E-09	0.0010	0.05	· · 1	7	6	49	2190	25550
1	İ		1		ĺ	Ì	1	j	j]	1 1
VOLATILE ORGANICS						ĺ	ĺ	ĺ	11	i ii
CHLOROMETHANE	1.5E-07	1.3E08	0.0077	0.05	1	7	6	49	2190	25550
]]1,2-DICHLORETHENE (total)	4.9E08	4.2E-09	0.0025	0.05	1	7	6	49	2190	25550
TRICHLOROETHENE	5.5E08	4.7E-09	0.0028	0.05	1	7	6	49	2190	25550
	Í		i			İ		İ	11	i ii
BASE NEUTRAL / ACIDS	ĺ		i			İ	i	i	11	i ii
DI-n-BUTYLPHALATE	2.0E08	1.7E-09	0.0010	0.05	1	7	6	j 49	2190	25550
bis(2-ETHYLHEXYL)PHTHALATE	3.9E08	3.4E-09	0.0020	0.05	1	1 7	6	49	2190	25550
	İ MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA MARAA M		n an an an an an an an an an an an an an							

TABLE C.1–2 UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 1 – Trespassing (Current)

	CHRONIC DAILY	CDI	1	1			CHEMICAL	TOTAL
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/		PATHWAY
11	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
EXPOSURE PATHWAY: INCIDEN	ITIAL INGESTION	OF CHEMICALS	IN SURFACE V	NAIER				3E-07
								111111111111111111111111111111111111111
INORGANICS			l	1		1	1 1	
ARSENIC	5.8E-08	No	1.75E+00	A	Skin	IRIS	1E–07	
BERYLLIUM	4.2E-08	No	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	2E-07	
LEAD	1.1E-07	No	NA	B2	Renal tumors	Oral/IRIS	I NA	1
11			İ			l	1 1	(
VOLATILE ORGANICS			j				l I	Î
ICHLOROMETHANE	1.3E-08	No	1.30E-02	i c	Kidney	Inhalation/HEAST	2E-10	
ITRICHLOROETHENE	4.7E-09	No	1.10E-02	B2	Liver	Gavage/HEAST	5E11	ĺ
11							· · ·	1
BASE NEUTRAL / ACIDS			i			i	j i	ĺ
bis(2-ETHYLHEXYL)PHTHALATE	3.4E-09	No	1.40E-02	B2	Liver	IRIS	5E-11	i i
				innn Tinnn		In the second second second second second second second second second second second second second second second		ü
NA: Not Applicable								
tha thett philadete								

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TABLE C.2–1 UNCERTAINTY ANALYSIS DERMAL CONTACT WITH CHEMICALS IN SOIL SCENARIO 2 – Industrial (Current)

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	ABSORBED DOSE	ABSORBED DOSE		CONVERSION	SKIN SURFACE	ADHERENCE	ABSORPTION	EXPOSURE	EXPOSURE	BODY	AVERAGING TIME	AVERAGING TIM
CHEMICAL	(NONCANCER) (mg/kg/day)	(CANCER) (mg/kg/day)	(mg/kg)	FACTOR (1E-6 kg/mg)	AREA (cm2/event)	FACTOR ((mg/cm2)	FACTOR (unitless)	FREQUENCY (events/year)	DURATION	(kg)	(NONCANCER).	(CANCER) (days)
INORGANICS	NA	NA	26159,5	1E-06	2000	0.2	NA	250	4.5	70	1643	2555
NTIMONY	NA	NA	5.1	1E-06	2000	0.2	NA	250	4.5	70	1643	255
RSENIC	NA	NA	2.4	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ARIUM	NA	NA	257.6	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ERYLLIUM	NA	NA	257.8	18-08	2000	0.2	NA	250	4.5	70	1643	255
	3.73E-09		0.95273		2000		0.001	250	4.5	70	1643	255
ADMIUM	3.73E~09	2.40E-10 NA	252.3	1E-06 1E-06	2000	0.2	NA	250	4.5	70	1643	255
HROMIUM III HROMIUM VI	NA I	NA	2.5	1E-06	2000	0.2 0.2	NA	250	4.5	70	1643	255
COBALT	NA	NA	2.5 6.9	1E-06	2000		NA	250	4.5	70	1643	255
COPPER (NA	NA	32.7	16-06	2000	0.2	NA	250	4.5	70	1643	255
EAD	NA I	NA	118.9	1E-06	2000	0.2	NA	250	4.5	70	1643	255
		NA			2000		NA	250		70	1643	255
IANGANESE	NA	NA I	1156,7	1E-06 1E-06	2000	0.2	NA	250	4.5	70	1643	
IERCURY	NA		0.10			0.2						255
ICKEL	NA	NA	837.0	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ELENIUM	NA	NA	1.5	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ILVER	NA	NA	1.6	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ANADIUM	NA	NA I	3383.1	1E06	2000	0.2	NA	250	4.5	70	1643	255
LINC	NA	NA	168.8	1E-06	2000	0.2	NA	250	4.5	70	1643	255
BORON	NA	NA	108.1	1E-06	2000	0.2	NA	250	4.5	70	1643	255
IOBIUM	NA	NA	184.0	1E-06	2000	0.2	NA	250	4.5	70	1643	255
TRONTIUM	NA	NA	160.3	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ITANIUM	NA	NA I	285.0	1E-06	2000	0.2	NA	250	4.5	70	1643	255
IRCONIUM	NA	NA	NA	1E06	2000	0.2	NA	250	4.5	70	1643	255
VOLATILE ORGANICS										i j		
CETONE	NA	NA	NA	1E-06	2000 j	0.2 1	NA	250	4.5	70	1643	255
ARBON DISULFIDE	NA	NA I	NA	1E-06	2000	0.2 j	NA	250	4.5	70	1643	255
2-DICHLORETHENE (total)	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
-BUTANONE	NA	NA	NA	1E06	2000	0.2	NA	250	4.5	70	1643	255
RICHLOROETHENE	NA İ	NA	0.0040	1E-06	2000	0.2	NA	250	j 4.5	.70	1643	255
ENZENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ETRACHLOROETHENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
OLUENE	NA	NA	NA	1E-06	2000	0.2 (NA	250	4.5	70	1643	255
THYLBENZENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
CYLENE (total)	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
BASE NEUTRAL / ACIDS		1										
HENOL	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ENZOICACID	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
IAPHTHALENE	NA	NA I	NA	1E-06	2000 (0.2	NA	250	4.5	70	1643	255
		NA	NA				NA			70	1643	255
-NITROPHENOL	NA			1E-06	2000	0.2	NA	250	4.5	70		255
4-DINITROTOLUENE	NA NA	NA NA	NA NA	1E-06 1E-06	2000 2000	0.2 0.2	NA	250 250	4.5 4.5	70	1643 1643	255
ENTACHLOROPHENOL		NA I					NA			70		
HENANTHRENE	NA		NA	1E06	2000	0.2		250	4.5		1643	255
NTHRACENE	NA I	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
I-n-BUTYLPHALATE	NA	NA	0.21	1E06	2000	0.2	NA	250	4.5	70	1643	255
LUORANTHENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
YRENE	NA	NA	NA	1E06	2000	0.2	NA	250	4.5	70	1643	255
UTYLBENZYLPHTHALATE	NA	NA I	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ENZO(2)ANTHRACENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
HRYSENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	· 1643	255
s(2-ETHYLHEXYL)PHTHALATE	NA	NA	0.085	1E06	2000	0.2	NA	250	4.5	70	1643	255
ENZO(b)FLUORANTHENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ENZO(k)FLUORANTHENE	NA	NA Į	NA j	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ENZO(a)PYRENE	NA	NA	NA İ	1E06	2000	0.2	NA	250	4.5	70	1643	255
IDENO(1,2,3-cd)PYRENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
ENZO(g,h,i)PERYLENE	NA	NA	NA	1E-06	2000	0.2	NA	250	4.5	70	1643	255
	İ	ĺ	İ		Ì	İ			1			
PCB'S ROCLOR-1248	4.46€−08	2.87E-09	1.9	1E-06	2000	0.2	0.006	250	4.5	70	1643	255
ROCLOR - 1243	3.52E-08	2.26E-09	1.5	1E-06	2000	0.2	0.006	250	4.5	70	1643	255
1000001-1014		0.00E+00 (NA I	1E-06	2000	0.2	0.006	250		70	1643	255
ROCLOR-1260	0.00E+00 1								4.5			

TABLE C.2-2 UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN SOIL SCENARIO 2 - Industrial (Current)

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						<u>H 111 H H H H H H H H H H H H H H H H </u>					
CHEMICAL	INTAKE (NONCANCER)	INTAKE (CANCER)	SOIL CONC	INGESTION RATE	CONVERSION FACTOR		EXPOSURE FREQUENCY	EXPOSURE DURATION		AVERAGING TIME (NONCANCER)	AVERAGING TIME (CANCER)
CHEMICAL	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(mg/day)	(1E-6kg/mg)	(unitiess)	(days/year)	(years)	(kg)	(days)	(days)
INORGANICS											
ALUMINUM	1.28E~02	8.23E-04	26159.5	50	1E-06	1 1	250	4.5	70	1643	25550
ANTIMONY	2.46E06	1.60E-07	5,1	50	1E-06	1	250	4.5	70	1643	25550
ARSENIC	1.19E~06	7.65E-08	2.4	50	1E06	1	250	4.5	70	1643	25550
BARIUM	1.26E04	8.10E-06	257.6	50 50	1E-06 1E-06	1	250	4.5	70	1643 1643	25550
BERYLLIUM CADMIUM	7,54E06 4.66E07	4.84E-07 3.00E-08	15.4	50	1E-06		250 250	4.5 4.5	70 70	1643	25550 25550
CHROMIUM III	4.882~07 1.23E~04	7.93E-06	252.3	50	1E-06	1	250	4.5	70	1643	25550
CHROMIUM VI	1.22E-06	7.86E-08	2.5	50	1E-06	i i	250	4.5	70	1643	25550
COBALT	3.37E-06	2.17E-07	6.9	50	1E-06	1	250	4.5	70	1643	25550
COPPER	1,60E~05	1.03E06	32.7	50	1E-06	i .	250	4.5	70	1643	25550
LEAD	5.82E05	3.74E-06	118,9	50	1E-06	1	250	4.5	70	1643	25550
MANGANESE	5.66E04	3.64E-05	1156.7	50	1E06	j 1	250	4.5	70	1643	25550
MERCURY	5.11E-08	3.29E-09	0.10	50	1E-06	1	250	4,5	70	1643	25550
NICKEL	4.10E-04	2.63E-05	837.0	50	1E-06	1	250	4.5	70	1643	25550
SELENIUM	7.31E-07	4.70E-08	1.5	50	1E06	1	250	4.5	70	1643	25550
SILVER	7.96E-07	5.12E-08	1.6	50	1E-06	1	250	4.5	70	1643	25550
VANADIUM	1.66E-03	1.06E-04	3383.1	50	1E06	1	250	4.5	70	1643	25550
ZINC	8.26E-05	5.31E-06	168.8	50	1E-06	1	250	4.5	70	1643	25550
BORON	5.29E05	3.40E-06	108.1	50	1E-06		250	4.5	70	1643	25550
NIOBIUM	9.00E05 7.84E05	5.79E06 5.04E06	184.0 160.3	50 50	1E-06 1E-06		250 250	4.5 4.5	70 70	1643 1643	25550 25550
TTTANIUM	1.39E04	5.04E-06 8.96E-06	285.0	50	1E-06	1	250	4.5 4.5	70 70	1643	25550
ZIRCONIUM	0.00E+00	0.000000		50	1E-06	i	250	4.5	70	1643	25550
II	0.002+00	0.00.00	11/1	00	12-40		200	4.5	10	10-10	20000
VOLATILE ORGANICS			i i								
ACETONE	0.00E+00	0.00E+00	NA	50	1E-06	1	250	4.5	70	1643	25550
CARBON DISULFIDE	0.00E+00	0.00E+00		50	1E-06	1	250	4.5	70	1643	25550
1,2-DICHLORETHENE (total)	0.00E+00	0.00E+00	NA	50	1E-06	1	250	4.5	70	1643	25550
2-BUTANONE	0.00E+00	0.00E+00		50	1E06	1	250	4.5	70	1643	25550
TRICHLOROETHENE	1.96E-09	1.26E-10	0.0040	50	1E-06	1	250	4.5	70	1643	25550
BENZENE	0.00E+00	0.00E+00		50	1E-06	1	250	4.5	70	1643	25550
TETRACHLOROETHENE	0.00E+00	0.00E+00		50	1E-06	1 1	250	4.5	70	1643	25550
TOLUENE	0.00E+00	0.00E+00	NA	50	1E-06			4.5	70	1643	25550
ETHYLBENZENE	0.00E+00	0.00E+00	INA	50	1E-06	1		4.5	70	1643	25550
XYLENE (total)	0.00E+00	0.00E+00	NA	50	1E-06	1	250	4.5	70	1643	25550
	ļ										
BASE NEUTRAL / ACIDS	0.00E+00	0.00E+00		50	1E-06	1	250	4.5	70	1643	25550
BENZOIC ACID	0.0000000	0.00E+00		50	1E-06		250	4,5	70	1643	25550
NAPHTHALENE	0.00E+00	0.00E+00		50	1E-06		250	4.5	70	1643	25550
4-NITROPHENOL	0.00E+00	0.00E+00		50	1E-06	i i	250	4.5	70	1643	25550
24-DINITROTOLUENE	0.00E+00	0.00E+00		50	1E-06	i i	250	4.5	70	1643	25550
PENTACHLOROPHENOL	0.00E+00	0.00E+00		50	1E-06	i i	250	4.5	70	1643	25550
PHENANTIRENE	0.00E+00	0.00E+00		50	1E-06	i	250	4.5	70	1643	25550
ANTHRACENE	0.00E+00	0.00E+00		50	1E-08	j 1	250	4.5	70	1643	25550
DI-n-BUTYLPHALATE	1.03E-07	6.60E09	0.21	50	1E-06	j 1	250	4.5	70	1643	25550
FLUORANTHENE	0.00E+00	0.00E+00	NA	50	1E06	1	250	j 4.5	70	1643	25550
PYRENE	0.00E+00	0.00E+00	INA I	50	1E-06	1	250	4.5	70	1643	25550
BUTYLBENZYLPHTHALATE	0.00E+00	0.00E+00		50	1E06	1	250	4.5	70	1643	25550
BENZO(2)ANTHRACENE	0.00E+00	0.00E+00		50	1E-06	1	250	4.5	70	1643	25550
CHRYSENE	0.00E+00	0.00E+00		50	1E-06	1	250	4.5	70	1643	25550
bis(2-ETHYLHEXYL)PHTHALATE	4.16E-08	2.67E-09 0.00E+00	0.085	50 50	1E-06	1	250	4.5	70	1643	25550
BENZO(b)FLUORANTHENE	0.00E+00 0.00E+00	0.00E+00		50 50	1E-06 1E-06		250	4.5	70 70	1643	25550
BENZO(k)FLUORANTHENE	0.00E+00	0.00E+00		50	1E-08		250	4.5 4.5	70	1643 1643	25550
BENZO(2)PYRENE INDENO(1,2,3-cd)PYRENE	0.00E+00	0.00E+00		50	1E-08		250	4.5	70	1643	25550
BENZO(g,h,i)PERYLENE	0.00E+00	0.00E+00		50	1E-06	1		4.5	70	1643	25550
III	0.002.700			50	1 1200		200	4.5		1 1043	20000
jj PCB'S			i i			1	i	1		1	1
AROCLOR-1248	9.30E07	5.98E-08	1.9	50	1E-06	1 1	250	4.5	70	1643	25550
AROCLOR -1254	7.34E-07	4.72E-08	1.5	50	1E-06	i i	250	4.5	70	1643	25550
HAROCLOR	0.005+00	0.000 + 00	ina i	50	15-08	i i	i 250		70	1043	05550
	İLILLEREN ULUNULUNULUNU		IIIIIIIIIIIIIIIIIIIIIIIIIIIIII								
ald. Al-t Annlianhia								······			

TABLE C.2-3 UNCERTAINITY ANALYSIS CANCER RISK ESTIMATES SCENARIO 2 - Industrial (Current)

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))	CHRONIC DAILY	CDI				l	CHEMICAL	TOTAL	[[
CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	SPECIFIC	PATHWAY	TOTAL
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK	RISK
IEXPOSURE PATHWAY: DERMA	CONTACT WITH	CHEMICALS IN SO	ILS					4E-08	3E-06
									IN STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STAT
PCB'S				J			1	1	
AROCLOR-1248	2.9E-09	No	7.70E+00	1		1	2E-08		
AROCLOR-1254	2.3E-09	No	7.70E+00			.	2E-08		•
AROCLOR-1260	0.0E+00	No	7.70E+00		Liver	Diet/IRIS	{ NA	11	
								1	
NA: Not Applicable	N								

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TABLE C.2-4 UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 2 - Industrial (Current)

CHRONIC DAILY CDI CHEMICAL INTAKE(CDI) ADJUSTED FOR SF WEIGHT OF TYPE OF	SF BASIS/ SPECIFIC PATHWAY
(mg/kg/day) ABSORPTION (mg/kg/day)-1 EVIDENCE CANCER	
EXPOSURE PATHWAY: INCIDENTAL INGESTION OF CHEMICALS IN SOIL	3E-06
ARSENIC 7.7E-08 No 1.75E+00 A Skin	IRIS 1E-07
BERYLLIUM 4.8E-07 No 4.30E+00 B2 gross tumors, all sites com LEAD 3.7E-06 No NA B2 Renal tumors	Oral/IRIS 22-00 Oral/IRIS NA
VOLATILE ORGANICS	
TRICHLOROETHENE 1.3E-10 No 1.10E-02 B2 Liver	Gavage/HEAST 1E-12
BENZENE 0.0E+00 No 2.90E-02 A Leukemia ITETRACHLOROFTHENE 0.0E+00 No 5.10E-02 B2 Liver	Occupational/IRIS NA Cavage/HEAST NA
TETRACHLOROETHENE 0.0E+00 No 5.10E-02 B2 Liver	Gavage/HEAST NA
BASE NEUTRAL/ACIDS	
12.4-DINITROTOLUENE 0.0E+00 No 6.80E-01 B2 Liver, mammary glan IPENTACHLOROPHENOL 0.0E+00 No 1.20E-01 B2 Hepatocellular adenoma, carcinor	
BENZO(a)ANTHRACENE 0.0E+00 No 1.15E+01 B2 Liver, lung, skin	IRIS NA
CHRYSENE 0.0E+00 No 1.15E+01 B2 Malignant lymphome	IRIS NA
bis(2-ETHYLHEXYL)PHTHALATE 2.7E-09 No 1.40E-02 B2 Liver	IRIS 4E-11
BENZO(b)FLUORANTHENE 0.0E+00 No 1.15E+01 B2 Lung, thorax, skin	IRIS NA
BENZO(k)FLUORANTHENE 0.0E+00 No 1.15E+01 B2 Lung, thorax, skin BENZO(a)PYRENE 0.0E+00 No 1.15E+01 B2 Stomach, lung	IRIS NA IRIS NA
BENZO(a)PYRENE 0.0E+00 No 1.15E+01 B2 Stomach, lung INDENO(1,2,3-cd)PYRENE 0.0E+00 No 1.15E+01 B2 Lung, skin	IRIS NA
PCB'S	
AROCLOR-1248 6.0E-08 No 7.70E+00	5E-07
AROCLOR-1254 4.7E-08 No 7.70E+00 Liver	4E-07 Diet/IRIS NA
AROCLOR−1260 0.0E+00 No 7.70E+00 B2 Liver	

TABLE C.3-1D UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN DEEP GROUND WATER SCENARIO 3-Residential (Current)

CHEMICAL	INTAKE NONCANCER	INTAKE CANCER	CONC. IN WATER	INGESTION RATE	EXPOSURE FREQUENCY	ED	BODY WIEGHT	AVG. TIME	AVG. TIM
	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(liter/day)	(days/yr)	(years)	(kg)	ADULT (days)	(days)
INORGANICS						,			
LUMINUM	1.91E+00	2.45E-01	99.40	1.4	350	9	70	3285	2555
NTIMONY	4.10E-02	5.28E-03	2.14	1.4	350	9	70	3285	2555
RSENIC	6.75E-03	8.68E-04	0.35	1.4	350	9	70	3285	255
ARIUM	9.72E-03	1.25E-03	0.51	1.4	350	9	70	3285	255
ERYLLIUM	2.17E-04	2.79E-05	0.011	1.4	350	9	70	3285	255
ADMIUM	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
HROMIUM III	1.93E+00	2.48E-01	100.60	1.4	350	9	70	3285	255
HROMIUM VI	2.68E-02	3.45E-03	1.40	1.4	350	9	70	3285	255
OBALT	8.40E-04	1.08E-04	0.044	1.4	350	9	70	3285	255
COPPER	7.23E-04	9.30E-05	0.038	1.4	350	9	70	3285	255
EAD	4.68E-04	6.02E-05	0.024	1.4	• 350	9	70	3285	255
IANGANESE	3.38E-03	4.34E-04	0.18	1.4	350	9	70	3285	255
IERCURY	1.88E-05	2.42E-06	0.0010	1.4	350	9	70	3285	255
ICKEL	1.67E-04	2.15E-05	0.0087	1.4	350	9	70	3285	255
ELENIUM	2.49E-03	3.21E-04	0.13	1.4	350	9	70	3285	255
ILVER	9.78E-05	1.26E-05	0.0051	1.4	350	9	70	3285	255
ANADIUM	3.84E-02	4.93E-03	2.00	1.4	350	9	70	3285	255
INC	1.25E-03	1.61E-04	0.065	1.4	350	9	70	3285	255
YANIDE	1.19E-03	1.53E-04	0.062	1.4	350	9	70	3285	255
ORON	3.03E-03	3.90E-04	0.16	1.4	350	9	70	3285	255
TRONTIUM	6.10E-03	7.84E-04	0.32	1.4	350	9	70	3285	j 255
ITANIUM	6.23E03	8.01E-04	0.33	1.4	350	9	70	3285	255
VOLATILE ORGANICS									
RICHLOROETHENE	1.34E-03	1.73E-04	0.070	1.4	350	9	70	3285	255
ETRACHLOROETHENE	1.92E05	2.47E-06	0.0010	1.4	350	9	70	3285	255
BASE NEUTRAL / ACIDS									
is(2-ETHYLHEXYL)PHTHALATE		9.86E-06	0.0040	1.4	350	9	70	3285	255

TABLE C.3-2D UNCERTAINTY ANALYSIS INHALATION OF AIRBORNE (VAPOR PHASE) CHEMICALS FROM DEEP GROUNDWATER SCENARIO 3-Residential (Current)

												İ
		INTAKE ADULT	INTAKE ADULT	CONC. IN	INHALATION	EXPOSURE	EXPOSURE		BODY	AVG. TIME	AVG. TIME	i
	CHEMICAL	NONCANCER	CANCER	AIR	RATE	TIME	FREQUENCY	ED	WIEGHT	NONCANCER	CANCER	í –
		(mg/kg/day)	(mg/kg/day)	(mg/m3)	(m3/hour)	(hours/day)	(days/yr)	(years)	(kg)	(days)	(days)	ļ
									[_	
	VOLATILE ORGANICS	2.70E-02	3.47E-03	0,210	0.625	15.	350	a	70	3285	25550	i
	TETRACHLOROETHENE	3.85E-04	4.95E-05	0.0030	0.625	15	350	9	70	3285	25550	i ·
			1				i i		j		i İİ	İ
	BASE NEUTRAL / ACIDS					1			Ì		i İİ	1
	bis(2-ETHYLHEXYL)PHTHALATE	1.54E-03	1.98E04	0.012	0.625	15	350	9	70	3285	25550	1.
												1
1	NA: Not Applicable											

TABLE C.3-3D UNCERTAINTY ANALYSIS DERMAL CONTACT WITH CHEMICALS IN DEEP GROUNDWATER SCENARIO 3-Residential (Current)

	ABSORBED DOSE			SKIN SURFACE	DERMAL	EXPOSURE	EXPOSURE		CONVERSION	BODY		AVG. TIME
I CHEMICAL	NONCANCER	CANCER	WATER	AREA	PERMEABILITY	-	FREQUENCY		FACTOR		NONCANCER	CANCER
	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(cm2/event)	(cm/hr)	(hrs/day)	(days/year)	(years)	(L/cm3)	(kg)	(days)	(days)
INORGANICS			i				i	i				i ii
ALUMINUM	2.49E-03	3.20E-04	99,40	18150	8.4E04	0.12	350	9	0.001	70	3285	25550
ANTIMONY	5.36E-05	6.90E-06	2.14	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
ARSENIC	8.82E-06	1.13E-06	0.35	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
BARIUM	1.27E-05	1.63E06	0.51	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
BERYLLIUM	2.83E-07	3.64E-08	0.011	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
CADMIUM	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
CHROMIUM III	2.52E-03	3.24E-04	100.60	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
CHROMIUM VI	3.51E-05	4.51E-06	1.40	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
COBALT	1.10E~06	1.41E-07	0.044	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
COPPER	9.45E07	1.21E-07	0.038	18150	8.4E-04	0.12	350	9	0.001	70) 3285	25550
LEAD	6.12E-07	7.86E-08	0.024	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
MANGANESE	4.41E~06	5.67E-07	0.18	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
MERCURY	2.46E~08	3.16E-09	0.0010	18150	8.4E-04	0.12) 350	9	0.001	70	3285	25550
NICKEL	2.18E07	2.80E-08	0.0087	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
SELENIUM	3.26E~06	4.19E-07	0.13	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
SILVER	1.28E-07	1,64E-08	0.0051	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
VANADIUM	5.01E-05	6.44E-06	2.00	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
ZINC	1.63E~06	2.10E-07	0.065	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
CYANIDE	1.56E06	2.00E-07	0.062	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
BORON	3.96E06	5.09E-07	0.16	18150	8.4E-04	0,12	350	9	0.001	70	3285	25550
STRONTIUM	7.97E06	1.02E-06	0.32	18150	8.4E04	0.12	350	9	0.001	70	3285	25550
TITANIUM	8.15E~06	1.05E-06	0.33	18150	8,4E-04	0.12	350	9	0.001	70	3285	25550
VOLATILE ORGANICS											[
TRICHLOROETHENE	1.75E-06	2.26E-07	0.070	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
TETRACHLOROETHENE	2.51E-08	3.22E-09	0.0010	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
							(ł	
BASE NEUTRAL / ACIDS												
bis(2-ETHYLHEXYL)PHTHAJ		1.29E-08	0.0040	18150	8.4E04	0.12	350	9	0.001	70		25550
NA: Not Applicable												

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TABLE C.3-4D UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 3-Residential (Current)

<u>i i i i i i i i i i i i i i i i i i i </u>						LITTO CONTRACTOR CONTRACTOR CONTRACTOR	(COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDER COORDE	
	CHRONIC DAILY) CDI						TOTAL TOTAL
CHEMICAL	INTAKE	ADJUSTEDFOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	CHEM, SPEC.	PATHWAY EXPOSURE
11	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK RISK
								N DAADADAAN MANANA MADAHAMMANA MANANA MA
EXPOSURE PATHWAY: INGESTION				•			ADULT	2E-03 2E-03
		LE SERVICE CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR C		*****************		A SA A A A A A A A A A A A A A A A A A	DAALAAN DAALAAN MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA MARKANA	
INORGANICS		ľ						
ARSENIC	8.7E04	No	1.75E+00	A	Skin	IRIS	2E-03	1
BERYLLIUM	2.8E-05	No	4.30E+00	62	gross tumors, all sites combined	Water/IRIS	1E-04	
ILEAD	6.0E-05	No	Í NA	82	Renal tumors	Oral/IRIS	NA	l
ii ii		l l	Ì	i i			1 . 1	ĺ
VOLATILE ORGANICS	Ì	i	Ì					
TRICHLOROETHENE	1.7E-04	No	1.10E-02	B2	Liver	Gavage/HEAST	2E-06	i
TETRACHLOROETHENE	2.5E-06	No	5.10E-02	B2	Liver	Gavage/HEAST	1E-07	
ii	1	i	ĺ	i		i i	i i	1
BASE NEUTRAL/ACIDS	i i	j				İ	i i	İ
bis(2-ETHYLHEXYL)PHTHALATE	9.9E06	No	1.40E-02	i B2	Liver	IRIS	1E07	
							MAAAAAMMAAAAMMAAAAA	İ
	*******************************							•
NA: Not Applicable								

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TABLE C.3-5D UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 3- Residential (Current)

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								444444444444444444444444444444444444444
11	CDI-ADULT	CDI	Ì				CHEM. SPEC.	TOTAL
CHEMICAL	MEAN	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	RISK-ADULT	PATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	MEAN	RISK
IEXPOSURE PATHWAY: INHALA	TION OF AIRBOR	NE (VAPOR PHAS	SE) CHEMICALS	FROM DEEP	GROUNDWATER			6E-05
11		1	1					[]
VOLATILE ORGANICS							ł]]
ITRICHLOROETHENE	3.5E~03	l No	1.70E-02	B2	Lung	HEAST	5.9E-05	11
TETRACHLOROETHENE	5.0E05		1.80E-03	B2	Leukemia, liver	HEAST	8.9E-08	,,
								<u> </u>
NA: Not Applicable								

TABLE C.3–6D UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 3–Residential (Current)

	CHRONIC DAILY	CDI		i i				TOTAL
CHEMICAL	INTAKE	ADJUSTED FOR	SF	WEIGHTOF	TYPE OF	SF BASIS/	CHEM. SPEC.	PATHWAY
ii	(mg/kg/day)	ABSORPTION		EVIDENCE	CANCER	SOURCE	RISK	RISK
EXPOSURE PATHWAY: DERMA	L CONTACT WITH	I CHEMICALS IN I	DEEP GROUND	WATER				2E-06
INORGANICS							ł	11
ARSENIC	1.1E-06	No .	1.75E+00) A	Skin	IRIS	2E-06	
II.	1						[
VOLATILE ORGANICS	i i			1	•]]
TRICHLOROETHENE	2.3E-07	No	1.10E-02	B2	Liver	Gavage/HEAST	2E-09	
TETRACHLOROETHENE	3.2E-09	No	5.10E-02	B2	Liver	Gavage/HEAST	2E-10	<u> </u>
ii .	İ						ł	[]
BASE NEUTRAL / ACIDS	1			(·)			ļ	1
bis(2-ETHYLHEXYL)PHTHALATE	1.3E-08	No	1.40E-02		Liver	IRIS	2E-10	
iinninninninninninninninninninninnin]]
NA: Not Applicable								

TABLE C.3-7D UNCERTAINTY ANALYSIS CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

	CHRONIC DALLY					RFD			មឈាអមណ ប្រ	PATHWAY TOTAL
CHEMICAL		ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL	BASIS/	UNCERTAINTY	MODIFYING	HAZARD	HAZARD EXPOSURE
	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT	SOURCE	ADJUSTMENTS		OUOTIENT	
iinnan marana an an an an an an an an an an an an	HINNIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		່ແມ່ນເຄົ້າເປັນແບ							
JEXPOSURE PATHWAY: INGEST	ON OF CHEMICA	LS IN DEEP GRO	UND WATER							1E+02 1E+02
ÜÜDIDIDIDIDISKO EKKIKALLITUUTUTUTUTUTU			11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1			HEALER CONTRACTOR CONTRACTOR	NINHUUUUU	NARAANAANAANAANAANAANAANAANAANAANAANAANA	KANKUUUUUUUUU	niuuuuutaan innaadaan ii
INORGANICS	1		[1		11	
ALUMINUM	1.9E+00	No	NA			NA/IRIS	i	i i	NA (
ANTIMONY	4.1E-02	No	4.00E-04	Low	Longevity,blood glucose and cholesterol	Water/IRIS	1000	1 1	1E+02	l
ARSENIC	6.8E-03	No	1.00E-03		Keratosis and hyperpigmentation	Diet/HEAST	į 1	1 1	7E+00	1
BARIUM	9.7E-03	No	7.00E-02	Medium	None observed	Water/IRIS	3	1	1E01	ł
BERYLLIUM	2.2E-04	No	5.00E-03	Low	None observed	Water/IRIS	100	1	4E-02	1
CADMIUM	0.0E+00	No	1.00E-03	High	Proteinuria	Diet/IRIS	10	1 1 1	NA 🕌	l l
CHROMIUMIII	1.9E+00	No	1.00E+00	Low	Hepatotoxicity	IRIS	1000	1 1	2E+00	ł
CHROMIUM VI	2.7E-02	No	5.00E-03	Low	No effects observed	Water/IRIS	500	1	5E+00	i i i i i i i i i i i i i i i i i i i
COBALT	8.4E-04	No	NA			NA/IRIS	1	1 1	NA Į	1
COPPER	7.2E-04 [No	4.00E~02		Local GI irritation	NA/HEAST	1		. 2E-02	1
LEAD	4.7E-04 (No	I NA		Neurobehavioral effects	NA/IRIS	1		NA	1
MANGANESE	3.4E-03	No	1.00E~01	Medium	CNS effects	Diet/IRIS	1	1	3E-02	1 · · · ·
MERCURY	1.9E~05	No	3.00E~04		Kidney effects	Oral/HEAST	1000)	6E-02	1
INICKEL	1.7E-04	No	2.00E~02		Reduced body and organ weight	Diet/HEAST	1		8E03	1
SELENIUM	2.5E~03	No	5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	1	5E-01	i i
ISILVER	9.8E~05	No	3.00E~03	Medium	Argyria	Orai/IRIS	į 2	1	3E-02	į
VANADIUM	3.8E-02	No	7.00E-03	•	None observed	Water/HEAST	100		5E+00	1
ZINC	1.2E03	No	2.00E-01		Anemia	Therap./HEAST	10		6E-03	
CYANIDE	1.2E03	No	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5	6E-02	ł
BORON	3.0E03	No	9.00E-02	Medlum	Pulmonary edema and hemotrhage in the alveolus	Occupational/IRIS	100	[1 [3E-02	1
STRONTIUM	6.1E-03	No	NA	-		NA/IRIS		!!!	NA	
TITANIUM	6.2E03	No	NA	÷.		NA/IRIS	[[]	NA	1
VOLATILE ORGANICS										
ITRICHLOROETHENE	1.3E-03	No	NA			NA/IRIS			NA	1
TETRACHLOROETHENE	1.9E-05	No	1.00E-02	Medium	Hepatotoxicity,weight gain	Gavage/IRIS	100	1 1	2E-03	
	1.32-00		1 1.000-02	moduli	riopatotomoty,#eight gain	044056/11(10	1	'		ł
BASE NEUTRAL / ACIDS							Į	1	i ji	i i i i i i i i i i i i i i i i i i i
bis(2-ETHYLHEXYL)PHTHALATE	7.7E05	No	2.00E-02	Medium	Increased relative liver weight	Diet/IRIS	1000	1	4E03	· ·
								HDDDDDDDDDDDDDDDDD	000400000000000000000000000000000000000	l
NA: Not Applicable										

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3LE C.3-1S UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN SHALLOW GROUNDWATER SCENARIO 3-Residential (Current)

CHEMICAL	INTAKE	INTAKE CANCER	CONC. IN WATER	INGESTION RATE	EXPOSURE FREQUENCY	ED	BODY WEIGHT	AVG. TIME NONCANCER	AVG. TIM
0	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(liter/day)	(days/yr)	(years)	(kg)	ADULT (days)	(days)
INORGANICS									
LUMINUM	7.52E-01	9.67E-02	39.2	1.4	350	9	70	3285	2555
NTIMONY	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	2555
RSENIC	1.43E-02	1.84E03	0.75	1.4	350	9	70	3285	255
ARIUM	1.66E-03	2.14E-04	0.09	1.4	350	9	70	3285	255
ERYLLIUM	1.09E-02	1.41E-03	0.57	1.4	350	9	70	3285	255
ADMIUM	1.48E-04	1.90E-05	0.0077	1.4	350	9	70	3285	255
HROMIUM III	1.62E-03	2.09E-04	0.08	1.4	350	9	70	3285	255
CHROMIUM VI	1.53E-07	1.97E-08	0.000008	1.4	350	9	70	3285	255
OBALT	1.44E-04	1.85E05	0.008	1.4	350	9	70	3285	255
COPPER	2.49E-03	3.21E-04	0.130	1.4	350	9	70	3285	255
EAD	1.32E-03	1.70E-04	0.069	1.4	350	9	70	3285	255
IANGANESE	1.15E-02	1.47E-03	0.6	1.4	350	9	70	3285	255
MERCURY	1.30E-05	1.68E-06	0.00068	1.4	350	9	70	3285	255
NICKEL	4.07E-03	5.23E-04	0.21	1.4	350	9	70	3285	255
ELENIUM	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
SILVER	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
ANADIUM	2.45E+00	3.16E-01	128.0	1.4	350	9	70	3285	255
LINC	2.07E-02	2.66E-03	1.1	1.4	350	9	70	3285	255
CYANIDE	5.06E-01	6.51E-02	26.4	1.4	350	9	70	3285	255
BORON	2.82E-01	3.62E-02	14.7	1.4	350	9	70	3285	255
TRONTIUM	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
TITANIUM	2.86E-03	3.67E-04	0,15	1.4	350	9	70	3285	255
VOLATILE ORGANICS		÷							1
FRICHLOROETHENE	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
TETRACHLOROETHENE	0.00E+00	0.00E+00	NA	1.4	350	9	70	3285	255
BASE NEUTRAL / ACIDS		0.005				-			
>is(2–ETHYLHEXYL)PHTHALATE		0.00E+00	NA	1.4	350	9	70	3285	255

TABLE C.3-2S UNCERTAINTY ANALYSIS DERMAL CONTACT WITH CHEMICALS IN SHALLOW GROUNDWATER SCENARIO 3-Residential (Current)

I CHEMICAL	ABSORBED DOSE NONCANCER	CANCER	CONC. IN WATER	SKIN SURFACE	DERMAL PERMEABILITY	EXPOSURE TIME	EXPOSURE	EXPOSURE	CONVERSION FACTOR	BODY WEIGHT	AVG TIME	AVG. TIME CANCER
I CHEMICAL	(mg/kg/day)	(mg/kg/day)	(mg/liter)	(cm2/event)	(cm/br)	(hrs/day)	(days/year)	(years)	(L/cm3)	(kg)	days)	(days)
! 			(ing/itter)			((uayaycar)	(years)	(L/cll3)		(uays)	(uny 5)
INORGANICS	ļ							1			1 	
ALUMINUM	9.55E-04	1.23E-04	39.20	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
ANTIMONY	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	9	0.001	į 70	3285	25550
ARSENIC	1.82E05	2.34E-06	0.75	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
BARIUM	2.11E06	2.72E-07	0.09	18150	8.4E-04	0.12	350	9	0,001	70	3285	25550
BERYLLIUM	1.39E~05	1.79E-06	0.57	18150	8.4E04	0.12	350	9	0.001	j 70	3285	25550
CADMIUM	1.88E07	2.41E-08	0.0077	18150	8.4E-04	0.12	350	(9	0,001	70	3285	25550
CHROMIUM III	2.06E-06	2.65E-07	0.08	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
CHROMIUM VI	1.95E-10	2.51E-11	0.000008	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
COBALT	1.83E-07	2.35E08	0,008	18150	8.4E-04	0.12	350	9	0,001	70	3285	25550
COPPER	3.17E~06	4.07E-07	0.13	18150	8.4E-04	0.12	350	9	0,001	70	3285	25550
LEAD	1.68E~06	2.16E-07	0.069	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
MANGANESE	1.46E05	1.87E06	0.60	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
MERCURY	1.66E08	2.13E-09	0.00068	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
NICKEL	5.17E06	6.64E-07	0.21	18150	8.4E04	0.12	350	9	0.001	j 70	3285	25550
ELENIUM	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	9	0.001	j 70	3285	25550
SILVER	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	9	0.001	j 70	3285	25550
VANADIUM	3.12E03	4.01E-04	128.00	18150	8.4E-04	0.12	350	9	0.001	70	3285	25550
ZINC	2.63E-05	3.38E-06	1.1	18150	8.4E-04	0.12	350) 9	0.001	j 70	3285	25550
CYANIDE	6.43E04	8.27E-05	26.40	18150	8.4E-04	0.12	350	9	0.001	j 70	3285	25550
BORON	3.58E04	4.61E05	14.70	18150	8.4E-04	0.12	350	j 9	0.001	70	3285	25550
STRONTIUM	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	9	0.001	j 70	3285	25550
TITANIUM	3.63E-06	4.67E-07	0.15	18150	8.4E-04	0.12	j 350	j 9	0.001	70	3285	25550
							İ	İ	1	İ	i	1
VOLATILE ORGANICS				j			i	i		i	i i	1
TRICHLOROETHENE	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	350	i 9	0.001	70	3285	25550
TETRACHLOROETHENE	0.00E+00	0.00E+00	NA	18150	8.4E-04	0.12	j 350	9	0.001	i '70	3285	25550
							i	i		i	i	1 -
BASE NEUTRAL / ACIDS							İ	i		i	i	· ·
bis(2-ETHYLHEXYL)PHTHALATE	0.00E+00	0.00E+00		18150	8.4E-04	0.12	350	9	0.001	j 70	3285	25550
A: Not Applicable												

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ABLE C.3-3S CANCER RISK ESTIMATES SCENARIO 3~Residential (Current)

	CHRONIC DAILY							
			6P					TOTAL TOTAL
CHEMICAL	INTAKE	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/		PATHWAY EXPOSURE
11	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK RISK
EXPOSURE PATHWAY: INGEST							ADULT	9E-03 9E-03
INORGANICS		1				1	1 1	1
ARSENIC	1.8E-03	No	1.75E+00	A	Skin	IRIS	3E-03	
BERYLLIUM	1.4E-03	No	4.30E+00	82	gross tum ors, all sites combined	Water/IRIS	6E-03	
LEAD	1.7E-04	No	NA	B2	Renaltumors	Oral/IRIS	NA I	
11 1		1		1		İ	i i	
VOLATILE ORGANICS		1		i I	· · · ·	İ	1 · · · · ·	
TRICHLOROETHENE	0.0E+00	No	1.10E-02	B2	Liver	Gavage/HEAST	NA I	
TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	NA I	
ii i		i		i		i j	i	
BASE NEUTRAL / ACIDS		i				İ	i i	
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00	No	1.40E-02	B2	Liver	IRIS	NA I	· · · · ·
	A A A A A A A A A A A A A A A A A A A	İNDIYANAN MANAN MANAN						
NA: Not Applicable				、				1

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TABLE C.3-4S UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 3- Residential (Current)

	CHRONIC DAILY						CHEM. SPEC. IUTAL
CHEMICAL	INTAKE	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/	RISK PATHWAY
U I	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK
IEXPOSURE PATHWAY: DERMAL	CONTACT WITH	I CHEMICALS IN :	SHALLOW GRO	UNDWATER			46-06
II INORGANICS							11
ARSENIC	2.3E-06	No	1.75E+00	A	Skin	IRIS	4E-06
	2.02 00	1				•	i ii
 VOLATILE ORGANICS		1					i ii
	0.0E+00	I No	1.10E-02	B2	Liver	Gavage/HEAST	I NA II
TRICHLOROETHENE		l No	5.10E-02	B2	Liver	Gavage/HEAST	I NA II
TETRACHLOROETHENE	0.0E+00		5.10E-02	02	Live:		
							1 51 T 11
BASE NEUTRAL / ACIDS		!			T ince	IRIS	NA
bis(2-ETHYLHEXYL)PHTHALATE		No	1.40E-02		Liver		
							UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
NA: Not Applicable							

TABLE C.3-5S UNCERTAINTY ANALYSIS CHRONIC HAZARD INDEX ESTIMATES SCENARIO 3-Residential (Current)

	CHRONIC DAILY		A 1940		LE CENTRE LE COMPANY DE LE COMPANY DE LE COMPANY DE LE COMPANY DE LE COMPANY DE LE COMPANY DE LE COMPANY DE LE Le company de la company de la company de la company de la company de la company de la company de la company de	(IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
CHEMICAL	INTAKE	ADJUSTED FOR	RFD	CONFIDENCE	CRITICAL		UNCERTAINTY	I MODIFYING	•	HAZARD EXPOSURE
II CREMICAL	(mg/kg/day)	ABSORPTION	(mg/kg/day)	LEVEL	EFFECT		ADJUSTMENTS		OUOTIENT	
LI AJ JAJ JAJ JAJ JAJ JAN SED DA A KARANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA MANANA M										
IEXPOSURE PATHWAY: INGEST				8		4				4E+02 4E+02
				1	JJ JJJJSJJJJJSJJJJSSJJJSSJJSSE U U U U U U U U U U U U U U U U U U	11 11 11 11 11 11 11 11 11 11 11 11 11			1 1111111111111111111	
ALUMINUM	7.5E-01	No	NA			NA/IRIS	1		NA I	
JANTIMONY	0.0E+00	No	4.00E04	Low	Longevity,blood glucose and cholesterol	Water/IRIS	1000	1 1	NA I	
ARSENIC	1.4E-02	No	1.00E-03	-	Keratosis and hyperpigmentation	Diet/HEAST	1 1		1E+01	
BARIUM	1.7E-03	No	7.00E~02	Medium	None observed	Water/IRIS	i s	i 1	2E-02	
BERYLLIUM	1.1E02	No	5.00E-03	Low	None observed	Water/IRIS	100		2E+00	
(CADMIUM	1.5E-04	No	1.00E~03	High	Proteinuria	Diet/IRIS	10	í i	1E-01	
CHROMIUM III	1.6E-03	No	1.00E+00	Low	Hepatotoxicity	IRIS	1000		2E-03	
CHROMIUM VI	1.5E-07	No	5.00E~03	Low	No effects observed	Water/IRIS	500	1	3E05	
COBALT	1.4E04	No	NA	2011		NA/IRIS		i .	NA	
COPPER	2.5E03	No	4.00E02		Local GI irritation	NAHEAST		1	6E02	
LEAD	1.3E03	No	NA		Neurobehavioral effects	NA/IRIS	i		NA	
IMANGANESE	1.1E~02	No	1.00E-01	Medium	CNS effects	Diet/IRIS	1 1	1	1E-01	
IMERCURY	1.3E05	No	3,00E-04		Kidney effects	Oral/HEAST	1000		4E-02	
INICKEL	4.1E-03	No	2.00E-02		Reduced body and organ weight	Diet/HEAST	300	i	2E-01	
SELENIUM	0.0E+00	No	5.00E-03	Medium	Clinical selenosis	Diet/IRIS	3	i 1	NA	
SILVER	0.0E+00	No	3.00E-03	Medium	Argyria	Oral/IRIS	2	1	NA	
VANADIUM	2.5E+00	No	7.00E-03		None observed	Water/HEAST	100		4E+02	
ZINC	2.1E-02	No	2.00E-01		Anemia	Therap./HEAST	10	i	1E-01	
CYANIDE	5.1E-01	No	2.00E-02	Medium	Weight loss, thyroid effects, myelin degeneration	Diet/IRIS	100	5	3E+01	
BORON	2.8E-01	No	9.00E-02	Medium	Pulmonary edema and hemorrhage in the alveolus	Occupational/IRIS	100	i i	3E+00	
STRONTIUM	0.0E+00	No	NA			NA/IRIS			NA	
ITTANIUM	2.9E-03	No	NA			NA/IRIS	í.	í	NA I	i
	2.02 00					1	;	j		
VOLATILE ORGANICS							1	i i	i i	
TRICHLOROETHENE	0.0E+00	No	NA			NA/IRIS	i	i	NA I	i i i i i i i i i i i i i i i i i i i
TETRACHLOROETHENE	0.0E+00	No	1.00E-02	Medium	Hepatotoxicity, weight gain	Gavage/IRIS	100	1 1	NA	
						,	i	i	i	· ·
BASE NEUTRAL / ACIDS						i	i	i	i	
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00	No	2.00E-02	Medium	Increased relative liver weight	Diet/IRIS	1000	1	NA I	i i i i i i i i i i i i i i i i i i i
			้าหมดกับแหน่งหลุดท	inanannann			hannannannan	jummmmmmmm		
NA: Not Applicable										•

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TABLE C.4-1 UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN SOIL SCENARIO 4 - Construction (Future)

CHEMICAL	INTAKE		SOIL	RATE	FACTOR	INGESTED	FREQUENCY			AVG. TIME NONCANCER	
	(mg/kg/day)	(mg/kg/day)			(10E-6kg/mg)			(years)	(kg)	(days)	(days)
			~~~~~	)							****
INORGANICS	1			ĺ	i	Í	İ	i i		i i	
LUMINUM	8.77E-03	6.18E-05	5116.1	480	1.0E-06	1 1	90	0.5	70	180	2555
NTIMONY	9.46E-06		5.5	480	1.0E-06	i 1	i 90	0.5	70	180 1	2555
ARSENIC	2.24E-06	1.57E-08	1.3	480	1.0E-06	1 1	90	0.5	70	180	2555
BARIUM	4.22E-05		24.6	480	1.0E-06	1 1	•	0.5	70	180	255
ERYLLIUM		1.14E-08	0.95	480	1.0E-06	1	90	0.5	70	180	255
CHROMIUM III	8.24E-05		48.1	480	1.0E-06	1	90	0.5	70	180	255
HROMIUMVI	4.58E-05		26.7	480	1.0E-06	1	•	0.5	70	180	255
OBALT	5.97E-06		3.5	480	1.0E-06	i 1	90	0.5	70	180	255
OPPER	7.43E-06		4.3	480	1.0E-06	1		0.5	70	180	255
EAD	•	1.57E-07	13.0	480	1.0E-06	1	•	0.5	70	180	255
ANGANESE	•	1.60E-06	132.8	480	1.0E-06	í i		0.5		180	255
IERCURY	1.68E-07		0.10	480	1.0E-06	1	•	0.5	70	180	255
VICKEL		1.56E-07	12.9	480	1.0E-06	1		0.5	70	180	255
ELENIUM	9.93E-07		0.58	480	1.0E-06	1		0.5	70	180	255
ELVER	2.42E-06		1.4	480	1.0E-06			0.5	70	180	255
ANADIUM	5.23E-04		304.9	480	1.0E-06	i í		0.5	70	180	255
LINC	3.43E-05		20.0	480	1.0E-06	1		0.5	70	180	255
BORON	4.20E-05	•	24.5	480	1.0E-06	1		0.5	70	1 180	,255
TITANIUM	2.57E-04		149.8	480	1.0E-06	1		0.5	70	180	255
ARCONIUM	1.82E-04		106.1	480	1.0E-06	1		0.5		180	255
SIRCONIOM	1.020-04	1.202-00	100.1	i 400		•	90	0.5		1 100	200
VOLATILE ORGANICS				1	1		1 90 I 90	0.5			
	2.57E-07	1.81E-09	0.15	480	1 1.0E-06	1	1 90	0.5	70	180	255
METHYLENE CHLORIDE	2.91E-07		0.15	480	1.0E-06	1			70	180	
CETONE							•	0.5			255
CHLOROFORM	5.05E-09		0.0029	480	1.0E-06		90	0.5	70	180	255
TRICHLOROETHENE	6.85E-09	4.82E-11	0.0040	480	1.0E-06		90	0.5	70	180	255
TETRACHLOROETHENE	5.10E-09		0.0030	480	1.0E-06	1		0.5	70	180	255
TOLUENE	4.91E-09	3.46E-11	0.0029	480	1.0E-06	1	90	0.5	70	180	255
					ł		ł	•	l		
BASE NEUTRAL / ACIDS						!					
HENOL	3.34E-07		0.19	480	1.0E-06	1	90	0.5	70	180	255
2,4,5 - TRICHLOROPHENOL	2.40E-06	1.69E-08	1.40	480	1.0E-06	1	90	0.5	70	180	255
PENTACHLOROPHENOL	5.14E-07		0.30	480	1.0E-06	1		0.5	70	180	255
HENANTHRENE	· · ·	1,93E-09	0.16	480	1.0E-06	1 1		0.5	70	180	255
DI-n-BUTYLPHALATE	2.06E-06		1.20	480	1.0E-06	j 1	90	0.5	70	180	255
LUORANTHENE	3.43E-07		0.20	480	1.0E-06	1	90	0.5	70	180	255
YRENE	3.56E-07		0.21	480	1.0E-06	1 1	90	0.5	70	180	255
BUTYLBENZYLPHTHALATE	2.23E-07	1.57E-09	0.13	480	1.0E-06	ļ ¹	90	0.5	70	180	255
ENZO(a)ANTHRACENE	2.23E-07	1.57E-09	0.13	, 480	1.0E-06	1	90	0.5	70	180	255
HRYSENE	2.23E-07	1.57E-09	0.13	480	1.0E-06	1	90	0.5	70	180	255
is(2-ETHYLHEXYL)PHTHALATE	8.05E-07	5.67E-09	0,47	480	1.0E-06	1	90	0.5	j 70	180	255
ENZO(b)FLUORANTHENE	3.53E-07	2.49E-09	0.21	480	1.0E~06	j 1	j 90	0.5	70	180	255
ENZO(k)FLUORANTHENE	1.29E-07	9.06E-10	0.075	480	1.0E-06	1	90	0.5	70	180	255
ENZO(a)PYRENE	1.13E-07	7.97E-10	0.066	480	1.0E-06	1	90	0.5	70	180	255
	i			·	i	· ·	1		i		
PESTICIDES / PCB'S	i i			į	i	i	i	i	Ì	1  -	
4-DDT	5.31E-05	3.74E-07	31.0	480	/ 1.0E-06	1	90	0.5	70	180	255

### TABLE C.4–2 UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 4 – Construction (Future)

	CHRONIC DAILY						CHEMICAL	TOTAL
II CHEMICAL	INTAKE(CDI)	ADJUSTED FOR	SF	WEIGHT OF	TYPE OF	SF BASIS/		ATHWAY
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	RISK	RISK
								KANARANNAN İİ
IEXPOSURE PATHWAY: INGEST	ON OF CHEMIC	ALS IN SOIL		******************				3E-07
						DISAMAADDDIAADDDIAADDDIAADDDIAA		NUMUUMUU İİ
II INORGANICS		1						
ARSENIC	1.6E-08	No	1.75E+00	A	Skin	IRIS	3E-08	
BERYLLIUM	1.1E-08	l No i	4.30E+00	B2	gross tumors, all sites combined	Water/IRIS	5E-08	
LEAD	1.6E−07	No	NA	B2	Renal tumors	Oral/IRIS	NA	
ji -		1 1		1				
VOLATILE ORGANICS		1 1		1			((	
METHYLENE CHLORIDE	1.8E~09	No	7.50E-03	j 82	Heptacellular carcinomas, neoplastic nodules	Water/IRIS	<u>1</u> E-11	
CHLOROFORM	) 3.6E-11	No	6.10E-03	B2	Kidney tumors	Oral/IRIS	2E-13	
TRICHLOROETHENE	4.8E-11	No	1.10E-02	B2	Liver	Gavage/HEAST	5E-13	
TETRACHLOROETHENE	3.6E-11	No	5.10E-02	B2	Liver	Gavage/HEAST	2E-12	
	1	{		ļ			[ "	
BASE NEUTRAL / ACIDS	_					0 16070		
PENTACHLOROPHENOL	3.6E-09	No	1.20E-01	B2	Hepatocellular adenoma, carcinomas, pheochromocytoma	Oral/IRIS	4E-10    NA	
BUTYLBENZYLPHTHALATE	1.6E09	No	NA	l C	Leukemia	Diet/IRIS		
BENZO(3)ANTHRACENE	1.6E09	No	1.15E+01	B2	Liver, lung, skin	IRIS IRIS	2E-08    2E-08	
CHRYSENE	1.6E~09	No	1.15E+01	B2	Malignant lymphoma	IRIS	8E-11	
bis(2-ETHYLHEXYL)PHTHALATE	5.7E-09	No I	1.40E-02	B2	Liver	IRIS	3E-11      3E-08	
BENZO(b)FLUORANTHENE	2.5E-09	No	1.15E+01	B2 B2	Lung, thorax, skin	IRIS	1E-08 1	
BENZO(k)FLUORANTHENE	9.1E-10	No	1.15E+01	1 B2 1 B2	Lung, thorax, skin	IRIS	9E-09	
(BENZO(a)PYRENE	8.0E-10	l No	1.15E+01		Stomach, lung	1112		
				l t	· ·			
PESTICIDES / PCB'S	3.7E-07	No	3.40E-01	B2	Liver tumor	Oral/IRIS	1E-07	
4,4 – DDT								
			******			******		•

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### TABLE C.5–1 UNCERTAINTY ANALYSIS DERMAL CONTACT WITH CHEMICALS IN SOIL SCENARIO 5 – Residential (Future)

	ABS, DOSE ADULT	ABS, DOSE ADULT	SOILCONC	CONVERSION	SURFACE		ABSORPTION	EXPOSURE	EXPOSURE	BODY WT.	AVERAGING TIME	AVERAGING TIM
CHEMICAL	(NONCANCER)	(CANCER)		FACTOR	AREA ADULT	FACTOR	FACTOR	FREQUENCY	DUR ADULT	ADULT	NONCANCER	CANCER
	(mg/kg/day)	(mg/kg/day)	(mg/kg)	(1E-6kg/mg)	(cm2/event)	(mg/cm2)	(unkless)	(cvents/year)	(years)	(kg)	ADULT (days)	(d±y*)
INORGANICS								~==~==				
LUMINUM	NA	0.00E+00	8422.5	1E-06	2000	0.2	NA	150	9	' 70	3285	255
ANTIMONY	NA	0,00E+00	5.9	1E-06	2000	0.2	NA I	150	9	70	3285	255
ARSENIC	NA	0.00E+00	2.0	1E06	2000	0.2	NA	150	. ei	70	3285	255
					2000		NA I	150	9	70	3285	255
BARIUM	NA	0.00E+00	77.4	1E-06		0.2					3285	255
BERYLLIUM	NA	0.00E+00	5.4	1E-06	2000	0.2	NA	150	9	70		255
CADMIUM	2.22E09	2.85E-10	0.94	1E06	2000	0.2	0.001	150	9	70	3285	
CHROMIUM III	NA	0.00E+00	242.6	1E06	2000	0.2	I NA I	150	9	70	3285	255
CHROMIUM VI	NA	0.00E+00	4.0	) 1E06	2000	0.2	į NA į	150	9	70	3285	255
COBALT	NA	0.00E+00	4.3	1E06	2000	0.2	NA	150	9	70	) 3285	255
COPPER	NA	0.00E+00	15.6	i 1E06	2000	0.2	I NA İ	150	9	70	3285	255
LEAD	NA	0.00E+00	56,1	1E-06	2000	0.2	NA I	150	9	70	3285	255
		0.00E+00	436,1	1E-06	2000	0.2	NA	150	9	70	3285	255
MANGANESE	NA										3285	255
MERCURY	NA	0.00E+00	0.13	1E-06	2000	0.2	NA I	150	9	70		25
NICKEL	NA	0.00E+00	223.6	1E-06	2000	0.2	I NA I	150	9	70	3285	
SELENIUM	NA	0.00E+00	0.66	1E-06	2000	ļ 0,2	NA	150	9	70	3285	255
SILVER	NA	0.00E+00	1.2	1E-06	2000	0.2	NA	150	) 91	70	3285	255
VANADIUM	NA	0.00E+00	1548.6	1E-06	2000	0.2	I NA I	150	9	70	3285	255
ZINC	NA	0.00E+00	69.9	1E-08	2000	0.2	NA I	150	9	70	3285	25
	NA	0.00E+00	33.6	1E-00	2000	0.2	NA	150	9	70	3285	25
BORON											3265	25
NIOBIUM	NA	0.00E+00	66.1	1E-08	2000	0.2	NA	150	9	70		
STRONTIUM	NA	0.00E+00	41.6	1E-06	2000	0.2	NA	150	9	70	3285	25
TITANIUM J	NA	0.00E+00	146.0	) 1E-08	2000	( 0.2	NA	150	9	70	3285	25
ZIRCONIUM	NA	0.00E+00	90.2	1E-08	2000	0.2	NA 1	150	9	70	3285	255
											<b>.</b> .	1
VOLATILE ORGANICS		0.005		45.00	0000			150		70	3285	255
ACETONE	NA	0.00E+00	0.082	1E-06	2000	0.2	NA NA		9			
CARBON DISULFIDE	NA	0.00E+00	0.0030	1E-06	2000	0.2	NA	150	[ 9	70		25
1,2-DICHLORETHENE(total)	NA	0.00E+00	0.0020	1E-06	2000	0.2	I NA I	150	9	70		25
2-BUTANONE	NA	0.00E+00	0.0061	1E-06	2000	0.2	I NA I	150	9	1 70	3285	25
TRICHLOROETHENE	NA	0.00E+00	0.0035	1E-06	2000	0.2	NA	150	9	70	3285	25
	NA	0.00E+00	0.15	1E-06	2000	0.2	NA	150	9	70		255
BENZENE						0.2	NA	150		70		255
TETRACHLOROETHENE	NA	0.00E+00	0.0036	1E-08	2000				9			
TOLUENE	NA	0.00E+00	0.0038	1E-06	2000	j 0.2	I NA	150	9	70		255
ETHYLBENZENE	NA	0.00E+00	0.014	1E-06	2000	0.2	NA	150	1 9	70		25
XYLENE (total)	NA	0.00E+00	0.051	1E-06	2000	0.2	NA	150	9	70	3285	25
				1		1			ļ		ļ	
BASE NEUTRAL / ACIDS	NA	0.00E+00	0.40	1E-06	2000	0.2	NA	150	9	70	3285	25
PHENOL			0.18									25
BENZOIC ACID	NA	0.00E+00	0.15	1E-06	2000	0.2	I NA	150	9	70		
NAPHTHALENE	NA	0.00E+00	0.13	) 1E-06	2000	į 0.2	NA	150	9	70		25
4-NITROPHENOL	NA	0.00E+00	1.0	1E-06	2000	0.2	I NA I	150	9	1 70	3285	25
2.4-DINITROTOLUENE	NA	0.00E+00	0.11	1E-06	2000	0.2	NA	150	9	į 70	3285	25
PENTACHLOROPHENOL	NA	0.00E+00	2.8	1E-06	2000	0.2	NA	150	9	70		25
						0.2	NA NA	150	9	70		25
PHENANTHRENE	NA	0.00E+00	0.13	1E-08	2000							
ANTHRACENE	NA	0.00E+00	0.084	1E-06	2000	0.2	NA	150	9	70		
DI-n-BUTYLPHALATE	NA	0.00E+00	0.093	1E-06	2000	) 0.2	NA I	150	9	70		
FLUORANTHENE	NA	0.00E+00	0,26	1E-06	2000	0.2	NA I	150	9	) 70		25
PYRENE	NA	0.00E+00	0.046	1E-06	2000	0,2	NA	150	9	70		j 25
	NA	0.00E+00	0.12		2000	0.2	NA	150	i s	70		
BUTYLBENZYLPHTHALATE										70		
BENZO(2)ANTHRACENE	NA	0.00E+00	0.42		2000	0.2	NA I	150	9			
CHRYSENE	NA	0.00E+00	0.30	1E06	2000	0.2	NA	150	9	70		
is(2-ETHYLHEXYL)PHTHALATE	NA	0.00E+00	0.25	1E-06	2000	0.2	J NA '	150	9	70		
SENZO(6)FLUORANTHENE	NA	0.00E+00	0.27	İ 1E-06	j 2000	į 0.2	NA	150	j 9	į 70	3285	25
BENZO(k)FLUORANTHENE	NA	0.00E+00	0.18	1E-06	2000	0.2	NA	150	. 9	70		
	NA	0.00E+00	0.74	1E-06	2000	0.2	I NA	150	9	70		
BENZO(a)PYRENE												
NDENO(1,2,3-cd)PYRENE	NA	0.00E+00	0,38	1E-06	2000	0.2	NA	150	9	70		
BENZO(g,h,i)PERYLENE	NA	0.00E+00	1.1	1E-06	2000	0.2	I NA	150	9	70	3285	25
					[	{		!	}	}	ł	1
PESTICIDES / PCB'S		<b>a-</b> -		·								1
AROCLOR-1248	2.68E-08	3.44E-09	1.9	1E-06	2000	0.2	0.006	150	9			
AROCLOR~1254	1.62E08	2.09E-09	1.2		2000	0.2	0.006	150	1 9			
	3.10E-10	3.99E-11	0.022	1E-06	2000	į 0.2	0.006	150	í a	į 70	3285	1 25
ROCLOR~1260	3.100101			1 12-00	1 2000	I U.Z.						

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### TABLE C.5–2 UNCERTAINTY ANALYSIS INGESTION OF CHEMICALS IN SOLL AND HOUSE DUST SCENARIO 5– Residential (Future)

CHEMICAL	(NONCANCER)	(CANCER)	INTAKE ADULT (NONCANCER)	(CANCER)	SOIL CONC.	INGESTION RATE CHILD	INGESTION RATE ADULT	FACTOR	FRACTION	EXPOSURE FREQUENCY	EXP. DUR. CHILD	EXP. DUR.	BODY WT. CHILD	BODY WT. ADULT	AVERAGING TIME NONCANCER	AVERAGING TIME NONCANCER	AVERAGING TIM (CANCER)
CHEMICAL	(mg/kg/day)	(mg/kg/day)	(NONCANCER) (mg/kg/day)	(CANCER) (mg/kg/day)	(mg/kg)	(mg soil/day)	(mg soil/day)	(1E-6kg/mg)	(unities)	(days/year)	(years)	(yean)	(kg)	(kg)	CHILD (days)	ADULT (days)	(daya)
INOR GANICS										1							
UMINUM	2.31E-02	1,98E-03	2.47E-03	3.18E-04	8422.5	100	50	1E-06	1	150	j 6	្រ ទ	15	70	2190	3285	255
VTIMONY	1.61E-05	1.38E-08	1.73E-06	2.22E-07	5.9	100	50	1E-06	1	150	) 6	j. 9	15	70	2190	3285	255
RSENIC	5.54E-06	4,75E07	5.93E-07	7.63E-08	2.0	100	50	1E-06	. 1	150	6	9	15	70	2190	3265	255
ARIUM	2.12E-04	1.82E-05	2.27E-05	2.92E-06	77.4	100	50	1E-06	1	150	6	9	16	70	2190	3285	255
RYLLIUM	1.49E-05	1.27E-06	1.59E-06	2.05E-07	5.4	100	50	1E-06	1	150	6	9	1 15	70	2190	3285	258
DMIUM	2.58E-06	2.22E-07	2.77E-07	3.56E-08	0.94	100	50	1E-06	1	150	6	9	15	70	2190	3285	255
ROMIUM III	6.65E-04	5.70E-05	7.12E-05	9.16E-06	242.6	100	50	1E-06	1	150	6	9	15	70	2190	3285	25
IROMIUM VI	1.10E-05	9.39E-07	1.17E-06	1.51E-07	4.0	100	50	1E-06	1	150	6	Į 9	15	70	2190	3285	25
BALT	1.19E-05	1.02E-06	1.28E06	1.64E-07	4.3	100	50	1E-06	1	150	6	1 8	15	70	2190	3285	25
OPPER	4.28E-05	3.67E-06	4.59E-08	5.90E-07	15.6	100	50	1E-06	1	150		9	16	70	2190	3285	25 25
BAD	1.54E-04	1.32E05	1.65E-05	2.12E-06	56.1	100	50	1E-08		150		( š	15	70	2190	3285	25
ANGANESE	1.19E~03	1.02E-04	1.28E-04	1.65E05	436.1	100	50	1E-06	1	150		8	15	70	2190	3285	25
ERCURY	3.49E-07	2.99E-08	3.73E-08	4.80E-09	0.13	100	50 50	1E-06	]	150			15	70	2190	3285	25
ICKEL	6.12E-04	5.25E-05	6.56E-05	8.44E-06	223.6	100		1E-06		150			15	70	2190	3285	26
LENIUM	1.82E-06 3.30E-06	1.56E-07 2.83E-07	1.95E-07 3.53E-07	2.50E-08	0.66 1.2	100 100	50 50	1E-06 1E-08		150			15	70	2190	3285	25
ANADIUM	4.24E-03	3.64E-04	4.55E-04	4.54E-08 5.84E-05	1548.6	100	50 50	16-06		150			15	70	2190	3285	25
	4.24203 1.92E04	1.64E-05	4.55E-04 2.05E-05	5.84E-05	1548.6	100	50	1E-06		150	6		15	70	2190	3285	25
INC ORON	1.92E04 9.19E05	7.685-05	2.05E-05 9.85E-06	2.64E-06	69.9 33.6	100	50	1E-06	1	150	6		10	70	2190	3285	25
IOBIUM	1.81E-04	1.55E-05	1.94E-05	2.49E-06	66.1	100	50	1E-06		150			15	70	2190	3285	25
RONTIUM	1.14E-04	9.78E-06	1.84E-05	2.49C-06	41.6	100	50	1E-06		150	i i		15	70	2190	3285	25
TANIUM	4.00E-04	3.43E-05	4.28E-05	5.51E-08	146.0	1001	50	1E-06		150	6		15	70	2190	3285	25
RCONIUM	2.47E-04	2.12E-05	4.28E-05	3.41E-06	90.2	100	50	1E-06	i	150	š	1 3	15	70	2190	3285	- 25
RCONIOM	2.4/2-04	2.125-00	2.000-00	0.416-00	3V.E		50	12-00	•		Ň			1 1	2100		
VOLATILE ORGANICS										1	1.	i .	j		1		
TETONE	2.25E-07	1.93E→08	2.41E-08	3.09E-09	0.082	100	50	1E-08	1	150	6	9	16	70	2190	3285	25
RBON DISULFIDE	8.29E-09	7.10E-10	8.88E-10	1.14E-10	0.0030	100	50	1E~08	1	160	6	9	15	70	2190	3285	25
Z-DICHLORETHENE (total)	5.48E-09	4.70E - 10	5.87E~10	7.55E-11	0.0020	100	50	1E~08		1 150	. 6	9	15	70	2190	3285	25
BUTANONE	1.67E-08	1.44E-09	1.79E-09	2.31E-10	0.0061	100	50	1E~06	. 1	150	6	9	15	70	2190	3265	25
RICHLOROETHENE	9.61E-09	6.24E-10	1.03E-09	1.32E-10	0.0035	100	50	1E~06	1	150	6		15	70	2190	3285	25
ENZENE	4.11E-07	3.52E-08	4.40E-08	5.66E-09	0.15	100	50	1E-08	2	150	6	9	15	70	1 2190	3285	25
ETRACHLOROETHENE	9.94E~09	8.52E-10	1.06E09	1.37E-10	0.0036	100	50	1E-06	1	150	6	9	15	70	2190	3285	25
OLUENE	1.03E-08	8.84E-10	1.11E-09	1.42E-10	0.0038	100	50	1E08	1	150	6	1 3	15	1 70			25
THYLBENZENE	3.77E08	3.23E-09	4.03E-09	5.19E-10	0.014	100	60	1E-06		150	6		15	70	j 2190 j 2190	3285	25
YLENE (total)	1.39E~07	1.19E~08	1.48E08	1.91E09	0.051	100	50	1E-06	1	150	6	1 2	15	70	2190	3285	20
BASE NEUTRAL / ACIDS						i i	i	i i		i		1			•		
HENOL	4.93E07	4.23E08	5.28E-08	6.79E-09	0.18	100	50	1E-06	1	150	6	9	15	70	2190	3285	25
ENZOIC ACID	4.11E~07	3.52E-08	4.40E-08	5.66E-09	0.15	100	50	1E-08	1	150	6	9	15	70		3285	25
APHTHALENE	3.56E~07	3.05E-08	3.82E-08	4.91E-09	0.13	100	50	1E-08.	1	160	1 8	8	15	70		3285	25
-NITROPHENOL	2.74E~06	2.35E-07	2.94E-07	3.77E∽08	1.0	100	50	1E-08	1	150	6	9	15	70		3285	25
-DINTROTOLUENE	3.01E~07	2.58E-08	3.23E-08	4.15E-09	0.11	100	50	1E08	1	150	6	9	15	70		3285	25
ENTACHLOROPHENOL	7.64E~06	6.55E-07	8.19E07	1.05E-07	2.8	100	50	1E-06	1	150	6	9	15	70		3285	25
HENANTHRENB	3.56E~07	3.05E-08	3.82E-08	4.91E-09	0.13	100	60	1E-06	1	150	6	9	1 15	70		3285	25
NTHRACENE	2.30E-07	1.97E08	2.47E-09	3.17E-09	0.084	100	50	1E-06	1	150	6	9	15	70		3285	25
I-A-BUTYLPHALATE	2.54E-07	2.18E-08	2.72E-08	3.50E-09	0.093	100	50	1E-06	1	150	6	9	15	70		3285	25
LUORANTHENE	7.09E-07	6.07E-08	7.59E08	9.76E-09	0.26	100	50	1E-08	1	150	6	9	15	70		3285	25
RENE	1.26E-07	1.06E-08	1.35E-08	1.74E-09	0.046	100	60	1E-06	1	150	i 6	1 9	15	70		3285	2
UTYLBENZYLPHTHALATE	3.29E-07	2.82E-08	3.52E-08	4.53E-09	0.12	100	50	1E-08	1	150	6	9	15	70		3285	2
ENZO(a)ANTHR ACENE	1.15E-06	9.86E-08	1.23E-07	1.59E-08	0.42	100	50	1E-06	1	150	6	9	15	70	2190	3285	25
IRYSENE	8.22E-07	7.04E08	6.60E-08	1.13E-08	0.30	100	50	1E-06	1	150	6	1 9	15	70	2190	3285	2
(2-ETHYLHEXYL)PHTHALATE	6.85E-07	5.87E-09	7.34E-08	9.44E-09	0.25	100	50	1E-06	1	150	6	9	15	70		3265	2
NZO(b)FLUORANTHENB	7.32E-07	6.27E-08	7.84E08	1.01E-08	0.27	100	50	1E-06	1	150	6	j 9	15	70		3285	2
ENZO(k)FLUORANTHENE	4.38E-07	3.76E-08	4.70E-08	6.04E-09	0.16	100	50	1E-08	1	150	6	1 9	15	70		3285	2
ENZO(a)PYRENE	2.03E-06	1.74E-07	2.17E-07	2.79E-08	0.74	100	50	1E-06	1	150	6	9	15	70		3265	1 2
IDENO(1,2,3-cd)PYRENE	1.04E06	8.92E-08	1.12E-07	1.43E~08	0.38	100	50	1E-06	1	150	6	9	15	70		3285	2
ENZO(ghi)PERYLENE	3.01E-06	2.58E-07	3,23E-07	4.15E-08	1.1	100 (	50	1E-06	1	150	6	9	15	70	2190	3285	2
PESTICIDES / PCB'S										1		1	1				
ROCLOR-1245	5.21E-06	4.46E-07	5.58E-07	7.17E-08	1.9	100	50	1E-06	1	150	1 6	9	15	j 70	2190	3285	2
ROCLOR-1254	3.16E-06	2.71E-07	3.38E-07	4.35E-08	1.2	100	50	1E-06	1	150	i š	1 9	15	70			i 2
OCLOR-1260	6.03E-08	5.17E-09	6.46E-09	8.30E~10	0.022	100	50	1E-06	i 1	150	6	9	15	70		3285	i 2
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII					194000000000000000000000000000000000000			นและเหตุการการการการการการการการการการการการการก								ว้ามรรณธภายและรถบบบ	

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NA: Not Applicable

### TABLE C.5–3 UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 5 – Residential (Future)

	CHRONIC DAILY			NUTRA NA ANA ANA ANA ANA ANA ANA ANA ANA AN				
II II CHEMICAL	INTAKE ADULT		l SF	WEIGHT OF	TYPE OF	SF BASIS/	SPEC. RISK	PATHWAY   TOTAL
	(mg/kg/day)	ABSORPTION	(mg/kg/day)-1	EVIDENCE	CANCER	SOURCE	ADULT	RISK RISK
							CHILD	NA   2E-05
IEXPOSURE PATHWAY: DERMAL	CONTACT WITH	SOILS					ADULT	4E-08   3E-06
				*****				
II INORGANICS	******		ł	}	1			1
ARSENIC	0.0E+00	No	1.75E+00	İ A	Skin	IRIS	0E+00	ii -
ü			Ì	Í	Í Í		1	1
VOLATILE ORGANICS			Í	i	i i			
TRICHLOROETHENE	0.0E+00	No	1.10E-02	B2	Liver	Gavage/HEAST	0E+00	4
BENZENE	0.0E+00	No	2.90E-02	A	Leukemia	Occupational/IRIS	0E+00	1
(TETRACHLOROETHENE	0.0E+00	No	5.10E-02	B2	Liver	Gavage/HEAST	0E+00	1
ii			1	Í	i l	-		11
]] BASE NEUTRAL / ACIDS		i .	l	ĺ	1		j l	1
2,4-DINITROTOLUENE	0.0E+00	No	6.80E-01	B2	Liver, mammary gland	Diet/IRIS	0E+00	ll
PENTACHLOROPHENOL	0.0E+00	No	1.20E-01	B2	Hepatocellular adenoma, carcinomas,p	Oral/IRIS	0E+00	11
BUTYLBENZYLPHTHALATE	0,0E+00	No	) NA	0	Leukemia	Diet/IRIS	NA NA	<b>H</b>
BENZO(a)ANTHRACENE	0.0E+00	No	I NA	B2	Liver, lung, skin	IRIS	NA I	11
CHRYSENE	0.0E+00	No	NA NA	B2	Malignant lymphoma	IRIS	NA NA	41
bis(2-ETHYLHEXYL)PHTHALATE	0.0E+00	No	1.40E-02	B2	Liver	IRIS	0E+00	11
BENZO(6)FLUORANTHENE	0.0E+00	No	j NA	B2	Lung, thorax, skin	IRIS	I NA	11
BENZO(k)FLUORANTHENE	0.0E+00	No	I NA	B2	Lung, thorax, skin	IRIS	NA .	11
BENZO(a)PYRENE	0.0E+00	No	NA	62	Stomach, lung	IRIS	I NA	11
INDENO(1,2,3-cd)PYRENE	0.0E+00	No	NA	B2	Lung, skin	IRIS	NA NA	1
11 1			Į	]	Į		1	li
PESTICIDES / PCB'S			ļ	l	1 1	t in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	1	11
AROCLOR-1248	3.4E-09	No	7.70E+00	•	1	1	1 3E-08	
AROCLOR-1254	2.1E-09	No	7.70E+00	•	1	}	2E-08	
AROCLOR-1260	4.0E-11	No	7.70E+00		Liver	Diet/IRIS	3E-10	
								11

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### TABLE C.5-4 UNCERTAINTY ANALYSIS CANCER RISK ESTIMATES SCENARIO 5 - Residential (Future)

II CHEMICAL	CHRONIC DAILY	CHRONIC DAILY		SF	WEIGHT OF	TYPE OF	SF BASIS/	CHEMICAL SPEC. RISK	SPEC, RISK	TOTAL
II CHEMICAL	(mg/kg/day)	(mg/kg/day)	ABSORPTION			CANCER	SOURCE	CHILD	ADULT	RISK
					I TATATATATATATATATATATATATATATATATATATA					
11				11:111111111111111111111111111111111111				484000000000000000000000000000000000000	ADULT	3E-06
EXPOSURE PATHWAY: INCIDEN	TAL INGESTION	OF CHEMICALS	IN SOILS						CHILD	2E-05
					A A MARKANA A A MARKANA A MARKANA A MARKANA A MARKANA A MARKANA A MARKANA A MARKANA A MARKANA A MARKANA A MARKA		11111111111111111111111111111111111111	UL RECEDENTIAL TANKA TANA TA	111111111111111111111111111111111111111	
INORGANICS	]			1	1		, in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	1		ł
ARSENIC	4.7E-07	7.6E-08	No	1.75E+00	A A	Skin	IRIS	8E-07	1E07	
BERYLLIUM	1.3E-06	2.0E-07	No	4.30E+00	B2	gross tumors, all sites	Water/IRIS	5E-06	9E07	1
LEAD	1.3E05	2.1E-06	No	NA	B2	Renal tumors	Oral/IRIS	I NA	NA	1
ii		l		Ì	(	1	1	1 1		1
VOLATILE ORGANICS	1	1	}	1	1	ł	1			
TRICHLOROETHENE	8.2E-10			1.10E-02			Gavage/HEA		1E-12	
BENZENE	3.5E-08	5,7E~09	No	2.90E-02		Leukemia	Occupationa		2E-10	
TETRACHLOROETHENE	( 8.5E-10	1.4E-10	No	5.10E-02	B2	Liver	Gavage/HEA	4E11	7E-12	ļ
			l	1			[			
BASE NEUTRAL / ACIDS	l _			1						1
24-DINITROTOLUENE	2.6E-08	4.2E-09	No	6.80E-01	B2	Liver, mammary glan		2E-08	3E-09	
PENTACHLOROPHENOL	6.5E-07	1.1E07	No	1.20E-01	B2	Hepatocellular adenc		8E-08	1E-08	
BUTYLBENZYLPHTHALATE	2.8E-08	4.5E-09	No	NA	C	Leukemia	Diet/IRIS	NA NA	NA	]
BENZO(a)ANTHRACENE	9.9E-08	1.6E-08	No	1.15E+01		Liver, lung, skin	IRIS	1E-06	2E-07	
CHRYSENE	7.0E-08	1.1E-08	No	1.15E+01	B2	Malignant lymphom a		8E-07	1E-07	
bis(2-ETHYLHEXYL)PHTHALATE	5.9E-08	9.4E-09	No	1.40E-02	B2	Liver	IRIS	8E-10-		
BENZO(b)FLUORANTHENE	6.3E-08	1.0E-08	No	1.15E+01	B2	Lung, thorax, skin	IRIS	7E-07	1E-07	
BENZO(k)FLUORANTHENE	3.8E-08	6.0E-09	No	1.15E+01	B2	Lung, thorax, skin	IRIS	4E-07	7E-08	
BENZO(a)PYRENE	1.7E-07	2.8E-08	No	1.15E+01		Stomach, lung	IRIS	2E-06		1
INDENO(1,2,3-cd)PYRENE	8.9E-08	1.4E-08	No	1.15E+01	B2	Lung, skin	IRIS	1E06	2E-07	
		1		}				[		
PESTICIDES / PCB'S	4.65 07		Na			1	ļ	1 3E~06	6E-07	1
AROCLOR-1248	4.5E-07 2.7E-07	7.2E-08	No No	1 7.70E+00			ļ }	2E-06		
AROCLOR-1254		4.3E-08	NO NO	7.70E+00	B2	Liver	Diet/IRIS	4E~08	6E-09	
AROCLOR-1260	5.2E09	8.3E-10				l District de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de la constanti de				
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# TABLE C.5-5 UNCERTAINTY ANALYSIS CHRONIC HAZARD INDEX ESTIMATES SCENARIO 5 - Residential (Puture)

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		CHRONIC DAILY					RFD				((()))))))))))))))))))))))))))))))))))	MHHHH PATH
	INTAKE CHILD	INTAKE ADULT	ADJUSTED FOR		CONFIDENCE	CRITICAL	BASIS/			QUOTIBNT	QUOTIENT	HAZ
 	(mg/kg/day)	(mg/kg/day) 	ABSORPTION	(=z/kg/day)	LEVEL SSSN012551111111111111111111111111111111111	BFFBCT	SOURCE	ADJUSTMEN	FACTORS	CHILD	NUMBER OF BUILDING	INDB)
											ADULT	7
POSURE PATHWAY: INCEDEN	ITAL INGESTION									1		
UMINUM	2.3E-02	2.5E-03	No	NA	1	T successive black also and	NA/IRIS	1000	1	NA 4E02	NA    4E-03	
TIMONY	1.6E-05 5.5E-06	1.7E06 5.9E07	No No	4.00E~04 1.00E~03	Low	Longevity, blood glucose Keratosis and hyperpigr	Water/IRIS Dict/HEAST	1	'	4E-02 6E-03	6E-04	1
RENIC	2.1E-04	2.3E-05	No	7,00E~02	Medum	None observed	Water/IRIS	3	1	3E-03	3E-04	d
RYLLIUM	1.5E-05	1.6E-06	No	5.00E~03	Low	None observed	Water/IRIS	100	1	3€-03	3E-04	ll –
DMIUM	2.6E-06	2.8E-07	I No I	1.00E~03	High	Proteinuria	Diet/IRIS	10	1	3E-03	3E-04	4
ROMIUMIII	6.6E-04	7.1E-05	No	1.00E+00	Low	Hepatotoxicity No effects observed	IRIS Water/IRIS	1000	1	7E-04 2E-03	7E05	A .
	1.1E-05 1.2E-05	1.2E-06 1.3E-06	No No	5.00E03 NA	Low	NO CLICUS ODSCIVED	NAIRIS	300	''''	NA NA	NA	ii 👘
OBALT OPPER	4.3E-05	4.6E-06	No	4.00E-02		Local GI irritation	NA/HEAST			1E-03	1E04	4
EAD	1.5E04	1.6E-05	No	NA		Neurobehavioral effects	NAARIS		1	NA	NA I	41
ANGANESE	1.2E-03	1.3E-04	No	1.00E-01	Medum	CNS effects	Diet/IRIS	1	1	1E-02	1E-03	41
ERCURY	3.5E-07	3.7E-08	No	3.00E-04		Kidney effects	Orsl/HEAST	1000		1E-03 NA	1E-04	#
ICKEL	6.1E-04	6.6E-05	No No	NA 5.00E-03	Medium	Clinical selenosis	NA/IRIS Diet/IRIS	3	1	NA 4E−04	NA      4E−05	ű
ELENIUM	1.8E−06 3.3E−06	1.9E07 3.5E07	i No	3.00E-03	Medum	Argyria	Oral/IRIS	2	i	16-03	1E-04 (	ü
LVER ANADIUM	4.2E-03	4.5E-04	No	7.00E-03		None observed	Water/HEAST	100		6E-01	6E-02	H.
INC	1.9E-04	2.1E05	No	2.00E-01		Anemia	Therap/HEAST	10	!	1E-03	1E-04	11
ORON	9.2E-05	9.8E-06	No	9.00E-02	Mədium	Pulmonary edema and t	Occupational/IR.	100	1	1E-03	1E-04	1
IOBIUM	1.8E04	1.9E-05	No	NA			NA/IRIS NA/IRIS			NA NA	NA NA	11
TRONTIUM	1.1E-04 4.0E-04	1.2E~05 4.3E~05	No No	NA NA			NAARIS		1	NA	NA	ii 🛛
ITANIUM IRCONIUM	2.5E-04	2.6E-05	No	NA			NAARIS		<b>.</b> .	NA	NA	1
VOLATILE ORGANICS			1						i		1 1	ii 👘
GETONE	2.2E-07	2.4E-08	No	1.00E-01	Low	Increased liver and kidn	Gavage/IRIS	1000	1 1	2E-06	2E07	11
ARBON DISULFIDE	8.3E-09	8.9E-10	No	1.00E-01	Medum	Fetal toxicity	Inhal/IRIS	100	ļ 1	8E-08 5E-07	9E-09	1
2-DICHLORETHENE (total)	5.5E-09	5.9E-10	No	1.00E-02	M-4	Decreased hematocrit a Fetotoxicity	Gavage/HEAST Inhal/IRIS	3000	}	5E-07 3E-07	6E08	H.
-BUTANONE	1.7E−08 9.6E−09	1.8E-09 1.0E-09	) No No	5.00Ë-02 NA	Medum	retotoxicity	NA/IRIS	1000	1	NA NA		11
RICHLOROETHENE	4.1E-07	4.4E-08	No	NA		i ·	NA/IRIS	í		NA	NA I	ii
ETRACHLOROETHENE	9.9E-09	1.1E-09	No	1.00E-02	Medum	Hepatotoxicity, weight g	Gavage/IRIS	100	1 1	1E08	1E-07	11
TOLUENB	1.0E-08	1.1E-09	No	2.00E-01	Medium	Changes in liver and kid		1000	1 1	5E-08	6E-09	"
THYLBENZENB	3.8E-08	4.0E-09	No	1.00E-01	Low	Liver and kidney toxicity Hyperactivity, decreased		1000	!	4E-07 7E-08	4E-08 7E-09	R
KYLENE (total)	1.4E07	1.5E-08	No	2.00E+00	Medium		Oavagoikis		'	15-00	/2-00	li –
BASE NEUTRAL / ACIDS	4.9E-07	5.3E-08	No	6.00E-01	Low	Reduced fetal body weig	Gavage/IRIS	100	1	8E-07	9E-08	n li
HENOL I	4.9E-07 4.1E-07	4,4E-08	No	4.00E+00	Medium	1	Oral/IRIS	1	i i	1E-07	1E-08	ii 👘
APHTHALENB	3.6E-07	3.8E-08	No	4.00E-03	······································	Decreased body weight		10000	i	9E-05	1E-05	Ϊ.
-NITROPHENOL	2.7E-06	2.9E-07	No	NA		1	NA/IRIS	1	Į	NA NA	NA	1
4-DINITROTOLUENE	3.0E07	3.2E-08	No	NA	Martine '	Thursday and hit day and a start	NA/IRIS Diet/IRIS	100	1	I NA I 3E−04	NA 3E-05	li li
ENTACHLOROPHENOL	7.6E-06	8.2E-07	No	3.00E-02  L NA	Medium	Liver and kidney pathol	NAJRIS	100	1 1	I 38≘−04 I NA	NA	K
HENANTHRENE NTHRACENE	3.6E-07 2.3E-07	3.8E-08 2.5E-08	No No	3.00E-01	Low	No observed effects	Gavage/IRIS	3000	1	8E-07.	8E-08	li
NTHRACENE	2.5E-07	2.7E-08	No	1.00E-01	Low	Increased mortality	Dict/IRIS	10000	i	3E-06	3E-07	lí
LUORANTHENE	7.1E-07	7.6E-08	No	4.00E-02	Low	Nephropathy, changes in	Gavage/IRIS	3000	1	2€-05	2E-06	1
YRENE	1.3E-07	1.4E-08	No	3.00E-02	Low	Kidney effects	Gavage/IRIS	3000	1 1	4E−06	5E-07	!!
UTYLBENZYLPHTHALATE	3.3E-07	3.5E-08	No	2.00E-01	Low	Effects on body weight a		10000	1	2E-06	2E-07	1
BNZO(a)ANTHRACENE	1.2E−06 8.2E−07	1.2E-07 8.8E-08	No No	NA NA			NA/IRIS NA/IRIS			NA NA	NA	.[[
HRYSENE #(2-ETHYLHEXYL)PHTHALATE	8.2E−07	7.35~08	l No	2.00E-02	Medium	Increased relative liver	Diet/IRIS	1000	1	3E-05	4E-06	ji 👘
ENZO(b)FLUORANTHENE	7.3E-07	7.8E-08	No	NA			NA/IRIS		i .	NA	NA	1
ENZO(k)FLUORANTHENB	4.4E-07	4.7E-08	No	NA		l	NA/IRIS	Į	1	NA	NA I	11
ENZO(a)PYRENE	2.0E-06	2.2E-07	No	NA		1	NA/IRIS	ļ	ļ	NA NA	NA	1
NDENO(1,2,3-cd)PYRENE	1.0E-06 3.0E-06	1.1E~07 3.2E~07	No No	NA NA		1	NA/IRIS NA/IRIS	1	1	NA NA	NA NA	l
PESTICIDES / PCB'S		1		1		[	1	ł	1	1		
AROCLOR-1248	5.2E-06	5.6E~07	No	NA	1	1	NA/IRIS	1	]	NA	NA	1
ROCLOR-1254	3.2E-06	3.4E~07	No	NA		•	NA/IRIS NA/IRIS	ļ	!	I NA	NA NA	[[
AROCLOR-1260	6.0E→08	1 6.5E~09	No	I NA		1	I NAVIKIS	1				11

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NA: Not Applicable

## **APPENDIX D**

# ASSESSMENT OF RADIOLOGICAL CONDITIONS AT THE NEWFIELD, NJ FACILITY

### SCENARIO 1 - TRESPASSING (CURRENT)

### DERMAL CONTACT WITH CHEMICALS IN SOIL

Equation:

Absorbed Dose 
$$(mg/kg-day) = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical of Concentration in Soil (mg/kg)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)
SA	==	Skin Surface Area Available for Contact (cm ² /event)
AF	=	Soil to Skin Adherence Factor (mg/cm ² )
ABS	=	Absorption Factor (unitless)
EF	=	Exposure Frequency (events/year)
ED	~	Exposure Duration (years)
BW	=	Body Weight (kg)
AT	=	Averaging Time (period over which exposure is averaged - days)

### Specific Parameter Values:

CS	=	Concentration of chemicals in soil
SA	=	$8,600 \text{ cm}^2$ , based upon exposed arms, hands and legs.
AF	=	1.45 mg/cm ² , based upon commercial potting soil adherence to hands
ABS	=	0.01 for cadmium; 0.06 for PCBs (EPA, 1992b)
EF	=	30 days/year (NJDEPE, 1994)
ED	=	9 years
BW	=	49 kg
AT	=	3,285 days for non-cancer risks
		25,550 days for cancer risks

### INGESTION OF CHEMICALS IN SOIL

Equation:

Intake 
$$(mg/kg-day) = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

where:

CS	=	Chemical Concentration in Soil (mg/kg)
IR	=	Ingestion Rate (mg soil/day)
CF	=	Conversion Factor (10 ⁻⁶ kg/mg)

contaminants following inhalation of fugitive dusts, dermal contact with soil or incidental ingestion of soil.

Current plume migration has resulted in restriction of ground water as a potable source with the exception of homes to the south of the site. Thus, a current residential use scenario will be addressed to evaluate exposure to contaminants in ground water (i.e., ingestion, inhalation of airborne volatiles and dermal exposure).

In the future, construction workers may be involved in developing the site (e.g. building homes). Through excavation and site preparation activities, they could receive extensive inhalation exposure to contaminants in dust, as well as dermal and ingestion exposures to contaminants in subsurface soil. It is assumed that excavation and site preparation activities would last for a 6 month period, and that no remediation of contaminants prior to the construction or residential scenarios would occur.

Also in the future, children and adults may occupy residences on the site. The relevant exposure pathways are indoor and outdoor ingestion of dust/soil (this will be addressed for 0-6 year old children, and for adults), outdoor dermal exposure to soil contaminants (adults) and outdoor inhalation of contaminants in dust (adults). For children, parameter values for 0-6 year old children were selected, and exposure was assumed to take place over 6 years. For adults, exposure is assumed to occur for 30 years.

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### APPENDIX A

### **RISK ASSESSMENT METHODS**

Five exposure scenarios will be included in the risk assessment for the Shieldalloy Metallurgical Corp. (SMC) Site. 1) A current use trespasser scenario will involve exposures to the site outside the restricted industrial area as it currently exists, 2) a current industrial use scenario will involve exposures to the site within the restricted industrial area and specifically addressing the undeveloped portion of the site due to the unvegetated and unpaved nature of this area, 3) a current residential use scenario involving exposure due to use of private wells outside the well restriction area, 4) future development of the site (construction scenario) and 5) a future residential use of the site property. The scenarios are briefly described below. Model equations and parameter values for each exposure pathway are detailed on the following pages.

Children may trespass on the unrestricted portion of the site as it currently exists, and thereby play with contaminated soils and stream water and/or sediments from the Hudson Branch. As a result, they may receive dermal and ingestion exposures to contaminants in soil and water. Based on information during the field investigation it is assumed that children trespass onto the site on an infrequent basis (30 days/year), that children are unlikely to enter this area of the site on a regular basis before the age of 9 due to its distance from residences, and regular exposures are not expected beyond the age of 18 due to changes in the use of recreational time.

SMC is currently an active industrial facility. The active industrial portion of the property is covered with buildings and pavement. Piles of material are stored on an undeveloped portion of the site. This area is devoid of any type of ground cover (e.g. vegetation, pavement). As a result, SMC employees who load/unload material in this area may be exposed to site

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# **APPENDIX** A

# **RISK ASSESSMENT METHODS**

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