ATTACHMENT 10B

THERMAL TREATMENT UNIT
HUMAN HEALTH RISK ASSESSMENT

Contents

ENVIRONMENTAL PERFORMANCE STANDARDS AND HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENTS

1.0 General

In 1987, Hill Air Force Base (HAFB) applied for a Treatment, Storage, and Disposal (TSD) facility permit for the Thermal Treatment Unit (TTU) located at the Utah Test and Training Range (UTTR). The Utah Department of Environmental Quality (UDEQ) issued the final permit February 13, 2003, and reissued the permit September 13, 2013. The 1997 human health risk assessment (HHRA) submitted in support of the original permit request indicated that the OB/OD operations would not cause undue harm to the potential onsite and offsite receptors. The risk evaluation was updated in April 2005 with the inclusion of additional soil sampling data from the 2002 and 2004 sampling events. The 2005 risk assessment forms the baseline against which the future soil sampling data must be evaluated, in terms of changes in the human health risk from the ongoing OB/OD operations.

This risk assessment must be reviewed every fifth calendar year after issuance of the Permit (Section II.F.2 of the Permit) and updated if needed. The risk assessment addresses risks for four distinct exposure scenarios or pathways. These are the groundwater exposure pathway (Section 2.0), the surface water exposure pathway (Section 3.0), the surface soil exposure pathway (Section 4.0), and the air exposure pathway (Section 5.0).

Sections 2.0 and 3.0 discuss the lack of potential exposure through the groundwater and surface water pathways and do not contain chemical-specific risk analysis for these exposure scenarios. Section 3.0 discusses the potential risks for soil ingestion, inhalation, and dermal adsorption to an industrial worker. The industrial worker is a full-time career person involved in the handling of soils displaced during detonations and in the preparation of the area for the next operation. The industrial worker was not evaluated in the original permit. Rather, a resident and a construction worker involved in a hypothetical residential development onsite were evaluated.

Given the unlikelihood that the site will ever be developed, the residential development scenario is not realistic; therefore, the assessment of risks to these hypothetical receptors is not appropriate at this time and has not been included. On the other hand, the grading and preparation of the OB/OD area by an industrial worker are real ongoing activities. Therefore, an assessment that the industrial TTU worker is not put at an unacceptable risk is appropriate and is required by Section III.G.1 of the Part B permit. Soil data from sampling events in 2019 and 2021 have been included in this revision.

Section 5.0 discusses the air exposure pathway and analyzes inhalation risks to (1) an Explosive Ordnance Disposal (EOD) person monitoring the OB/OD operations onsite, (2) to a resident at the nearby community of Oasis, and (3) to a recreational boater on the Great Salt Lake. These receptors remain the same as in the original permit, but chemical information has been updated and chemical-specific risks have been recalculated.

1.1 Current Evaluation

This HHRA was originally completed and incorporated into the Permit in 2005. Biennial evaluations of the risk assessment were conducted in 2007, 2009, 2011, 2013, and 2018. The 2022 Human Health Risk Screen Evaluation is attached as Appendix G. It summarizes the findings of the previous evaluations and incorporates new sampling data.

2.0 Groundwater Pathway [UAC R315-264-601]

2.1 Performance Standards

The environmental performance standard for protection of groundwater calls for the prevention of any releases that may adversely affect human health or the environment due to migration of waste constituents in the groundwater or subsurface environments. Specific items to be considered include:

- The volume and chemical characteristics of the waste in the unit;
- The hydrogeologic and geologic characteristics of the unit and surrounding area;
- The existing quality of groundwater;
- The quantity and direction of groundwater flow;
- The proximity to and withdrawal rates of current and potential groundwater users;
- The patterns of land use in the region;
- The potential for deposition or migration of waste constituents into the subsurface, physical structures, and the root zone of food chain crops and other vegetation;
- The potential for health risks caused by human exposure to waste constituents; and
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents.

2.2 Required Programs

Utah regulations require groundwater monitoring and reporting at all hazardous waste management facilities unless a waiver is granted. The groundwater monitoring program consists of detection monitoring, compliance monitoring, and monitoring during and after corrective actions. Detection monitoring at the TTU is conducted on a semiannual basis.

2.3 Site-Specific Conditions

Groundwater and geologic conditions beneath the TTU facility were investigated in 1991 through monitoring wells TTU-1 and TTU-2 (see Figure 1). Boreholes for the wells revealed extensive thicknesses of unsaturated, low-permeability soils. Groundwater in an unnamed aquifer occurs at depths ranging from 450 feet (ft) near the southwest corner of the facility to 650 ft beneath the ridge at Sedal Pass above the TTU. Based on groundwater levels in the upgradient and downgradient monitoring wells, depth to groundwater beneath the three OB/OD units is estimated to be greater than 585 ft.

Groundwater samples collected from the wells at TTU-1 and TTU-2 since 2018 were analyzed for energetics and metals. Table 1 shows the detected analytes. Each is commonly found in area soils.

Analytical results to date show various metals were present in groundwater samples taken from both monitoring wells in 2018, 2019, 2020, and 2021 (Table 1). Each is commonly found in area soils. One energetic (nitrobenzene) was detected in one sample taken from one monitoring well (TTU-1) in 1996. Energetics were also detected in samples taken in 1996 (including TNT, HMX, and PETN) and 2000 (TNT). The 2000 detection was attributed to laboratory contamination and the 1995 and 1996 detections were attributed to sample contamination in the field. Samples taken in December 2004 also showed the presence of perchlorate at levels less than 1 part per billion (ppb). Groundwater analytical results collected since 2018 show that no explosives or explosive breakdown products were detected in the groundwater. Perchlorate, which is both naturally occurring and used as an oxidizer in propellants, was detected at concentrations consistent with those previously observed (approximately 1 microgram per liter (ug/L), with the exception of the 2018 sample in TTU-2 (2.01 ug/L). All analyses included equipment blanks and matrix spikes (MS) and were completed by environmental laboratories certified by the State of Utah.

The information in Table 1 suggests that groundwater contamination resulting from OB/OD activities at the TTU is not likely to have occurred. A previous groundwater dating study using carbon-14, tritium/helium, and chlorofluorocarbon methods has demonstrated that groundwater in this area is Pleistocene in age (14,000 years before present), is essentially stagnant, and receives little or no current recharge (CH2M HILL, 2006). That study supports the conclusion that some perchlorate in groundwater beneath the TTU is naturally occurring. Groundwater contamination from this facility is unlikely because:

- Groundwater occurs at greater than 400 to 600 ft below the ground surface (bgs)
- The average annual precipitation is generally low (i.e., approximately 6 in/year)
- The potential for evapotranspiration is high
- The soil deposits exhibit low permeability characteristics

The U.S. Geological Survey (USGS) well records for two nearby wells (within 7 miles) are shown in Table 2. Current groundwater users withdraw water through three of these wells. Two of the wells are pumped to supply Oasis with water; the third is used intermittently for stock watering by non-resident sheepherders. The fourth well, which lies east of the TTU, is owned by the Air Force and is not currently used.

As shown in Table 2, groundwater in the area contains moderate to high concentrations of chloride and sodium, which limits its usefulness for many applications. According to Price (1970), the groundwater in the Sink Valley Hydrologic Basin is unsuitable for irrigation, but there is sufficient groundwater locally to support some industrial development for which the chemical quality of water is not a limiting factor. However, the groundwater throughout the area is too highly mineralized for any industry that requires water with a total dissolved solids (TDS) concentration less than 2,000 milligrams per liter (mg/L). Low TDS water for industries or for domestic supplies must be transported into the area, as was done at the railroad camp at Lakeside, or pumped from the groundwater sources and demineralized, as is done at the support compound of Oasis.

As discussed in Attachment 1 of the hazardous waste operating permit, the amount of groundwater recharged due to infiltration is slight. Groundwater recharge in the vicinity of the TTU enters the groundwater system only along the margins of the adjacent mountains where coarser-grained sediments are present.

2.4 Assessment of Potential Health Risks

Analytical results demonstrate that groundwater beneath the TTU has likely not been impacted by OB/OD activities. This, coupled with the following facts, make it extremely unlikely anyone would be at risk because of TTU activities by drinking from the same groundwater source that lies beneath the TTU:

- The area receives less than 6 inches of precipitation per year; the soil and rock beneath the TTU have low vertical permeabilities; and groundwater is more than 400 ft bgs.
- All wells in the vicinity have low specific yields; before any groundwater can be considered potable, it must be treated to remove impurities.
- There is no current or projected future use of groundwater resources near the TTU.

3.0 Surface Water [UAC R315-264-601]

3.1 Performance Standards

The environmental performance standard for surface water calls for the prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water or in wetlands. Considerations include:

- The volume and physical and chemical characteristics of the waste in the unit
- The effectiveness and reliability of containing, confining, and collecting systems and structures and preventing migration
- The hydrologic characteristics of the unit and surrounding area, including the topography and land around the unit
- The patterns of precipitation in the region
- The quantity and quality and direction of groundwater flow
- The proximity of the unit to surface waters
- The current and potential uses of nearby surface waters and any other water quality standards established for those surface waters
- The existing quality of surface waters and surface soils, including other sources of contamination
- Patterns of land use in the region
- The potential for health risks caused by human exposure to waste constituents
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents

3.2 Required Programs

In accordance with Section III.G.4.a of the permit, surface water accumulation will be monitored during the monthly environmental compliance inspection of the TTU required by Condition II.H. and described in Attachment 5. Sampling of observed surface water will take place within 24 hours if, in the judgement of the Facility inspector, significant surface water accumulation is observed that is likely to facilitate contaminant transport or serve as a water source for wildlife. The area of inspection for surface water will be limited to the TTU boundary.

3.3 Site-Specific Conditions

There are no permanent surface water bodies within the confines of the TTU or in the surrounding area. However, as shown in Figure 1, there is an erosional dry wash located topographically below the TTU subunits. Surface water may also collect in detonation craters or other depressions within the TTU operational area, although the area is actively managed to facilitate storm water runoff. Surface water is present in the dry wash and detonation craters infrequently during major storm events. Annual precipitation in and around the TTU is generally less than 6 inches per year. The only additional water input to the site is from localized dust control operations. Because the TTU subunits are located near the top of the precipitation catchment basin, there is little potential for surface water runoff collecting in the subunits. The natural topography directs the flow away from active portions of the TTU.

The closest surface water body to the TTU is the Great Salt Lake, which lies approximately 3 miles eastward. Because the TTU is located on the west side of the Lakeside Mountain Range, surface water runoff from the TTU facility is directed to the west, away from the Great Salt Lake, into the Sink Valley, which is a closed, internally drained basin.

For these reasons, surface water resources in the vicinity will not be affected by OB/OD operations at the TTU. In addition, there are no known surface water pathways from the TTU subunits to any human or environmental receptors.

3.4 Assessment of Potential Health Risks

The only surface water present at the TTU is the infrequent accumulation of storm water in a detonation crater and dry wash. A heavy rain event in August 2012 resulted in the accumulation of surface water runoff in one of the detonation craters. Surface water was collected from the crater in 2012 and evaluated for potential risks in the 2013 HHRSE. No accumulations of surface water have been observed at the site since 2013; therefore, surface water is not evaluated in this 2022 HHRSE. Human health risks and hazards via surface water exposure pathway are considered insignificant because the limited duration of standing water and limited access renders potential exposures de minimis. Therefore, there is no potential for significant human health risks from this pathway.

4.0 Surface Soil [UAC R315-264-601]

4.1 Performance Standards

The environmental performance standard for soil calls for the prevention of any releases that may have adverse effects on the health of a career industrial worker.

4.2 Required Programs

The *Draft Final Open Burning/Open Detonation Permitting Guidelines* (EPA, 2002), requires sampling of surface soil within and contiguous to the OB/OD units' area of impact. Soil sampling at the TTU is required on a biennial basis in accordance with Section III.G.1 of the Permit.

4.3 Surface Soil Data

This report addresses soil data from the 2019 and 2021 sampling events (CH2M HILL, 2020; CH2M HILL, 2022). The analytical data for these sampling events were verified and validated according to the Air Force Center for Engineering and the Environment data quality assessment and validation guidelines.

4.3.1 Chemicals of Concern

Appendix A presents the descriptive statistics for the soil samples. The total number of samples, number of detects and other concentration-related statistics are presented in the appendix. The sampling locations are indicated on Figure 1.

The United States Environmental Protection Agency (EPA) does not require a toxicity assessment for chemicals with less than a 5% detection frequency. However, Hill AFB evaluated all the detected analytes in the HHRSE regardless of the detection frequency. The surface soil analytes are presented in Table 4.

4.3.2 Exposure Point Concentrations

The exposure point concentration (EPC) is a statistical concentration for the exposure area in which the receptor performs his/her work. It was assumed that the worker had an equal probability of exposure to soils anywhere in the TTU sampling area; therefore, data from all locations were grouped together.

The derivation of the EPC requires specific treatment of the undetected results. While the detected values were considered as reported, following the EPA's guidelines the undetected results were considered potential detects at one-half the reported detection limits. The resulting values were then subjected to data distribution tests using the EPA's ProUCL software (EPA, 2004). The software then calculates a distribution-specific upper limit around the mean concentration (UCL). Table 4 presents the results of the data distribution tests and the UCLs. Finally, the EPC to be used in the risk assessment was selected between the maximum detected concentration and the UCL based on the detection frequency. When the data consist primarily of the treated values (i.e., one-half the detection limit), the calculated UCLs are of little utility. Therefore, in cases where the detection frequency was less than 20 percent, the maximum detection concentrations were used as the EPC instead of the UCL.

4.3.3 Background Evaluation

Most of the metals detected in the TTU samples also occur naturally. In risk characterization, it is important to distinguish metals that may be attributable to the OB/OD operations from those not originating from the operations. If the site sample concentration for a metal is not statistically distinguishable from the natural concentration, it could be concluded that TTU operations have

not affected the area soils with respect to that metal; therefore, that metals can be excluded from risk characterization.

Soil characterization studies surrounding the TTU have adequately characterized the background soil composition (CH2M Hill, 2011b; Appendix A). This updated HHRA report addresses background versus site comparisons only for analytes that exceed risk based screening levels.

o 4.4 Assessment of Potential Health Risks

The HHRSE was conducted to determine whether existing concentrations of the analytes in soil indicate potential unacceptable health risk for the industrial worker. The EPA's regional screening levels (RSLs) for the industrial worker soil exposure were the basis of this HHRSE (EPA, 2022a). The RSLs are risk-based concentrations (RBCs) derived from standardized equations combining exposure information assumptions with EPA toxicity data. The RSLs are considered by the EPA to be protective for humans (including sensitive groups) over a lifetime. The excess lifetime cancer risk (ELCR) and hazard quotient (HQ) used to calculate the RSLs are 10^{-6} and 1, respectively.

▪ 4.4.1 Exposure and Intake Parameters

The RSLs account for exposure to soil via incidental ingestion, dermal contact, and inhalation of volatiles and particulate inhalation. These are the same exposure pathways considered in the 2018 HHRSE (CH2M HILL, 2013).

The RSL table and User's Guide (EPA, 2022a) presenting the updated EPA default exposure factors and resulting RSLs are presented in Appendix A and the EPA's Regional Screening Level User's Guide (EPA, 2022b).

▪ 4.4.2 Toxicity Factors

The RSLs use toxicity factors derived from the three-tier hierarchy established by EPA (2003). These sources include the following:

- Tier 1—The EPA's Integrated Risk Information System.
- Tier 2—The EPA's Provisional Peer reviewed Toxicity Values (PPRTVs).
- Tier 3—Other Toxicity Values. Tier 3 includes additional EPA and non-EPA sources of toxicity information.
  - The Agency for Toxic Substances and Disease Registry minimal risk levels
  - The California Environmental Protection Agency Office of Environmental Health Hazard Assessment Toxicity Criteria Database
  - The EPA's PPRTV Screening Toxicity Values
  - The EPA's Health Effects Assessment Summary Table.

The toxicity factors for the chemicals detected in the surface soil are presented in Table 6. A more complete list of chemicals, toxicity factors, dermal toxicity factors, and GI absorption factors is presented in Appendix B.

▪ 4.4.3 Risk-based Concentrations

The risk-based soil concentrations (RBC) were individually calculated for the oral, dermal, and inhalation pathways using the exposure and intake parameters for the industrial worker, and the toxicity factors. The RBCs are the threshold concentrations that equate to an excess lifetime cancer risk (ELCR) of 1E-06 or the hazard index (HI) of 1. The RBCs for the individual pathways were then inverse-summed to provide a combined carcinogenic or non-carcinogenic RBC that accounts for the cumulative risks from the three pathways. The RBC calculation equations are as follows:

Carcinogenic Oral RBC

$$RBC\ (mg/Kg) = \frac{TR\_SI * ATc\_SI * BW\_SI * 365 days/year}{EF\_SI * ED\_SI * SFo * 0.000001 * IRs\_SI}$$

where

TR_SI	=	Target Risk (1×10^{-6})
ATc_SI	=	Carcinogenic averaging time (70 yrs)
BW_SI	=	Body weight (70 Kg)
EF_SI	=	Exposure frequency (250 days/yr)
ED_SI	=	Exposure duration (25 yr)
SFo	=	Oral slope factor (Kg-day/mg)
IRs_SI	=	Soil ingestion rate (100 mg/day)
0.000001	=	Conversion factor (Kg/mg)

Carcinogenic Dermal RBC

$$RBC\ (mg/Kg) = \frac{TR\_SI * ATc\_SI * BW\_SI * 365 days/year}{EF\_SI * ED\_SI * SFo/GI\_Factor * 0.000001 * SA\_SI * AF\_SI * ABS}$$

where

TR_SI	=	Target Risk (1×10^{-6})
ATc_SI	=	Carcinogenic averaging time (70 yrs)
BW_SI	=	Body weight (70 Kg)
EF_SI	=	Exposure frequency (250 days/yr)
ED_SI	=	Exposure duration (25 yr)
SFo	=	Oral slope factor (Kg-day/mg)
GI_Factor	=	Gastro-intestinal absorption factor (chemical-specific)
SA_SI	=	Skin surface area, (3300 cm^2)
AF_SI	=	Skin adherence factor (0.2 mg/cm^2)
ABS	=	Skin absorption factor (chemical-specific)
0.000001	=	Conversion factor (Kg/mg)

Carcinogenic Inhalation RBC

$$RBC\ (mg/Kg) = \frac{TR\_SI * BW\_SI * ATc\_SI * 365 days/year}{EF\_SI * ED\_SI * SFi * IRa\_SI / PEF\_SI}$$

where

TR_SI = Target Risk (1×10^{-6})
ATc_SI = Carcinogenic averaging time (70 yrs)
BW_SI = Body weight (70 Kg)

EF_SI = Exposure frequency (250 days/yr)
ED_SI = Exposure duration (25 yr)
SFi = Inhalation slope factor (Kg-day/mg)
IRa_SI = Air inhalation rate (20 M^3/day)
PEF_SI = Particulate emission factor (5.11×10^7 M^3/Kg)

Non-carcinogenic Oral RBC

$$\text{RBC (mg/Kg)} = \frac{\text{THI\_SI*ATn\_SI*BW\_SI*365days/year}}{\text{EF\_SI*ED\_SI/RfDo*0.000001*IRs\_SI}}$$

where

THI_SI = Target hazard index (1)
ATn_SI = Non-carcinogenic averaging time (25 yrs)
BW_SI = Body weight (70 Kg)
EF_SI = Exposure frequency (250 days/yr)
ED_SI = Exposure duration (25 yr)
RfDo = Oral reference dose (mg/Kg-day)
IRs_SI = Soil ingestion rate (100 mg/day)
0.000001 = Conversion factor (Kg/mg)

Non-carcinogenic Dermal RBC

$$\text{RBC (mg/Kg)} = \frac{\text{THI\_SI*ATn\_SI*BW\_SI*365days/year}}{\text{EF\_SI*ED\_SI/RfDo*GI\_Factor*0.000001*SA\_SI*AF\_SI*ABS}}$$

where

THI_SI = Target hazard index (1)
ATn_SI = Non-carcinogenic averaging time (25 yrs)
BW_SI = Body weight (70 Kg)
EF_SI = Exposure frequency (250 days/yr)
ED_SI = Exposure duration (25 yr)

RfDo = Oral reference dose (mg/Kg-day)
GI_ Factor = Gastro-intestinal absorption factor (chemical-specific)
SA_SI = Skin surface area, (3300 cm^2)
AF_SI = Skin adherence factor (0.2 mg/cm^2)

ABS	=	Skin absorption factor (chemical-specific)
0.000001	=	Conversion factor (Kg/mg)

Non-carcinogenic Inhalation RBC

$$RBC\ (mg/Kg) = \frac{THI\_SI * BW\_SI * ATn\_SI * 365 days/year}{EF\_SI * ED\_SI / RfDi * IRa\_SI / PEF\_SI}$$

where

THI_SI	=	Target hazard index (1)
ATn_SI	=	Carcinogenic averaging time (70 yrs)
BW_SI	=	Body weight (70 Kg)
EF_SI	=	Exposure frequency (250 days/yr)
ED_SI	=	Exposure duration (25 yr)
RfDi	=	Inhalation reference dose (mg/Kg-day)
IRa_SI	=	Air inhalation rate (20 M^3/day)
PEF_SI	=	Particulate emission factor (5.11×10^7 M^3/Kg)

Appendix C presents the risk-based concentrations (RBC) for a comprehensive list of chemicals including the COCs.

▪ 4.4.4 Risk Characterization

The risks for each COC were calculated using the chemical-specific EPCs and RBCs as follows:

$$ELCR = EPC/Cancer\ RSL \times 10^{-6}$$

$$HI = EPC/Noncancer\ RSL$$

The carcinogenic risks were then added for all chemicals for the total carcinogenic and non-carcinogenic risks to the industrial worker. The total risks are provided in Table 7.

Table 7 indicates a cumulative ELCR of 5E-06 (roughly, 5 incidences per million) and a cumulative HI of 0.7. Both of these risk estimates are within the general risk acceptance limits. Depending on the site specifics, an ELCR up to 1E-4 (1 incidence per 10,000) can be accepted. The HI acceptance limit is generally 1.

Table 7 also indicates that practically all of the carcinogenic risk arises from arsenic. Arsenic is not known to be a major component of the OB/OD items. Its presence is likely attributable to the native soil. The arsenic UCL of 7.7 mg/Kg is comparable to the background UCL for the Western US soils. The USGS background soils data (Schacklette and Boerngen, 1984) indicate that the 37 soil samples collected throughout Utah averaged 8 mg/Kg in concentration with a UCL of 10.7 mg/Kg. Therefore, the carcinogenic risk from arsenic is most likely naturally occurring. The cumulative ELCR drops to 7E-08 if arsenic is excluded.

Approximately 45 percent of the noncarcinogenic risk arises from manganese, and other metals that have concentration and distribution characteristics similar to the USGS statewide data. If these metals are eliminated, the cumulative HI reduces to 0.4.

For information purposes, the USGS background data for arsenic and manganese, and their descriptive statistics are presented in Tables 8 and 9, respectively.

The risk assessment assumed exposure for 250 days/year for 25 years for the same person, which is likely to be overly conservative. The adoption of oral toxicity factors for dermal and inhalation risks also adds to conservatism in the risk estimates. Despite these conservative measures, the estimated risks to the industrial worker are not significant.

5.0 Air [UAC R315-264-601]

○ 5.1 Performance Standards

The environmental performance standard for the protection of the air pathway requires the prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air. Specific items to be considered include:

- The volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols, and particulates
- The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air
- The operating characteristics of the unit
- The atmospheric, meteorological, and topographic characteristics of the unit and surrounding area
- The existing quality of the air, including other sources of contamination and their cumulative impact on the air
- The potential for health risks caused by human exposure to waste constituents
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents

○ 5.2 Receptors

The air pathway entails inhalation risks to (1) an EOD person monitoring the OB/OD operations onsite, (2) to a resident at the nearby community of Oasis, and (3) to a recreational boater on the Great Salt Lake. These receptors remain the same as in the original permit. Water levels in the Great Salt Lake have dropped substantially over the last 10 years with the net result of significantly limiting access to, and use of, the Great Salt Lake for recreation.

○ 5.3 Emission Characterization

As a source of air pollutants, OB/OD units must operate in accordance with specifications provided in the state-issued hazardous waste permit. All OB/OD units must be in compliance with National Ambient Air Quality Standards (NAAQS) and the Utah Division of Air Quality (UDAQ) standards, as demonstrated by the use of state-approved air dispersion modeling

protocol. In addition, OB/OD facilities must evaluate whether air emissions pose a risk to human health or the environment.

The air modeling exercise was completed as part of the 1997 permit application. The EPA's INPUFF model was used to estimate the air concentrations; hence, risks for three specific receptors. The air modeling does not need to be re-done, unless the OB/OD operations have changed significantly in terms of the types and quantities of material being destroyed or the emissions. The OB/OD is carried out as on-demand batch operation, depending on the needs of the time. However, an analysis of the materials destroyed over a period of 10 years indicated that regardless of the items being destroyed (i.e., a rocket motor or missile engine), the explosives and propellants types and quantities have remained relatively unchanged (Hill Air Force Base, 2005). From year to year, the detonation of C-4 missile motors has comprised from 60 to 85 percent of the net amount of explosives and propellants destroyed. As the inventory of C-4 motors awaiting disposal is almost depleted, disposal of D-5 missile motors (the successor to the C-4 missiles) is commencing. The propellant in the C-4 and D-5 missiles is nearly identical with no discernible upward change to projected emissions. Further, there is no new information in the MIDAS database to warrant a revision of the modeling or a change in the emissions. It should be noted that waste streams using the burn pan (e.g., small munitions and dunnage) were last treated at the TTU in 1997 and the burn pan was decommissioned and removed in 2018. This does not add or increase emissions.

Therefore, the emissions and emission factors presented in Tables 8, 9, and 10 of the 1997 permit are still considered representative of the current operations and have been used in the risk characterization.

5.3.1 Dioxin and Furan Emissions

As part of this 2005 risk assessment revision and as a requirement of Section II.F.2.c, HAFB also investigated the potential for formation of dioxins and furans from the OB/OD operations, including the burning of dunnage and diesel fuel. Dioxin/furan emissions from OB/OD treatment have been characterized in several tests, including the 1992 "Bang Box" studies that were conducted to characterize emissions from propellant burning operations (U.S. Army, 1992). The tests found that the burning of composite propellant did not produce detectable levels of the most toxic 2,3,7,8-tetrachlorodibenzodioxin, but did produce trace amounts of the less toxic 2,3,7,8-tetrachlorodibenzofuran and measurable amounts of the chlorinated derivatives hepta- and octachlorodibenzo-p-dioxin. Emission factors related with these compounds were reported at 5.3×10^{-12} g/g and 30×10^{-12} g/g, respectively, which are an order of magnitude lower than the emission factor considered in the analysis below.

Another attempt to characterize dioxin furan emissions from OB/OD activities, specifically from diesel fuel and dunnage, was reported in EPA, 1998. A 1995 Bang Box study collected data from the burning of a dunnage surrogate containing Styrofoam, pasteboard, and wood soaked in diesel fuel (87.5 percent cellulose and 12.5 percent plastic/diesel fuel by weight). The test produced no detectable furan emissions. Octachlorodibenzo-p-dioxin (OCDD) was detected in one of the three test burns, but the emission factor was not considered reliable because the chemical was not present in the other two tests, the background emission factor accounted for 70 percent of the corrected emission factor, and the uncorrected emission factor was only 30 percent larger than the emission factor calculated from the minimum quantitation limit emission factor

(2.1 E-10 g/g). An emission factor of 1E-11 g/g was included in the resulting OB/OD emission factor database for dunnage and diesel fuel. An emission factor for furan of 4.0E-8 g/g for the burning of a simulated ammonium perchlorate manufacturing waste (65 percent aluminized AP, 20 percent plastic, 11 percent paper/wood/cloth, and 4 percent diesel) was also included.

With respect to open detonations, from the reaction kinetics perspective, it appears highly unlikely that dioxins/furans will form from these operations. Detonations do not provide favorable conditions for dioxin and furan formation, which include low temperatures (250-400 °C) and long residence times (seconds) (EPA, 1998). This is supported by the lack of detectable emissions from detonation tests during the Bang Box studies (EPA, 1998). The detonation of the M43A2 flare was the only detonation test that produced measurable dioxin levels that were included in the OB/OD emission factor database.

Considering the available data and the types of munitions treated at the TTU, the potential for dioxin/furan production and exposure is low. The primary areas where dunnage and diesel fuel would be burned are at operational Site 1 and the burn pan. Scrap propellant burns at Site 1 do contain dunnage including wooden and cardboard containers and some plastic packaging, but the percentage of these materials in comparison to the mass of propellant is generally much less than the 31 percent used in the 1995 Bang Box study (EPA, 1998), and these burns are conducted infrequently (usually once each month). The use of dunnage and diesel fuel at Site 1 is very rare and only allowed if a solid waste burn variance is obtained from the Waste Management and Radiation Control Board (Section III.D.1.a.iii). Section III.D.3 of the permit allows for the use of a reasonable amount of diesel fuel to be added to munitions and dunnage during operation of the burn pan. However, the burn pan has not been used in the past several years, and as of this revision (2005), there are no plans to use it in the foreseeable future.

If the burn pan were to be used on a frequent basis, then the emission factor for dunnage reported in (EPA, 1998) may be applicable. This emission factor is also the one applied for diesel and dunnage in the current Open Burn/Open Detonation Model (OBODM) (Bjorkland et al., 1998). As discussed above, the reported emission factor is for OCDD, the only compound of the dioxins/furans class detected in the diesel and dunnage test. Its emission rate is estimated at 1E-11 g/g (10 picograms/gram of diesel and dunnage).

Although, the dioxins/furans were not specifically modeled in the 1997 TTU risk assessment, a reasonable estimate of dioxin/furan risks can be made with a comparative analysis of the OBODM emission rates and toxicity factors for a known compound such as benzene and those for OCDD. The diesel and dunnage emission rate of 1E-11 g/g for OCDD is seven orders-of-magnitude lower than that for benzene (1E-4 g/g). On the other hand, OCDD is three orders-of-magnitude more toxic than benzene (inhalation toxicity factor for benzene is 0.027 Kg-day/mg compared to the factor of 15 Kg-day/mg for OCDD, based on 2,3,7,8-TCDD toxicity of 150000 Kg-day/mg and the World Health Organization Toxicity Equivalent factor of 0.0001). See Appendix B for the inhalation slope factors. Therefore, the risk from potential dioxin/furan emissions from diesel and dunnage would be four orders-of-magnitude lower than the risk from benzene.

As discussed later, the inhalation risk from benzene is in the 1E-10 to 1E-9 range. This would put the dioxin/furan risk from diesel dunnage in the 1E-14 to 1E-13 range. The margin of safety (a minimum seven orders-of-magnitude below the risk acceptance level) is large enough to

conclude that dioxin/furan emissions would not pose a risk concern to the three receptors if the burn pan were to be used on a frequent basis.

○ 5.4 Assessment of Potential Health Risks

The results of the 1997 INPUFF air dispersion modeling were used in the inhalation risk characterization. The toxicity factors were updated to the most recent values available.

▪ 5.4.1 Exposure and Intake Parameters

The exposure and intake parameters for the air receptors are included in Table 5. These parameters are the same as in the 1997, 2003, 2005, 2007, 2009, 2011, 2013, and 2018 assessments, except for the update on the exposure duration for the Oasis resident in the 2018 HHRSE. The exposure duration for the Oasis resident was changed from 30 years to 26 years according to the EPA's update to standard default exposure factors in 2014 (EPA, 2014). It was assumed that the EOD worker was exposed to emissions only while conducting OB/OD operations. The recreational boater was assumed to spend 2 days on the lake every week. Access to the Oasis compound is limited to working employees only and no family members are allowed to reside in the area. The Oasis resident (adult workers) was assumed to spend at least 5 days per week at the Oasis compound. The daily exposure times include a factor to account for the fraction of the time the wind blows in the direction of a given receptor.

▪ 5.4.2 Toxicity Factors

The EPA's IRIS, PPRTV, and HEAST data sources were researched for the most current carcinogenic slope factors and non-carcinogenic reference doses. The specific inhalation toxicity factors were generally not available for the constituents in the air emissions. In such cases, the oral toxicity factors were used as inhalation toxicity factors.

Table 10 presents the air constituents and the toxicity values. Both the original 1997 and the 2005 values are provided for a comparison. The changes in the toxicity factors are further highlighted in Table 11 (new toxicity factors) and Table 12 (changes in the toxicity factors). The 2005 toxicity factors were used in the risk calculations.

▪ 5.4.3 Risk-based Concentrations

The RBCs were calculated for the inhalation pathway using the exposure and intake parameters for the three receptors, and the toxicity factors. The RBCs are the threshold concentrations that equate to an ELCR of 1E-06 or the HI of 1. The RBC calculation equations are as follows:

EOD Personnel - Carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{TR\_EOD * BW\_EOD * ATc\_EOD * 365}{EF\_EOD\_Air * ED\_EOD\_Air * SFi * IRa\_EOD\_Air}$$

where

TR_EOD = Target Risk (1×10^{-6})
ATc_EOD = Carcinogenic averaging time (70 yrs)
BW_EOD = Body weight (70 Kg)
EF_EOD_Air = Exposure frequency (250 days/yr)
ED_EOD_Air = Exposure duration (20 yr)

SFi = Inhalation slope factor (mg/Kg-day)
IRa_EOD_Air = Air inhalation rate (0.0216 M^3/day)

EOD Personnel - Non-carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{THI\_EOD * BW\_EOD * ATn\_EOD * 365}{EF\_EOD\_Air * ED\_EOD\_Air / RfDi * IRa\_EOD\_Air}$$

where

THI_EOD = Target hazard index (1)
ATn_EOD = Non-carcinogenic averaging time (20 yrs)
BW_EOD = Body weight (70 Kg)
EF_EOD_Air = Exposure frequency (250 days/yr)
ED_EOD = Exposure duration (20 yr)
RfDi = Inhalation reference dose (mg/Kg-day)
IRa_EOD_Air = Air inhalation rate (0.0216 M^3/day)

Boater - Carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{TR\_REC * BW\_REC * ATc\_REC * 365}{EF\_REC\_Air * ED\_REC\_Air * SFi * IRa\_REC\_Air}$$

where

TR_REC = Target Risk (1×10^{-6})
ATc_REC = Carcinogenic averaging time (70 yrs)
BW_REC = Body weight (70 Kg)
EF_REC_Air = Exposure frequency (104 days/yr)
ED_REC_Air = Exposure duration (20 yr)
SFi = Inhalation slope factor (mg/Kg-day)
IRa_REC_Air = Air inhalation rate (0.96 M^3/day)

Boater - Non-carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{THI\_REC * BW\_REC * ATn\_REC * 365}{EF\_REC\_Air * ED\_REC\_Air / RfDi * IRa\_REC\_Air}$$

where

THI_REC	=	Target hazard index (1)
ATn_REC	=	Non-carcinogenic averaging time (20 yrs)
BW_REC	=	Body weight (70 Kg)
EF_REC_Air	=	Exposure frequency (104 days/yr)
ED_REC	=	Exposure duration (20 yr)
RfDi	=	Inhalation reference dose (mg/Kg-day)
IRa_REC_Air	=	Air inhalation rate (0.96 M^3/day)

Oasis Resident - Carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{TR\_RES * BW\_RES * ATc\_RES * 365}{EF\_RES\_Air * ED\_RES\_Air * SFi * IRa\_RES\_Air}$$

where

TR_RES	=	Target Risk (1×10^{-6})
ATc_RES	=	Carcinogenic averaging time (70 yrs)
BW_RES	=	Body weight (70 Kg)
EF_RES_Air	=	Exposure frequency (250 days/yr)
ED_RES	=	Exposure duration (30 yr)
SFi	=	Inhalation slope factor (mg/Kg-day)
IRa_RES_Air	=	Air inhalation rate (1.38 M^3/day)

Oasis Resident - Non-carcinogenic Inhalation RBC

$$RBC\ (mg/M^3) = \frac{THI\_RES * BW\_RES * ATn\_RES * 365}{EF\_RES\_Air * ED\_RES\_Air / RfDi * IRa\_RES\_Air}$$

where

THI_RES	=	Target hazard index (1)
ATn_RES	=	Non-carcinogenic averaging time (20 yrs)
BW_RES	=	Body weight (70 Kg)
EF_RES_Air	=	Exposure frequency (250 days/yr)
ED_RES	=	Exposure duration (20 yr)
RfDi	=	Inhalation reference dose (mg/Kg-day)
IRa_RES_Air	=	Air inhalation rate (0.0216 M^3/day)

Appendices D, E, and F present a comprehensive list of RBCs for the three receptors.

▪ 5.4.4 Risk Characterization

The risks for each COC were calculated using the chemical-specific emission rates and RBCs as follows:

$$ELCR = EPC/RBC \times 10^{-6}$$

$$HI = EPC/RBC$$

The individual chemical risks were then added for each receptor. The total risks are provided in Tables 13, 14, and 15 for the EOD personnel, boater and the Oasis resident, respectively. These tables relate to Tables 8, 9, and 10 in the original permit.

The tables indicate that the estimated risks are well within the general risk acceptance range of $1x10^{-6}$ to $1x10^{-4}$ cancer incidence rate or HI of 1 (EPA, 1991). Updates in the toxicity values, availability of new values and adoption of oral toxicity values for inhalation across the board make the current risk estimates somewhat higher than the previously estimated risks; nonetheless, the risks are acceptable. The EOD person has the highest risk potential out of the three receptors evaluated. An ELCR of 6E-6 and HI of 0.12 are predicted for the EOD personnel. The risks for the boater (ELCR = 3E-6 and HI = 0.06) and the resident (ELCR = 3E-6 and HI= 0.03) are lower than the estimates for the EOD person.

On a chemical-specific basis, cadmium is the major risk contributor (~90 percent of the carcinogenic risk and ~50 percent of the non-carcinogenic risk). Although cadmium was modeled as potential emission from the OB/OD operations, the actual soil data surrounding the test area do not indicate elevated levels of cadmium. Further, cadmium is not known to be a significant component of the OB/OD items. It is likely that the air risk estimates may be exaggerated.

Based on the evaluations of the soil data and the air emissions, it appears that continuation of the OB/OD operations will not cause undue harm to the workers and the citizen population in the vicinity of the TTU.

6.0 References

Bjorklund, Bowers, Dodd and White. 1998. *Open Burn/Open Detonation Dispersion Model (OBODM)*. U.S. Army Dugway Proving Ground, Dugway, Utah.

EPA. 1991. "Risk Assessment Guidance for Superfund," Volume 1: *Human Health Evaluation Manual (Part B) – Development of Risk-Based Preliminary Remediation Goals*, EPA9285.7-01B. EPA/540/R-92/003.

EPA. 1998. *Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD)*. W. J. Mitchell and J.C. Suggs, U.S. Environmental Protection Agency, MD-46 Research Triangle Park, NC. August 1998. EPA/600/R-98/103.

EPA. 2001a, as amended. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites*. OSWER Directive 9355.4-24.

EPA. 2001b, as amended. "Risk Assessment Guidance for Superfund," Volume I: *Human Health Evaluation Manual (Part E) – Supplemental Guidance for Dermal Risk Assessment*, EPA/540/R/00/005.

EPA. 2002. *Draft Final Open Burning/Open Detonation Permitting Guidelines.* Prepared for EPA by Tetra Tech, Inc., EPA February 2002.

EPA. 2004. *ProUCL Software*. EPA Technical Support Center, Las Vegas, Nevada.

Hill Air Force Base. 2005. *Utah Test and Training Range – Waste Characterization Evaluation for the Thermal Treatment Unit.*

SAS Institute. 1999. *SAS/STAT User's Guide*, Version 8. SAS Institute, Cary, NC.

Schacklette H.T.and J.G. Boerngen. 1984. *Element concentrations in soils and other surficial materials of the conterminous United States*. U.S. Geological Survey, Prof. Paper 1270, Washington, DC., 1984.

U.S. Army. 1992. "Development of Methodology and Technology for "Group III Release Assessment Report" Identifying and Quantifying Emission Products from Open Burning and Open Detonation Thermal Treatment Methods," Volume 1: *Test Summary*. Headquarters U.S. Army Armament, Munitions, and Chemical Command. January 1992.

URS. September 2004. *Release Assessment Report, Group III Sites, Utah Test and Training Range-North.*

Tables

TABLE 1
TTU Groundwater Monitoring Well Sampling Results
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			METALS[b] (mg/L)						
DATE	**WELL**	**ENERGETICS (ug/L)**	**CALCIUM**	**IRON**	**MAGNESIUM**	**MANGANESE**	**POTASSIUM**	**SODIUM**	**ZINC**
3-Feb-1994			59.0	0.085	24.5	0.023	36.4	314.0	ND
	TTU-1	ND	1116.0	0.200	58.8	0.017	36.1	371.0	ND
11-Apr-1994	TTU-1	ND	61.8	ND	23.4	ND	31.2	ND	ND
	TTU-2	ND	115.0	ND	57.9	ND	33.4	355.0	ND
26-Jul-1994	TTU-1	ND	56.9	0.075	24.7	ND	39.1	318.0	ND
	TTU-2	ND	112.0	ND	61.2	ND	37.3	367.0	ND
18-Oct-1994	TTU-1	ND	68.3	ND	27.5	ND	38.5	319.0	ND
	TTU-2	ND	116.0	ND	61.2	ND	36.2	366.0	ND
3-Mar-1995	TTU-1	Nitrobenzene 0.25	61.1	ND	26.2	ND	37.4	320.0	ND
	TTU-2	N	119.0	ND	61.3	ND	36.2	371.0	ND
28-Apr-1995	TTU-1	N	58.7	0.120	24.6	ND	36.4	309.0	0.019
	TTU-2	ND	115.0	ND	61.0	ND	36.1	367.0	ND
27-Jul-1995 [d]	TTU-1	-	-	-	-	-	-	-	-
	TTU-2	-	-	-	-	-	-	-	-
23-Oct-1995	TTU-1	ND	58.5	ND	24.6	ND	36.1	307.0	0.010
	TTU-2[e]	ND	107.0	ND	54.6	ND	31.9	325.0	0.230
4-Apr-1996	TTU-1[e]	ND	54.4	ND	23.0	ND	33.9	282.0	0.014
	TTU-2[e]	ND	105.0	ND	54.9	ND	32.5	330.0	0.160
Jul-1996	TTU-1	ND	63.0	-	27.0	-	38.0	320.0	-
	TTU-2	*	120.0	-	61.0	-	36.0	360.0	-
Oct-1996	TTU-1	ND	Pump problems	-	Pump problems	-	Pump problems	Pump problems	Pump problems
	TTU-2	*	120.0	-	64.0	-	37.0	380.0	65.000
12-Jan-1997	TTU-1[e]	ND	61.8	ND	26.2	ND	37.1	322.0	ND
	TTU-2[e]	ND	119.0	ND	61.3	ND	35.6	371.0	0.330
26-Apr-1997	TTU-1[e]	ND	62.1	ND	25.7	ND	36.5	304.0	0.084
	TTU-2[e]	ND	108.0	ND	57.7	ND	33.8	335.0	0.014
21-Oct-1997	TTU-1	ND	64.6	0.086	26.1	0.01	36.1	296.0	0.064
	TTU-2	ND	113.0	ND	58.1	ND	35.7	342.0	0.011
Apr-1998	TTU-1	ND	68.0	-	28.0		37.0	310.0	22 (J)
	TTU-2	ND	110.0	-	60.0		35.0	360.0	34.000
Oct-1998	TTU-1	ND	62.0	-	26.0		36.0	300.0	29.000
	TTU-2	ND	110.0	-	61.0		35.0	360.0	27.000
15-Apr-1999	TTU-1	ND	66.9	ND	27.6	0.003	35.5	302.0	0.019
	TTU-2	ND	106.0	0.047	59.3	0.004	33.8	345.0	0.023
20-Oct-1999	TTU-1	ND	63.3	0.164	27.2	0.0029	35.2	309.0	0.0657
	TTU-2	ND	109.0	0.043	59.9	0.0016	34.0	359.0	0.078
5-Apr-2000	TTU-1	TNT [f]	63.9	0.018	27.7	ND	36.9	315.0	0.017
	TTU-2	TNT [f]	108.0	0.032	60.5	0.003	35.0	358.0	0.0061
17-Oct-2000	TTU-1	ND	58.1	68.600	26.2	0.0017	35.8	304.0	0.0077
	TTU-2	ND	115.0	0.029	63.7	0.0032	35.9	375.0	ND
18-Apr-2001	TTU-1	ND	66.6	0.026	27.6	ND	35.4	295.0	0.056
	TTU-2	ND	102.0	0.014	55.0	ND	31.6	323.0	0.12
22-Oct-2001	TTU-1	ND	63.7	0.020	28.6	0.0028	36.6	314.0	0.027
	TTU-2	ND	110.0	ND	61.1	0.0023	34.8	364.0	0.072
18-Apr-2002	TTU-1	ND	62.2	ND	27.0	0.0034	34.0	301.0	0.041
	TTU-2	ND	110.0	ND	59.9	0.0026	32.9	353.0	0.018
28-Oct-2002	TTU-1	ND	59.0	ND	26.0	0.0041	35.0	300.0	0.031
	TTU-2	ND	110.0	0.039	58.0	0.0047	34.0	350.0	0.022
1-May-2003	TTU-1	ND	63.0	ND	30.0	0.0021	41.0	320.0	0.015
	TTU-2	ND	120.0	0.042	64.0	0.0035	40.0	380.0	0.014
21-Dec-2004	TTU-1	Perchlorate 0.6230 ug/l	-	0.019	-	-	-	-	0.00361
	TTU-2	Perchlorate 0.5020 ug/l	-	0.039	-	-	-	-	0.00421

Notes:

[a] Picric acid; nitroglycerine; PETN; nitro guanidine; nitrobenzene; 2,4-DNT; 2,6-DNT; 2,4,6-TNT; RDX; HMX; 2-amino-4,6-DNT.

[b] Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury,

[c] High level in the equipment blank suggests this value may be biased high.

[d] TTU-1 and TTU-2 not sampled.

[e] Sampled for dissolved metals.

[f] TNT was also detected in the method blank indicating that the laboratory was the source of the compound.

*Several energetic compounds were detected in well TTU-2 in July 1996. These included 4-Amino-2,6-dinitortoluene, HMX, nitroguanadine, and TNT. PETN was also detected in well TTU-2 in October 1996. Because of the high concentrations found (1,510 ug/L HMX in July 1996), and lack of detection in later sampling, it is believed that these samples were contaminated in the field.

TABLE 2

Chemical Analysis of Pre-Treatment Water from UTTR-North Production Wells

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Test	EPA Method	Well No. 1 (mg/L)	Well No. 2 (mg/L)
Sodium	200.7	2797.87	1901.23
Antimony	204.2	0.08	0.008
Arsenic	206.2	0.11	0.076
Barium	200.7	<0.100	<0.100
Beryllium	210.2	<0.001	<0.001
Cadmium	213.2	0.001	0.001
Calcium	200.7	60.4	32
Chromium	200.7	<0.050	<0.050
Magnesium	200.7	117	76
Hardness	—	631	395.5
Iron	200.7	0.389	0.215
Manganese	200.7	<0.050	<0.050
Mercury	295.2	<0.001	<0.001
Nickel	200.7	<0.050	<0.050
Potassium	200.7	80	63
Selenium	270.2	1.005	0.788
Silver	200.7	<0.005	<0.005
Thallium	279.2	<0.002	<0.002
Zinc	200.7	0.09	0.177
Lead	239.2	0.01	0.06
Copper	200.7	<0.020	<0.020
Oil and Grease	413	0.3	0.3
Nitrate	353.2	8.4	2.6
Nitrite	353.2	<0.200	<0.020
Cyanide	335.3	0.005	<0.005
Chloride	325.2	3480	4400
Fluoride	380.76	4.8	6
Sulfate	300.1	540	660

Source: Armstrong Laboratory, Brooks AFB, TX, Reports of Analysis, May-Sep 1993.

TABLE 3
Chemicals of Concern in Surface Soil
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Analyte	CASNo	Units	Total Samples	Total Detects
1,2,3-Trichlorobenzene	87-61-6	mg/Kg	22	1
1,2,4-Trichlorobenzene	120-82-1	mg/Kg	27	1
1,2-Dichlorobenzene	95-50-1	mg/Kg	27	1
1,3-Dichlorobenzene	541-73-1	mg/Kg	27	1
1,4-Dichlorobenzene	106-46-7	mg/Kg	27	1
2,4-Dinitrotoluene	121-14-2	mg/Kg	47	1
2-Butanone	78-93-3	mg/Kg	22	4
2-Methylnaphthalene	91-57-6	mg/Kg	27	3
Acetone	67-64-1	mg/Kg	27	9
Aluminum	7429-90-5	mg/Kg	47	47
Anthracene	120-12-7	mg/Kg	27	1
Antimony	7440-36-0	mg/Kg	27	22
Arsenic	7440-38-2	mg/Kg	47	27
Barium	7440-39-3	mg/Kg	47	47
Benzene	71-43-2	mg/Kg	22	3
Beryllium	7440-41-7	mg/Kg	47	23
bis(2-ethylhexyl)phthalate	117-81-7	mg/Kg	27	5
Cadmium	7440-43-9	mg/Kg	47	21
Calcium	7440-70-2	mg/Kg	42	42
Chloride		mg/Kg	42	30
Chromium	7440-47-3	mg/Kg	47	47
Cobalt	7440-48-4	mg/Kg	27	22
Copper	7440-50-8	mg/Kg	47	41
Dibenzofuran	132-64-9	mg/Kg	27	3
Ethylbenzene	100-41-4	mg/Kg	22	1
Fluoranthene	206-44-0	mg/Kg	27	1
Fluorene	86-73-7	mg/Kg	27	3
Iron	7439-89-6	mg/Kg	42	42
Lead	7439-92-1	mg/Kg	47	40
m,p-Xylenes	1330-20-7	mg/Kg	22	1
Magnesium	7439-95-4	mg/Kg	42	42
Manganese	7439-96-5	mg/Kg	47	47
Mercury	7439-97-6	mg/Kg	47	13
Methylene chloride	75-09-2	mg/Kg	22	1
Molybdenum	7439-98-7	mg/Kg	22	20
Naphthalene	91-20-3	mg/Kg	27	6
Nickel	7440-02-0	mg/Kg	47	47
Nitrate	14797-55-8	mg/Kg	47	43
Nitroguanidine	556-88-7	mg/Kg	42	2
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	mg/Kg	42	13
o-Xylene	95-47-6	mg/Kg	22	3
Perchlorate	7601-90-3	mg/Kg	22	11
Phenanthrene	85-01-8	mg/Kg	27	4
Phosphorus	7723-14-0	mg/Kg	20	20
Picric acid	88-89-1	mg/Kg	42	3
Potassium	7440-09-7	mg/Kg	42	42
Silver	7440-22-4	mg/Kg	47	4
Sodium	7440-23-5	mg/Kg	42	42
Strontium	7440-24-6	mg/Kg	22	22
Styrene	100-42-5	mg/Kg	21	2
Sulfate		mg/Kg	42	23
Thallium	7440-28-0	mg/Kg	47	26
Toluene	108-88-3	mg/Kg	22	5
Total petroleum hydrocarbons		mg/Kg	5	5
Vanadium	7440-62-2	mg/Kg	27	27
Zinc	7440-66-6	mg/Kg	47	47
Zinc	7440-66-6	mg/Kg	50	50

TABLE 4
Data Distribution, Upper Confidence Limits and Exposure Point Concentrations for Surface Soil
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Analyte	Units	Number of Samples	Number of Detects	Detection Frequency	Maximum Detect	Data Distribution[a]	95UCL	Exposure Point Concentration (EPC)[b]	EPC Basis[c]
SS_Ind_Std	1,2,3-Trichlorobenzene	mg/Kg	22	1	4.5%	0.003	NON-PARAMETRIC	7.25E-04	0.003	Max
SS_Ind_Std	1,2,4-Trichlorobenzene	mg/Kg	28	1	3.7%	0.003	NON-PARAMETRIC	2.02	0.003	Max
SS_Ind_Std	1,2-Dichlorobenzene	mg/Kg	28	1	3.7%	0.001	NON-PARAMETRIC	2.01	0.001	Max
SS_Ind_Std	1,3-Dichlorobenzene	mg/Kg	28	1	3.7%	0.002	NON-PARAMETRIC	2.01	0.002	Max
SS_Ind_Std	1,4-Dichlorobenzene	mg/Kg	28	1	3.7%	0.003	NON-PARAMETRIC	2.01	0.003	Max
SS_Ind_Std	2,4-Dinitrotoluene	mg/Kg	48	1	2.1%	2.00	NON-PARAMETRIC	4.70	2.00	Max
SS_Ind_Std	2-Butanone	mg/Kg	22	4	18.2%	0.016	NON-PARAMETRIC	0.008	0.016	Max
SS_Ind_Std	2-Methylnaphthalene	mg/Kg	28	3	11.1%	170	NON-PARAMETRIC	97.0	170	Max
SS_Ind_Std	Acetone	mg/Kg	28	9	33.3%	24.0	NON-PARAMETRIC	11.5	11.5	UCL
SS_Ind_Std	Aluminum	mg/Kg	48	47	100.0%	54,000	GAMMA	14,575	14,575	UCL
SS_Ind_Std	Anthracene	mg/Kg	28	1	3.7%	3.60	NON-PARAMETRIC	4.79	3.60	Max
SS_Ind_Std	Antimony	mg/Kg	28	22	81.5%	167	NON-PARAMETRIC	67.0	67.0	UCL
SS_Ind_Std	Arsenic	mg/Kg	48	27	57.4%	41.3	NON-PARAMETRIC	7.75	7.75	UCL
SS_Ind_Std	Barium	mg/Kg	48	47	100.0%	640	NON-PARAMETRIC	224	224	UCL
SS_Ind_Std	Benzene	mg/Kg	22	3	13.6%	0.004	NON-PARAMETRIC	0.002	0.004	Max
SS_Ind_Std	Beryllium	mg/Kg	48	23	48.9%	0.720	NON-PARAMETRIC	0.567	0.567	UCL
SS_Ind_Std	Bis(2-ethylhexyl)phthalate	mg/Kg	28	5	18.5%	1.50	NON-PARAMETRIC	4.27	1.50	Max
SS_Ind_Std	Cadmium	mg/Kg	48	21	44.7%	32.0	NON-PARAMETRIC	7.80	7.80	UCL
SS_Ind_Std	Calcium	mg/Kg	42	42	100.0%	1.56E+06	NON-PARAMETRIC	387,630	387,630	UCL
SS_Ind_Std	Chloride	mg/Kg	42	30	71.4%	120,000	NON-PARAMETRIC	1.07E+06	1.07E+06	UCL
SS_Ind_Std	Chromium	mg/Kg	48	47	100.0%	55.3	GAMMA	16.0	16.0	UCL
SS_Ind_Std	Cobalt	mg/Kg	28	22	81.5%	4.90	NORMAL	3.13	3.13	UCL
SS_Ind_Std	Copper	mg/Kg	48	41	87.2%	18,000	NON-PARAMETRIC	4,155	4,155	UCL
SS_Ind_Std	Dibenzofuran	mg/Kg	28	3	11.1%	12.0	NON-PARAMETRIC	6.66	12.0	Max
SS_Ind_Std	Ethylbenzene	mg/Kg	22	1	4.5%	0.001	NON-PARAMETRIC	5.63E-04	0.001	Max
SS_Ind_Std	Fluoranthene	mg/Kg	28	1	3.7%	0.144	NON-PARAMETRIC	7.42	0.144	Max
SS_Ind_Std	Fluorene	mg/Kg	28	3	11.1%	33.0	NON-PARAMETRIC	18.5	33.0	Max
SS_Ind_Std	Iron	mg/Kg	42	42	100.0%	15,000	GAMMA	11,423	11,423	UCL
SS_Ind_Std	Lead	mg/Kg	48	40	85.1%	48,000	NON-PARAMETRIC	11,009	11,009	UCL
SS_Ind_Std	m,p-Xylene	mg/Kg	10	1	10.0%	0.002	NON-PARAMETRIC	9.65E-04	0.002	Max
SS_Ind_Std	Magnesium	mg/Kg	42	42	100.0%	24,300	GAMMA	17,809	17,809	UCL
SS_Ind_Std	Manganese	mg/Kg	48	47	100.0%	519	GAMMA	350	350	UCL
SS_Ind_Std	Mercury	mg/Kg	48	13	27.7%	0.070	NON-PARAMETRIC	0.032	0.032	UCL
SS_Ind_Std	Methylene chloride	mg/Kg	22	1	4.5%	0.003	NON-PARAMETRIC	0.001	0.003	Max
SS_Ind_Std	Molybdenum	mg/Kg	22	20	90.9%	17.0	NON-PARAMETRIC	4.93	4.93	UCL
SS_Ind_Std	Naphthalene	mg/Kg	28	6	22.2%	53.0	NON-PARAMETRIC	9.95	9.95	UCL
SS_Ind_Std	Nickel	mg/Kg	48	47	100.0%	41.3	NON-PARAMETRIC	12.7	12.7	UCL
SS_Ind_Std	Nitrate	mg/Kg	48	43	91.5%	22.8	NON-PARAMETRIC	12.8	12.8	UCL
SS_Ind_Std	Nitroguanidine	mg/Kg	42	2	4.8%	0.300	NON-PARAMETRIC	0.501	0.300	Max
SS_Ind_Std	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	mg/Kg	42	13	31.0%	25.0	NON-PARAMETRIC	8.12	8.12	UCL
SS_Ind_Std	o-Xylene	mg/Kg	22	3	13.6%	0.003	NON-PARAMETRIC	0.001	0.003	Max
SS_Ind_Std	Perchlorate	mg/Kg	22	11	50.0%	4.50	NON-PARAMETRIC	2.73	2.73	UCL
SS_Ind_Std	Phenanthrene	mg/Kg	28	4	14.8%	92.0	NON-PARAMETRIC	49.1	92.0	Max
SS_Ind_Std	Phosphorus	mg/Kg	20	20	100.0%	990	NORMAL	722	722	UCL
SS_Ind_Std	Picric acid	mg/Kg	42	3	7.1%	0.500	NON-PARAMETRIC	0.248	0.500	Max

TABLE 4
Data Distribution, Upper Confidence Limits and Exposure Point Concentrations for Surface Soil
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Analyte	Units	Number of Samples	Number of Detects	Detection Frequency	Maximum Detect	Data Distribution[a]	95UCL	Exposure Point Concentration (EPC)[b]	EPC Basis[c]
SS_Ind_Std	Potassium	mg/Kg	42	42	100.0%	490,000	NON-PARAMETRIC	66,223	66,223	UCL
SS_Ind_Std	Silver	mg/Kg	48	4	8.5%	4.00	NON-PARAMETRIC	1.01	4.00	Max
SS_Ind_Std	Sodium	mg/Kg	42	42	100.0%	2,020	GAMMA	1,047	1,047	UCL
SS_Ind_Std	Strontium	mg/Kg	22	22	100.0%	484	NORMAL	377	377	UCL
SS_Ind_Std	Styrene	mg/Kg	22	2	9.5%	0.003	NON-PARAMETRIC	0.001	0.003	Max
SS_Ind_Std	Sulfate	mg/Kg	42	23	54.8%	3,060	NON-PARAMETRIC	989	989	UCL
SS_Ind_Std	Thallium	mg/Kg	48	26	55.3%	0.550	NON-PARAMETRIC	2.80	2.80	UCL
SS_Ind_Std	Toluene	mg/Kg	22	5	22.7%	0.019	NON-PARAMETRIC	0.014	0.014	UCL
SS_Ind_Std	Total petroleum hydrocarbons	mg/Kg	6	5	100.0%	47,000	GAMMA	328,216	328,216	UCL
SS_Ind_Std	Vanadium	mg/Kg	28	27	100.0%	25.7	NORMAL	17.8	17.8	UCL
SS_Ind_Std	Zinc	mg/Kg	48	47	100.0%	2,300	NON-PARAMETRIC	337	337	UCL

[a] Data distribution determined with EPA's ProUCL software, 2005.

[b] EPC = Exposure Point concentration. It is the maximum detect if the detection frequncy is less than 20%, otherwise it the 95 percent upper confidence limit from ProUCL.

[c] EPC Basis: Max = maximum detected, UCL = 95UCL from ProUCL.

TABLE 5

Intake and Exposure Parameters

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Intake and Exposure Parameter	Units	Surface Soil Industrial Worker Value	Air Emissions Resident Value	Air Emissions EOD Worker Value	Air Emissions Boater Value
Target Excess Lifetime Cancer Risk (TR)	--	1.00E-06	1.00E-06	1.00E-06	1.00E-06
Target Hazard Index (THI)	--	1	1	1	1
Body Weight Adult (BW)	Kg	70	70	70	70
Body Weight Child (BWc)	Kg	--	15	--	NA
Averaging Time, Cancer (ATc)	yrs	70	70	70	70
Averaging Time, Non-Cancer (ATn) - For Air Emissions Only	yrs	NA	30	20	20
Averaging Time, Non-Cancer (ATn) - Adult	yrs	25	24	NA	NA
Averaging Time, Non-Cancer - Child (Atn-c)	yrs	--	6	NA	NA
Exposure Frequency (EF) - For Air Emissions Only	days/yr	NA	250	250	104
Exposure Frequency (EF)	days/yr	250	350	NA	NA
Exposure Duration (ED) - For Air Emissions Only	yrs	NA	30	20	20
Exposure Duration (ED) - Adult	yrs	25	24		NA
Exposure Duration - Child (ED-c)	yrs	--	6	--	NA
Soil Ingestion Rate - Adult (IRs)	mg/day	100	100		NA
Soil Ingestion Rate (IRs) - age adjusted	mg-yr/Kg-day		114	--	NA
Soil Ingestion Rate - Child (IRs-c)	mg/day	--	200	--	NA
Air Inhalation Rate - Adult (IRa) - For Air Emissions only	M^3/day	NA	1.38	0.0216	0.96
Air Inhalation Rate - Adult (IRa)	M^3/day	20	20	NA	NA
Air Inhalation Rate (IRa) - age adjusted	M^3-yr/Kg-day	--	10.9	--	NA
Air Inhalation Rate - Child (IRa-c)	M^3/day	--	10	--	NA
Particulate Emission Factor (PEF)	M^3/Kg	5.11E+07	1.17E+09		NA
Volatilization Factor, Soil (VF)	M^3/Kg	chem-spec	chem-spec	chem-spec	chem-spec
Skin Surface Area - Adult (SA)	cm^2/day	3300	5700	NA	NA
Skin Surface Area/adherence Factor(SA) - age adjusted	mg-yr/Kg-Event	--	361	--	NA
Skin Surface Area - Child (SA)	cm^2/day	--	2800	--	NA
Adherence Factor Adult (AF)	mg/cm^2/event	0.2	0.07	NA	NA
Event Frequency, EV	--	1	1	NA	NA
Adherence Factor Child (AF)	mg/cm^2	--	0.2	--	NA
Absorption Factor, Metals (ABSm)	--	chem-spec	chem-spec	chem-spec	chem-spec
Absorption Factor, SVOA (ABSs)	--	0.1	0.1	NA	NA
Absorption Factor, VOA (ABSv)	--	chem-spec	chem-spec	chem-spec	chem-spec

TABLE 6
Toxicity Factors for Chemicals Detected in Surface Soil
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CASNo	2005_SFo (Kg-day/mg)	2005_SFi (Kg-day/mg)	2005_RfDo (mg/Kg-day)	2005_RfDi (mg/Kg-day)
1,2,3-Trichlorobenzene	87-61-6				
1,2,4-Trichlorobenzene	120-82-1			0.0100	0.0010
1,2-Dichlorobenzene	95-50-1			0.0900	0.0400
1,3-Dichlorobenzene	541-73-1			0.0030	0.0030
1,4-Dichlorobenzene	106-46-7	0.0240	0.0220	0.0300	0.2290
2,4-Dinitrotoluene	121-14-2			0.0020	0.0020
2-Butanone	78-93-3			0.6000	1.4000
2-Methylnaphthalene	91-57-6			0.0040	0.0040
Acetone	67-64-1			0.9000	0.9000
Aluminum	7429-90-5			1.0000	0.0010
Anthracene	120-12-7			0.3000	0.3000
Antimony	7440-36-0			0.0004	0.0004
Arsenic	7440-38-2	1.5000	15.1000	0.0003	0.0003
Barium	7440-39-3			0.0700	0.0001
Benzene	71-43-2	0.0550	0.0270	0.0040	0.0086
Beryllium	7440-41-7		8.4000	0.0020	0.0000
bis(2-ethylhexyl)phthalate	117-81-7	0.0140	0.0140	0.0200	0.0200
Cadmium	7440-43-9		6.3000	0.0010	0.0001
Calcium	7440-70-2				
Chloride					
Chromium	7440-47-3			1.5000	1.5000
Cobalt	7440-48-4		9.8000	0.0200	0.0000
Copper	7440-50-8			0.0400	0.0400
Dibenzofuran	132-64-9			0.0020	0.0020
Di-n-octylphthalate	117-84-0			0.0400	0.0400
Ethylbenzene	100-41-4			0.1000	0.2900
Fluoranthene	206-44-0			0.0400	0.0400
Fluorene	86-73-7			0.0400	0.0400
Iron	7439-89-6			0.3000	0.3000
Lead	7439-92-1				
m,p-Xylenes	1330-20-7			0.2000	0.0300
Magnesium	7439-95-4				
Manganese	7439-96-5			0.1400	0.0000
Mercury	7439-97-6				0.0001
Methylene chloride	75-09-2	0.0075	0.0017	0.0600	0.3000
Molybdenum	7439-98-7			0.0050	0.0050
Naphthalene	7440-02-0			0.0200	0.0200
Nitrate	14797-55-8			1.6000	1.6000
Nitroguanidine	556-88-7			0.1000	0.1000
n-Nitrosodiphenylamine	91-20-3			0.0200	0.0009
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0			0.0500	0.0500
o-Xylene	95-47-6			0.2000	0.0300
Perchlorate	7601-90-3			0.0007	0.0007
Phenanthrene	85-01-8				
Phosphorus	7723-14-0			0.00002	0.00002
Picric acid	88-89-1				
Potassium	7440-09-7				
Silver	7440-22-4			0.0050	0.0050
Sodium	7440-23-5				
Strontium	7440-24-6			0.6000	0.6000
Styrene	100-42-5			0.2000	0.2860
Sulfate					
Thallium	7440-28-0			0.0001	0.0001
Toluene	108-88-3			0.2000	0.1140
Total petroleum hydrocarbons					
Vanadium	7440-62-2			0.0010	0.0010
Zinc	7440-66-6			0.3000	0.3000

Sfo = Oral slope Factor, Sfi = Inhalation Slope Factor, RfDo = Oral Reference dose, RfDi - Inhalation Reference Dose
Source: EPA Integreted Risk Information System (IRIS), May 2005.

TABLE 7

Summary of Human Health Risks from Surface Soils - Industrial Worker Scenario

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Analyte	Units	Exposure Point Concentration (EPC)[a]	Carcinogenic RBC[b]	ELCR[c]	% ELCR	Non-carcinogenic RBC[b]	HI[d]	% HI
SS_Ind_Std	1,2,4-Trichlorobenzene	mg/Kg	0.003				9,835	3.25E-07	0.0%
SS_Ind_Std	1,2-Dichlorobenzene	mg/Kg	0.001				91,177	1.54E-08	0.0%
SS_Ind_Std	1,3-Dichlorobenzene	mg/Kg	0.002				3,054	6.22E-07	0.0%
SS_Ind_Std	1,4-Dichlorobenzene	mg/Kg	0.003	119	3.E-11	0.0%	30,644	1.01E-07	0.0%
SS_Ind_Std	2,4-Dinitrotoluene	mg/Kg	2.00				2,036	9.82E-04	0.1%
SS_Ind_Std	2-Butanone	mg/Kg	0.016				612,173	2.60E-08	0.0%
SS_Ind_Std	2-Methylnaphthalene	mg/Kg	170				2,196	0.077	11.5%
SS_Ind_Std	Acetone	mg/Kg	11.5				916,214	1.25E-05	0.0%
SS_Ind_Std	**Aluminum**	mg/Kg	14,575				207,982	0.070	10.4%
SS_Ind_Std	Anthracene	mg/Kg	3.60				164,669	2.19E-05	0.0%
SS_Ind_Std	Antimony	mg/Kg	67.0				407	0.165	24.5%
SS_Ind_Std	**Arsenic**	mg/Kg	7.75	1.54	5.E-06	97.6%	255	0.030	4.5%
SS_Ind_Std	**Barium**	mg/Kg	224				24,194	0.009	1.4%
SS_Ind_Std	Benzene	mg/Kg	0.004	51.9	8.E-11	0.0%	4,081	1.00E-06	0.0%
SS_Ind_Std	**Beryllium**	mg/Kg	0.567	87.0	7.E-09	0.1%	861	6.59E-04	0.1%
SS_Ind_Std	bis(2-ethylhexyl)phthalate	mg/Kg	1.50	204	7.E-09	0.1%	20,360	7.37E-05	0.0%
SS_Ind_Std	Cadmium	mg/Kg	7.80	116	7.E-08	1.3%	956	0.008	1.2%
SS_Ind_Std	**Chromium**	mg/Kg	16.0				1.53E+06	1.05E-05	0.0%
SS_Ind_Std	**Cobalt**	mg/Kg	3.13	74.6	4.E-08	0.8%	1,387	0.002	0.3%
SS_Ind_Std	Copper	mg/Kg	4,155				40,721	0.102	15.2%
SS_Ind_Std	Dibenzofuran	mg/Kg	12.0				2,036	0.006	0.9%
SS_Ind_Std	Ethylbenzene	mg/Kg	0.001				102,062	1.27E-08	0.0%
SS_Ind_Std	Fluoranthene	mg/Kg	0.144				21,956	6.56E-06	0.0%
SS_Ind_Std	Fluorene	mg/Kg	33.0				21,956	0.002	0.2%
SS_Ind_Std	**Iron**	mg/Kg	11,423				305,405	0.037	5.6%
SS_Ind_Std	m,p-Xylenes	mg/Kg	0.002				199,202	1.00E-08	0.0%
SS_Ind_Std	**Manganese**	mg/Kg	350				3,639	0.096	14.3%
SS_Ind_Std	**Mercury**	mg/Kg	0.032				22,456	1.42E-06	0.0%
SS_Ind_Std	Methylene chloride	mg/Kg	0.003	381	8.E-12	0.0%	61,272	5.22E-08	0.0%
SS_Ind_Std	Molybdenum	mg/Kg	4.93				5,090	9.69E-04	0.1%
SS_Ind_Std	Naphthalene	mg/Kg	9.95				20,360	0.000	0.1%
SS_Ind_Std	**Nickel**	mg/Kg	12.7				20,360	6.23E-04	0.1%
SS_Ind_Std	Nitrate	mg/Kg	12.8				1.63E+06	7.84E-06	0.0%
SS_Ind_Std	Nitroguanidine	mg/Kg	0.300				61,421	4.88E-06	0.0%
SS_Ind_Std	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	mg/Kg	8.12				30,711	2.64E-04	0.0%
SS_Ind_Std	o-Xylene	mg/Kg	0.003				199,202	1.36E-08	0.0%

TABLE 7

Summary of Human Health Risks from Surface Soils - Industrial Worker Scenario

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Analyte	Units	Exposure Point Concentration (EPC)[a]	Carcinogenic RBC[b]	ELCR[c]	% ELCR	Non-carcinogenic RBC[b]	HI[d]	% HI
SS_Ind_Std	Perchlorate	mg/Kg	2.73				713	3.83E-03	0.6%
SS_Ind_Std	Silver	mg/Kg	4.00				5,090	7.86E-04	0.1%
SS_Ind_Std	**Strontium**	mg/Kg	377				610,809	6.18E-04	0.1%
SS_Ind_Std	Styrene	mg/Kg	0.003				203,842	1.28E-08	0.0%
SS_Ind_Std	**Thallium**	mg/Kg	2.80				71.3	0.039	5.9%
SS_Ind_Std	Toluene	mg/Kg	0.014				203,006	7.00E-08	0.0%
SS_Ind_Std	**Vanadium**	mg/Kg	17.8				1,018	0.017	2.6%
SS_Ind_Std	Zinc	mg/Kg	337				305,405	0.001	0.2%
				Total Risk	**5.E-06**	**100%**		**0.7**	**100.0%**
				Total Risk Without Background Metals[e]	**7.E-08**			**0.4**	

[a] EPC = Exposure Point concentration. It is the maximum detect if the detection frequncy is less than 20%, otherwise it is the 95 percent upper confidence limit from ProUCL.

[b] RBC = Risk-based concentration. Equates to a carcinogenic risk of 1E-06 or hazard index of 1.

[c] ELCR = Excess Life-time Cancer Risk.

[d] HI = Hazard Index.

[e] The **bolded** and right-indented analytes are most likely attributable to the background.

TABLE 8

USGS Background Surface Soil Data for Selected Metals

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

State	County	Collection Date	Arsenic	Manganese
UT	San Juan	1-May-62		300
UT	Iron	1-Feb-67	7.5	150
UT	Washington	1-Feb-67	7.6	500
UT	Box Elder	1-Aug-65	5.3	700
UT	Box Elder	1-Aug-65	4	1000
UT	Salt Lake	1-Aug-65	19	1000
UT	Wasatch	1-Aug-65	3.9	300
UT	Duchesne	1-Aug-65	7.5	500
UT	Washington	1-Feb-67	5.4	150
UT	Garfield	1-Jun-71	3.377	500
UT	Grand	1-Sep-64	12	150
UT	Emery	1-May-62		200
UT	Millard	1-Sep-72	4.748	500
UT	Millard	1-Aug-62		200
UT	Millard	1-Aug-62		500
UT	Millard	1-Aug-62		700
UT	Sevier	1-Aug-62		700
UT	Wayne	1-Aug-62		500
UT	Wayne	1-Aug-62		200
UT	Millard	1-Aug-64	7.1	200
UT	Rich	1-Aug-64	6.4	150
UT	Uintah	1-Aug-64	6.3	150
UT	Grand	1-May-62		200
UT	Carbon	1-Sep-73	2.907	200
UT	Tooele	1-Jul-66	6.2	300
UT	Tooele	1-Jul-66	9.3	700
UT	Salt Lake	1-Jul-66	7	300
UT	Morgan	1-Jun-65	8.9	300
UT	Wasatch	1-Jun-65	4.1	700
UT	Wasatch	1-Jun-65	5	300
UT	Duchesne	1-Jun-65	6.5	300
UT	Kane	1-Jul-64		300
UT	Millard	1-Sep-74	3.797	200
UT	Millard	1-Sep-72	4.403	200
UT	Emery	1-Sep-73	6.734	200
UT	Millard	1-Sep-72	2.734	200
UT	Utah	1-Sep-73	11.95	500
UT	Emery	1-May-73	20.23	300
UT	Kane	1-Feb-73	3.662	300
UT	Garfield	1-Feb-73	19.26	200
UT	Garfield	1-Feb-73	3.574	700
UT	Sevier	1-Feb-73	1.489	500
UT	Grand	1-Sep-72	5.906	200
UT	Emery	1-Sep-72	7.581	500
UT	Sevier	1-Sep-72	4.386	100
UT	Summit	1-Jul-68	48	300
UT	San Juan	1-Oct-73	1.857	200

Units: mg/Kg

Data Source: Shacklette and Boerngen, 1984

TABLE 9

Descriptive Statistics for Selected Metals in Utah Background Surface Soils

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Statistic	Arsenic	Manganese
Mean	7.99	371
Standard Error	1.33	32.9
Median	6.20	300
Mode	7.50	200
Standard Deviation	8.11	226
Sample Variance	65.8	50,951
Kurtosis	16.6	0.743
Skewness	3.70	1.16
Range	46.5	900
Minimum	1.49	100
Maximum	48.0	1,000
Sum	296	17,450
Count	37	47
Confidence Level (95.0%)	2.71	66.3
95UCL	10.7	438

Data Source: Shacklette and Boerngen, 1984.

TABLE 10

Updated Toxicity Factors for Air Emissions

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	Permit_Chemical	CASNo	1997_SFi (Kg-day/mg)	2005_SFi (Kg-day/mg)	1997_RfDi (mg/Kg-day)	2005_RfDi (mg/Kg-day)
1,1,1-Trichloroethane	Methyl chloroform	71-55-6				0.6300
1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethane	79-34-5	0.2000	0.2000		**0.0600**
1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1				8.6000
1,1-Dichloroethene	Vinylidene chloride	75-35-4				0.0600
1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6				0.0017
1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8				0.0017
1,3-Butadiene	1,3-Butadiene	106-99-0	1.8000	*0.1000*		0.0006
2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5				
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	0.0300	**0.0300**	0.0005	**0.0005**
2,6-Dinitrotoluene	2,4-DNT	606-20-2	0.6800	[a]	0.0020	***0.0010***
Allyl chloride	Allyl chloride	107-05-1			0.0010	*0.0003*
Aluminum	Aluminum	7429-90-5				0.0010
Antimony	Antimony	7440-36-0			0.0004	**0.0004**
Barium	Barium	7440-39-3			0.0005	*0.0001*
Benzene	Benzene	71-43-2	0.0290	*0.0270*		0.0086
Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	7.3000	**0.7300**		
Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	7.3000	*3.1000*		
bis(2-ethylhexyl)phthalate	bis(2-ethylhexyl)phthalate	117-81-7	0.0140	**0.0140**	0.0200	**0.0200**
Bromomethane	Methyl Bromide	74-83-9				0.0014
Butylbenzylphthalate	Butylbenzylphthalate	85-68-7		**0.0019**	0.2000	**0.2000**
Cadmium	Cadmium	7440-43-9		6.3000	0.0010	*0.0001*
Calcium	Calcium	7440-70-2				
Carbon tetrachloride	Carbon tetrachloride	56-23-5	0.0530	0.0530		0.0500
Chloroethane	Ethyl chloride	75-00-3		**0.0029**	10.0000	*2.9000*
Chloromethane	Methyl chloride	74-87-3				0.0260
Chromium	Chromium	7440-47-3			0.0050	***1.5000***
Chrysene	Chrysene	218-01-9		**0.0073**		
Copper	Copper	7440-50-8				0.0400
Dichlorodifluoromethane	Freon12	75-71-8				0.0500
Diethylphthalate	Diethylphthalate	84-66-2			0.8000	**0.8000**
Dimethylphthalate	Dimethylphthalate	131-11-3			10.0000	**10.0000**
Di-n-butylphthalate	Di-n-butylphthalate	84-74-2			0.1000	**0.1000**
Di-n-octylphthalate	Di-n-octylphthalate	117-84-0				**0.0400**
Ethylbenzene	Ethylbenzene	100-41-4			1.0000	*0.2900*
p-Ethyltoluene	p-Ethyltoluene	100-41-4				
Fluoranthene	Fluoranthene	206-44-0			0.0400	**0.0400**
Fluorene	Fluorene	86-73-7			0.0400	**0.0400**
Hexachlorobenzene	Hexachlorobenzene	118-74-1		1.6000	0.0008	**0.0008**
Hexahydro-1,3,5-trinitro-1,3,5-triazine	Hexahydro-1,3,5…(RDX)	121-82-4	0.1100	**0.1100**	0.0030	**0.0030**
Lead	Lead	7439-92-1				
m,p-Xylenes	m,p-Xylene	1330-20-7				0.0300
Mercury	Mercury	7439-97-6			0.0003	*0.0001*
Methane	Methane					
Methylene chloride	Dichloromethane	75-09-2		0.0017		0.3000
Naphthalene	Naphthalene	91-20-3				0.0009
Nickel	Nickel	7440-02-0			0.0200	**0.0200**
Nitroglycerin	Nitroglycerine	55-63-0		**0.0140**		
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	Octahydro-1,3,5,7…(HMX)	2691-41-0			0.0500	**0.0500**
o-Xylene	o-Xylene	95-47-6				0.0300
Pentaerythritol tetranitrate	Pentaerythritol tetranitrate (PETN)	78-11-5	0.1100	**0.1100**[b]	0.0030	**0.003**[b]
Phenanthrene	Phenanthrene	85-01-8				
Phenol	Phenol	108-95-2			0.6000	***0.3000***
Potassium	Potassium	7440-09-7				
Pyrene	Pyrene	129-00-0			0.0300	**0.0300**
Sodium	Sodium	7440-23-5				
Styrene	Styrene	100-42-5				0.2860
Titanium	Titanium	7440-32-6				0.0086
Toluene	Toluene	108-88-3				0.1140
Trichlorofluoromethane	Freon11	75-69-4				0.2000
Vinyl Chloride	Vinyl chloride	75-01-4	0.3000	***0.0150***		0.0280
Zinc	Zinc	7440-66-6			0.3000	**0.3000**

SFi = Carcinogenic Inhalation Slope Factor, RfDi = Non-carcinogenic Inhalation Reference dose.

Bolded values denote route-to-route extrapolation of oral toxicity to inhalation pathway, italicized values denote a change from the 1997 Permit values, the boxed values are new.

[a] Toxcity values do not exist in the latest EPA peer-reviewed sources.

[b] Toxcity values for PETN derived from RDX.

Source: EPA Integreted Risk Information System (IRIS), May 2005.

TABLE 11
New Toxicity Factors for Air Emissions
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	Permit_Chemical	CASNo	1997_SFi (Kg-day/mg)	2005_SFi (Kg-day/mg)	1997_RfDi (mg/Kg-day)	2005_RfDi (mg/Kg-day)
1,1,1-Trichloroethane	Methyl chloroform	71-55-6				**0.6300**
1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethane	79-34-5	0.2000	0.2000		**0.0600**
1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1				**8.6000**
1,1-Dichloroethene	Vinylidene chloride	75-35-4				**0.0600**
1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6				**0.0017**
1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8				**0.0017**
1,3-Butadiene	1,3-Butadiene	106-99-0	1.8000	0.1000		**0.0006**
2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5				
Aluminum	Aluminum	7429-90-5				**0.0010**
Benzene	Benzene	71-43-2	0.0290	0.0270		**0.0086**
Bromomethane	Methyl Bromide	74-83-9				**0.0014**
Butylbenzylphthalate	Butylbenzylphthalate	85-68-7		**0.0019**	0.2000	0.2000
Cadmium	Cadmium	7440-43-9		**6.3000**	0.0010	0.0001
Calcium	Calcium	7440-70-2				
Carbon tetrachloride	Carbon tetrachloride	56-23-5	0.0530	0.0530		**0.0500**
Chloroethane	Ethyl chloride	75-00-3		**0.0029**	10.0000	2.9000
Chloromethane	Methyl chloride	74-87-3				**0.0260**
Chrysene	Chrysene	218-01-9		**0.0073**		
Copper	Copper	7440-50-8				**0.0400**
Dichlorodifluoromethane	Freon12	75-71-8				**0.0500**
Di-n-octylphthalate	Di-n-octylphthalate	117-84-0				**0.0400**
p-Ethyltoluene	p-Ethyltoluene	100-41-4				
Hexachlorobenzene	Hexachlorobenzene	118-74-1		**1.6000**	0.0008	0.0008
Lead	Lead	7439-92-1				
m,p-Xylenes	m,p-Xylene	1330-20-7				**0.0300**
Methane	Methane					
Methylene chloride	Dichloromethane	75-09-2		**0.0017**		**0.3000**
Naphthalene	Naphthalene	91-20-3				**0.0009**
Nitroglycerin	Nitroglycerine	55-63-0		**0.0140**		
o-Xylene	o-Xylene	95-47-6				**0.0300**
Phenanthrene	Phenanthrene	85-01-8				
Potassium	Potassium	7440-09-7				
Sodium	Sodium	7440-23-5				
Styrene	Styrene	100-42-5				**0.2860**
Titanium	Titanium	7440-32-6				**0.0086**
Toluene	Toluene	108-88-3				**0.1140**
Trichlorofluoromethane	Freon11	75-69-4				**0.2000**
Vinyl Chloride	Vinyl chloride	75-01-4	0.3000	0.0150		**0.0280**

SFi = Carcinogenic Inhalation Slope Factor, RfDi = Non-carcinogenic Inhalation Reference dose.
Bolded values denote new toxicity values since the permit.
Source: EPA Integreted Risk Information System (IRIS), May 2005.

TABLE 12

Changes in Toxicity Factors for Air Emissions

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	Permit_Chemical	CASNo	1997_SFi (Kg-day/mg)	2005_SFi (Kg-day/mg)	1997_RfDi (mg/Kg-day)	2005_RfDi (mg/Kg-day)
1,3-Butadiene	1,3-Butadiene	106-99-0	1.8000	**0.1000**		0.0006
2,6-Dinitrotoluene	2,4-DNT	606-20-2	0.6800	*	0.0020	**0.0010**
Allyl chloride	Allyl chloride	107-05-1			0.0010	**0.0003**
Barium	Barium	7440-39-3			0.0005	**0.0001**
Benzene	Benzene	71-43-2	0.0290	**0.0270**		0.0086
Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	7.3000	**3.1000**		
Cadmium	Cadmium	7440-43-9		6.3000	0.0010	**0.0001**
Chloroethane	Ethyl chloride	75-00-3		0.0029	10.0000	**2.9000**
Chromium	Chromium	7440-47-3			0.0050	**1.5000**
Ethylbenzene	Ethylbenzene	100-41-4			1.0000	**0.2900**
Mercury	Mercury	7439-97-6			0.0003	**0.0001**
Phenol	Phenol	108-95-2			0.6000	**0.3000**
Vinyl Chloride	Vinyl chloride	75-01-4	0.3000	**0.0150**		0.0280

SFi = Carcinogenic Inhalation Slope Factor, RfDi = Non-carcinogenic Inhalation Reference dose.

Bolded values denote a change in the toxicity values since the permit.

* Toxcity values do not exist in the latest EPA peer-reviewed sources.

Source: EPA Integreted Risk Information System (IRIS), May 2005.

TABLE 13

Estimating Risk to EOD Personnel on Bug Knoll (Permit Table 8)

Attachment 10B - Thermal Treatment Unit Human Health Risk

Assessment Scenario	Chemical	Permit Chemical Name	CASNo	EPC (mg/M^3)	1997 ELCR	2005 ELCR	2005 ELCR%	1997 HI	2005 HI	2005 HI%
Air_EOD	1,1,1-Trichloroethane	Methyl chloroform	71-55-6	1.32E-04					4.E-08	0.00%
Air_EOD	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethae	79-34-5	1.38E-04	2.E-09	2.E-09	0.03%		5.E-07	0.00%
Air_EOD	1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1	5.43E-06					1.E-10	0.00%
Air_EOD	1,1-Dichloroethene	Vinylidene chloride	75-35-4	3.40E-05					1.E-07	0.00%
Air_EOD	1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6	3.04E-04					4.E-05	0.03%
Air_EOD	1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8	3.87E-06					5.E-07	0.00%
Air_EOD	1,3-Butadiene	1,3-Butadiene	106-99-0	2.38E-04	3.E-08	1.E-09	0.02%		9.E-05	0.07%
Air_EOD	2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	3.89E-05	7.E-11	7.E-11	0.00%	2.E-05	2.E-05	0.01%
Air_EOD	2,6-Dinitrotoluene	2,4-DNT	606-20-2	1.17E-05	5.E-10			1.E-06	2.E-06	0.00%
Air_EOD	2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5	1.82E-06						
Air_EOD	Allyl chloride	Allyl chloride	107-05-1	2.30E-04				5.E-05	2.E-04	0.14%
Air_EOD	Aluminum	Aluminum	7429-90-5	2.38E-01				0.E+00	5.E-02	41.85%
Air_EOD	Antimony	Antimony	7440-36-0	1.49E-03				8.E-04	8.E-04	0.65%
Air_EOD	Barium	Barium	7440-39-3	4.11E-03				2.E-03	6.E-03	5.16%
Air_EOD	Benzene	Benzene	71-43-2	7.90E-04	1.E-09	1.E-09	0.02%		2.E-05	0.02%
Air_EOD	Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	5.98E-07	3.E-10	3.E-11	0.00%			
Air_EOD	Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	7.76E-06	3.E-09	1.E-09	0.02%			
Air_EOD	bis(2-ethylhexyl)phthalate	bis(2-ethylhexyl)phthalate	117-81-7	6.24E-05	5.E-11	5.E-11	0.00%	7.E-07	7.E-07	0.00%
Air_EOD	Bromomethane	Methyl Bromide	74-83-9	6.54E-05					1.E-05	0.01%
Air_EOD	Butylbenzylphthalate	Butylbenzylphthalate	85-68-7	4.26E-06		5.E-13	0.00%	5.E-09	5.E-09	0.00%
Air_EOD	Cadmium	Cadmium	7440-43-9	1.52E-02	6.E-06	6.E-06	91.26%	3.E-03	6.E-02	46.89%
Air_EOD	Calcium	Calcium	7440-70-2	2.58E-02						
Air_EOD	Carbon tetrachloride	Carbon tetrachloride	56-23-5	8.30E-06	3.E-11	3.E-11	0.00%		4.E-08	0.00%
Air_EOD	Chloroethane	Ethyl chloride	75-00-3	2.46E-05		4.E-12	0.00%	5.E-10	2.E-09	0.00%
Air_EOD	Chloromethane	Methyl chloride	74-87-3	3.44E-05					3.E-07	0.00%
Air_EOD	Chromium	Chromium	7440-47-3	1.06E-03				4.E-05	1.E-07	0.00%
Air_EOD	Chrysene	Chrysene	218-01-9	5.73E-07		3.E-13	0.00%			
Air_EOD	Copper	Copper	7440-50-8	4.88E-02					3.E-04	0.21%
Air_EOD	Dichlorodifluoromethane	Freon12	75-71-8	1.24E-05					5.E-08	0.00%
Air_EOD	Diethylphthalate	Diethylphthalate	84-66-2	1.03E-02				3.E-06	3.E-06	0.00%
Air_EOD	Dimethylphthalate	Dimethylphthalate	131-11-3	1.29E-07				3.E-12	3.E-12	0.00%
Air_EOD	Di-n-butylphthalate	Di-n-butylphthalate	84-74-2	2.73E-04				6.E-07	6.E-07	0.00%
Air_EOD	Di-n-octylphthalate	Di-n-octylphthalate	117-84-0	1.48E-05					8.E-08	0.00%
Air_EOD	Ethylbenzene	Ethylbenzene	100-41-4	2.52E-05				5.E-09	2.E-08	0.00%
Air_EOD	Fluoranthene	Fluoranthene	206-44-0	2.05E-06				1.E-08	1.E-08	0.00%
Air_EOD	Fluorene	Fluorene	86-73-7	2.58E-07				1.E-09	1.E-09	0.00%
Air_EOD	Hexachlorobenzene	Hexachlorobenzene	118-74-1	2.13E-05	2.E-09	2.E-09	0.03%	6.E-06	6.E-06	0.00%
Air_EOD	Hexahydro-1,3,5-trinitro-1,3,5-triazine	Hexahydro-1,3,5…(RDX)	121-82-4	7.63E-02	5.E-07	5.E-07	8.00%	5.E-03	5.E-03	4.47%
Air_EOD	Lead	Lead	7439-92-1	2.13E-02						
Air_EOD	m,p-Xylenes	m,p-Xylene	1330-20-7	1.90E-05					1.E-07	0.00%
Air_EOD	Mercury	Mercury	7439-97-6	1.94E-06				1.E-06	5.E-06	0.00%

TABLE 13

Estimating Risk to EOD Personnel on Bug Knoll (Permit Table 8)

Attachment 10B - Thermal Treatment Unit Human Health Risk

Assessment Scenario	Chemical	Permit Chemical Name	CASNo	EPC (mg/M^3)	1997 ELCR	2005 ELCR	2005 ELCR%	1997 HI	2005 HI	2005 HI%
Air_EOD	Methane	Methane		3.17E-03						
Air_EOD	Methylene chloride	Dichloromethane	75-09-2	3.39E-03		3.E-10	0.01%		2.E-06	0.00%
Air_EOD	Naphthalene	Naphthalene	91-20-3	8.98E-06					2.E-06	0.00%
Air_EOD	Nickel	Nickel	7440-02-0	6.82E-03				7.E-05	7.E-05	0.06%
Air_EOD	Nitroglycerin	Nitroglycerine	55-63-0	1.71E-05		1.E-11	0.00%			
Air_EOD	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	Octahydro-1,3,5,7…(HMX)	2691-41-0	5.81E-03				2.E-05	2.E-05	0.02%
Air_EOD	o-Xylene	o-Xylene	95-47-6	9.18E-06					6.E-08	0.00%
Air_EOD	Pentaerythritoltetranitrate	Pentaerythritol tetranitrate (PETN)	78-11-5	5.81E-03	4.E-08	4.E-08	0.61%	4.E-04	4.E-04	0.34%
Air_EOD	p-Ethyltoluene	p-Ethyltoluene	622-96-8	9.99E-06						
Air_EOD	Phenanthrene	Phenanthrene	85-01-8	1.59E-06						
Air_EOD	Phenol	Phenol	108-95-2	1.08E-05				4.E-09	8.E-09	0.00%
Air_EOD	Potassium	Potassium	7440-09-7	2.89E-01						
Air_EOD	Pyrene	Pyrene	129-00-0	8.17E-06				6.E-08	6.E-08	0.00%
Air_EOD	Sodium	Sodium	7440-23-5	1.26E-02						
Air_EOD	Styrene	Styrene	100-42-5	1.98E-04					1.E-07	0.00%
Air_EOD	Titanium	Titanium	7440-32-6	6.17E-04					2.E-05	0.01%
Air_EOD	Toluene	Toluene	108-88-3	1.99E-04					4.E-07	0.00%
Air_EOD	Trichlorofluoromethane	Freon11	75-69-4	1.95E-05					2.E-08	0.00%
Air_EOD	Vinyl Chloride	Vinyl chloride	75-01-4	1.67E-05	4.E-09	2.E-11	0.00%		1.E-07	0.00%
Air_EOD	Zinc	Zinc	7440-66-6	4.43E-02				3.E-05	3.E-05	0.03%
Total					**6.E-06**	**6.E-06**	**100%**	**1.E-02**	**1.E-01**	**100%**

TABLE 14

Estimating Risk to Boater on the Great Salt Lake (Permit Table 9)

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Chemical	Permit Chemical Name	CASNo	EPC (mg/M^3)	1997 ELCR	2005 ELCR	2005 ELCR%	1997 HI	2005 HI	2005 HI%
Air_Rec	1,1,1-Trichloroethane	Methyl chloroform	71-55-6	1.74E-06					1.E-08	0.00%
Air_Rec	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethae	79-34-5	1.82E-06		4.E-10	0.01%		1.E-07	0.00%
Air_Rec	1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1	7.13E-08					3.E-11	0.00%
Air_Rec	1,1-Dichloroethene	Vinylidene chloride	75-35-4	4.47E-07					3.E-08	0.00%
Air_Rec	1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6	3.99E-06					9.E-06	0.02%
Air_Rec	1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8	5.09E-08					1.E-07	0.00%
Air_Rec	1,3-Butadiene	1,3-Butadiene	106-99-0	3.12E-06	6.E-09	3.E-10	0.01%	0.E+00	2.E-05	0.04%
Air_Rec	2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	5.11E-07	2.E-11	2.E-11	0.00%	4.E-06	4.E-06	0.01%
Air_Rec	2,6-Dinitrotoluene	2,4-DNT	606-20-2	1.54E-07	1.E-10			3.E-07	6.E-07	0.00%
Air_Rec	2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5	2.39E-08						
Air_Rec	Allyl chloride	Allyl chloride	107-05-1	3.02E-06				1.E-05	4.E-05	0.07%
Air_Rec	Aluminum	Aluminum	7429-90-5	3.12E-03					1.E-02	20.98%
Air_Rec	Antimony	Antimony	7440-36-0	1.96E-05				2.E-04	2.E-04	0.33%
Air_Rec	Barium	Barium	7440-39-3	5.40E-05				4.E-04	2.E-03	2.59%
Air_Rec	Benzene	Benzene	71-43-2	1.04E-05	3.E-10	3.E-10	0.01%	1.E-11	5.E-06	0.01%
Air_Rec	Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	7.85E-09	6.E-11	6.E-12	0.00%			
Air_Rec	Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	1.02E-07	8.E-10	4.E-10	0.01%			
Air_Rec	bis(2-ethylhexyl)phthalate	bis(2-ethylhexyl)phthalate	117-81-7	8.20E-07	1.E-11	1.E-11	0.00%	2.E-07	2.E-07	0.00%
Air_Rec	Bromomethane	Methyl Bromide	74-83-9	8.59E-07					2.E-06	0.00%
Air_Rec	Butylbenzylphthalate	Butylbenzylphthalate	85-68-7	5.59E-08		1.E-13	0.00%	1.E-09	1.E-09	0.00%
Air_Rec	Cadmium	Cadmium	7440-43-9	1.99E-04	1.E-06	1.E-06	45.77%	8.E-04	1.E-02	23.48%
Air_Rec	Calcium	Calcium	7440-70-2	3.39E-04						
Air_Rec	Carbon tetrachloride	Carbon tetrachloride	56-23-5	1.09E-07	6.E-12	6.E-12	0.00%		9.E-09	0.00%
Air_Rec	Chloroethane	Ethyl chloride	75-00-3	3.23E-07		1.E-12	0.00%	1.E-10	4.E-10	0.00%
Air_Rec	Chloromethane	Methyl chloride	74-87-3	4.51E-07					7.E-08	0.00%
Air_Rec	Chromium	Chromium	7440-47-3	1.39E-05				1.E-05	4.E-08	0.00%
Air_Rec	Chrysene	Chrysene	218-01-9	7.52E-09		6.E-14	0.00%			
Air_Rec	Copper	Copper	7440-50-8	6.41E-04					6.E-05	0.11%
Air_Rec	Dichlorodifluoromethane	Freon12	75-71-8	1.63E-07					1.E-08	0.00%
Air_Rec	Diethylphthalate	Diethylphthalate	84-66-2	1.35E-04				1.E-09	7.E-07	0.00%
Air_Rec	Dimethylphthalate	Dimethylphthalate	131-11-3	1.69E-09				5.E-08	7.E-13	0.00%
Air_Rec	Di-n-butylphthalate	Di-n-butylphthalate	84-74-2	3.58E-06				3.E-10	1.E-07	0.00%
Air_Rec	Di-n-octylphthalate	Di-n-octylphthalate	117-84-0	1.95E-07					2.E-08	0.00%
Air_Rec	Ethylbenzene	Ethylbenzene	100-41-4	3.31E-07				1.E-09	4.E-09	0.00%
Air_Rec	Fluoranthene	Fluoranthene	206-44-0	2.69E-08				2.E-10	3.E-09	0.00%
Air_Rec	Fluorene	Fluorene	86-73-7	3.39E-09				3.E-09	3.E-10	0.00%
Air_Rec	Hexachlorobenzene	Hexachlorobenzene	118-74-1	2.80E-07	2.E-10	5.E-10	0.02%	5.E-07	1.E-06	0.00%
Air_Rec	Hexahydro-1,3,5-trinitro-1,3,5-triazine	Hexahydro-1,3,5…(RDX)	121-82-4	1.00E-03	4.E-13	1.E-07	4.02%	4.E-09	1.E-03	2.24%
Air_Rec	Lead	Lead	7439-92-1	2.80E-04						
Air_Rec	m,p-Xylenes	m,p-Xylene	1330-20-7	2.49E-07					3.E-08	0.00%

TABLE 14

Estimating Risk to Boater on the Great Salt Lake (Permit Table 9)

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Chemical	Permit Chemical Name	CASNo	EPC (mg/M^3)	1997 ELCR	2005 ELCR	2005 ELCR%	1997 HI	2005 HI	2005 HI%
Air_Rec	Mercury	Mercury	7439-97-6	2.55E-08				3.E-07	1.E-06	0.00%
Air_Rec	Methane	Methane		4.17E-05	1.E-06	2.E-06	49.85%		3.E-02	49.88%
Air_Rec	Methylene chloride	Dichloromethane	75-09-2	4.46E-05		8.E-11	0.00%		6.E-07	0.00%
Air_Rec	Naphthalene	Naphthalene	91-20-3	1.18E-07					5.E-07	0.00%
Air_Rec	Nickel	Nickel	7440-02-0	8.95E-05				2.E-05	2.E-05	0.03%
Air_Rec	Nitroglycerin	Nitroglycerine	55-63-0	2.24E-07		4.E-12	0.00%			
Air_Rec	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	Octahydro-1,3,5,7…(HMX)	2691-41-0	7.63E-05				2.E-08	6.E-06	0.01%
Air_Rec	o-Xylene	o-Xylene	95-47-6	1.21E-07					2.E-08	0.00%
Air_Rec	Pentaerythritoltetranitrate	Pentaerythritol tetranitrate (PETN)	78-11-5	7.63E-05	9.E-09	9.E-09	0.31%	1.E-04	1.E-04	0.17%
Air_Rec	p-Ethyltoluene	p-Ethyltoluene	622-96-8	1.31E-07						
Air_Rec	Phenanthrene	Phenanthrene	85-01-8	2.08E-08						
Air_Rec	Phenol	Phenol	108-95-2	1.42E-07				1.E-10	2.E-09	0.00%
Air_Rec	Potassium	Potassium	7440-09-7	3.79E-03						
Air_Rec	Pyrene	Pyrene	129-00-0	1.07E-07				2.E-08	1.E-08	0.00%
Air_Rec	Sodium	Sodium	7440-23-5	1.65E-04						
Air_Rec	Styrene	Styrene	100-42-5	2.61E-06					4.E-08	0.00%
Air_Rec	Titanium	Titanium	7440-32-6	8.10E-06					4.E-06	0.01%
Air_Rec	Toluene	Toluene	108-88-3	2.62E-06					9.E-08	0.00%
Air_Rec	Trichlorofluoromethane	Freon11	75-69-4	2.56E-07					5.E-09	0.00%
Air_Rec	Vinyl Chloride	Vinyl chloride	75-01-4	2.20E-07	7.E-11	4.E-12	0.00%		3.E-08	0.00%
Air_Rec	Zinc	Zinc	7440-66-6	5.82E-04					**8.E-06**	**0.01%**
Total					**3.E-06**	**3.E-06**	**100%**	**2.E-03**	**6.E-02**	**100%**

TABLE 15
Estimating Risk to Oasis Resident (Permit Table 10)
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Scenario	Chemical	Permit Chemical Name	CASNo	EPC (mg/M^3)	1997 ELCR	2005 ELCR	2005 ELCR%	1997 HI	2005 HI	2005 HI%
Air_Res	1,1,1-Trichloroethane	Methyl chloroform	71-55-6	5.52E-07					1.E-08	0.00%
Air_Res	1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethae	79-34-5	5.78E-07	7.E-10	7.E-10	0.03%		1.E-07	0.00%
Air_Res	1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1	2.27E-08					4.E-11	0.00%
Air_Res	1,1-Dichloroethene	Vinylidene chloride	75-35-4	1.42E-07					3.E-08	0.00%
Air_Res	1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6	1.27E-06					1.E-05	0.03%
Air_Res	1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8	1.62E-08					1.E-07	0.00%
Air_Res	1,3-Butadiene	1,3-Butadiene	106-99-0	9.92E-07	1.E-08	6.E-10	0.02%		2.E-05	0.07%
Air_Res	2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	1.63E-07	3.E-11	3.E-11	0.00%	4.E-06	4.E-06	0.01%
Air_Res	2,6-Dinitrotoluene	2,4-DNT	606-20-2	4.90E-08	2.E-10			3.E-07	7.E-07	0.00%
Air_Res	2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5	7.61E-09						
Air_Res	Allyl chloride	Allyl chloride	107-05-1	9.61E-07				1.E-05	5.E-05	0.14%
Air_Res	Aluminum	Aluminum	7429-90-5	9.92E-04					1.E-02	41.82%
Air_Res	Antimony	Antimony	7440-36-0	6.23E-06				2.E-04	2.E-04	0.66%
Air_Res	Barium	Barium	7440-39-3	1.72E-05				5.E-04	2.E-03	5.18%
Air_Res	Benzene	Benzene	71-43-2	3.30E-06	6.E-10	5.E-10	0.02%		5.E-06	0.02%
Air_Res	Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	2.50E-09	1.E-10	1.E-11	0.00%			
Air_Res	Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	3.24E-08	1.E-09	6.E-10	0.02%			
Air_Res	bis(2-ethylhexyl)phthalate	bis(2-ethylhexyl)phthalate	117-81-7	5.22E-11	9.E-14	4.E-15	0.00%	1.E-14	4.E-11	0.00%
Air_Res	Bromomethane	Methyl Bromide	74-83-9	2.73E-07					3.E-06	0.01%
Air_Res	Butylbenzylphthalate	Butylbenzylphthalate	85-68-7	1.78E-08		2.E-13	0.00%	1.E-09	1.E-09	0.00%
Air_Res	Cadmium	Cadmium	7440-43-9	6.34E-05	2.E-06	2.E-06	91.26%	9.E-04	2.E-02	46.89%
Air_Res	Calcium	Calcium	7440-70-2	1.08E-04						
Air_Res	Carbon tetrachloride	Carbon tetrachloride	56-23-5	3.47E-08	1.E-11	1.E-11	0.00%		9.E-09	0.00%
Air_Res	Chloroethane	Ethyl chloride	75-00-3	1.03E-07		2.E-12	0.00%	1.E-10	5.E-10	0.00%
Air_Res	Chloromethane	Methyl chloride	74-87-3	1.43E-07					7.E-08	0.00%
Air_Res	Chromium	Chromium	7440-47-3	4.42E-06				1.E-05	4.E-08	0.00%
Air_Res	Chrysene	Chrysene	218-01-9	2.39E-09		1.E-13	0.00%			
Air_Res	Copper	Copper	7440-50-8	2.04E-04					7.E-05	0.22%
Air_Res	Dichlorodifluoromethane	Freon12	75-71-8	5.19E-08					1.E-08	0.00%
Air_Res	Diethylphthalate	Diethylphthalate	84-66-2	4.28E-05				7.E-07	7.E-07	0.00%
Air_Res	Dimethylphthalate	Dimethylphthalate	131-11-3	5.38E-10					7.E-13	0.00%
Air_Res	Di-n-butylphthalate	Di-n-butylphthalate	84-74-2	1.14E-06				2.E-07	2.E-07	0.00%
Air_Res	Di-n-octylphthalate	Di-n-octylphthalate	117-84-0	6.20E-08					2.E-08	0.00%
Air_Res	Ethylbenzene	Ethylbenzene	100-41-4	1.05E-07				2.E-09	5.E-09	0.00%
Air_Res	Fluoranthene	Fluoranthene	206-44-0	8.57E-09				3.E-09	3.E-09	0.00%
Air_Res	Fluorene	Fluorene	86-73-7	1.08E-09				4.E-10	4.E-10	0.00%
Air_Res	Hexachlorobenzene	Hexachlorobenzene	118-74-1	8.90E-08	8.E-10	8.E-10	0.03%	2.E-06	2.E-06	0.00%
Air_Res	Hexahydro-1,3,5-trinitro-1,3,5-triazine	Hexahydro-1,3,5…(RDX)	121-82-4	3.18E-04	2.E-07	2.E-07	7.99%	1.E-03	1.E-03	4.47%
Air_Res	Lead	Lead	7439-92-1	8.90E-05						
Air_Res	m,p-Xylenes	m,p-Xylene	1330-20-7	7.92E-08					4.E-08	0.00%
Air_Res	Mercury	Mercury	7439-97-6	8.12E-09				4.E-07	1.E-06	0.00%
Air_Res	Methane	Methane		1.32E-05						
Air_Res	Methylene chloride	Dichloromethane	75-09-2	1.42E-05		1.E-10	0.01%		6.E-07	0.00%
Air_Res	Naphthalene	Naphthalene	91-20-3	3.75E-08					6.E-07	0.00%
Air_Res	Nickel	Nickel	7440-02-0	2.85E-05				2.E-05	2.E-05	0.06%
Air_Res	Nitroglycerin	Nitroglycerine	55-63-0	7.13E-08		6.E-12	0.00%			
Air_Res	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	Octahydro-1,3,5,7…(HMX)	2691-41-0	2.43E-05				7.E-06	7.E-06	0.02%
Air_Res	o-Xylene	o-Xylene	95-47-6	3.83E-08					2.E-08	0.00%
Air_Res	Pentaerythritoltetranitrate	Pentaerythritol tetranitrate (PETN)	78-11-5	2.43E-05	2.E-08	2.E-08	0.61%	1.E-04	1.E-04	0.34%
Air_Res	p-Ethyltoluene	p-Ethyltoluene	622-96-8	4.17E-08						
Air_Res	Phenanthrene	Phenanthrene	85-01-8	6.62E-09						
Air_Res	Phenol	Phenol	108-95-2	4.51E-08				1.E-09	2.E-09	0.00%
Air_Res	Potassium	Potassium	7440-09-7	1.21E-03						
Air_Res	Pyrene	Pyrene	129-00-0	3.41E-08				2.E-08	2.E-08	0.00%
Air_Res	Sodium	Sodium	7440-23-5	5.24E-05						
Air_Res	Styrene	Styrene	100-42-5	8.28E-07					4.E-08	0.00%
Air_Res	Titanium	Titanium	7440-32-6	2.58E-06					4.E-06	0.01%
Air_Res	Toluene	Toluene	108-88-3	8.34E-07					1.E-07	0.00%
Air_Res	Trichlorofluoromethane	Freon11	75-69-4	8.14E-08					5.E-09	0.00%
Air_Res	Vinyl Chloride	Vinyl chloride	75-01-4	6.99E-08	1.E-10	6.E-12	0.00%		3.E-08	0.00%
Air_Res	Zinc	Zinc	7440-66-6	1.85E-04				8.E-06	8.E-06	0.03%
Total					**2.E-06**	**3.E-06**	**100%**	**3.E-03**	**3.E-02**	**100%**

Figure

\\Slcdb\gis\PROJECTS\HAFB\UTTR\TTU\Map_Documents\Monitoring_Wells\FIG1_TTU_SITE_MAP.mxd; 08-25-05; mnl

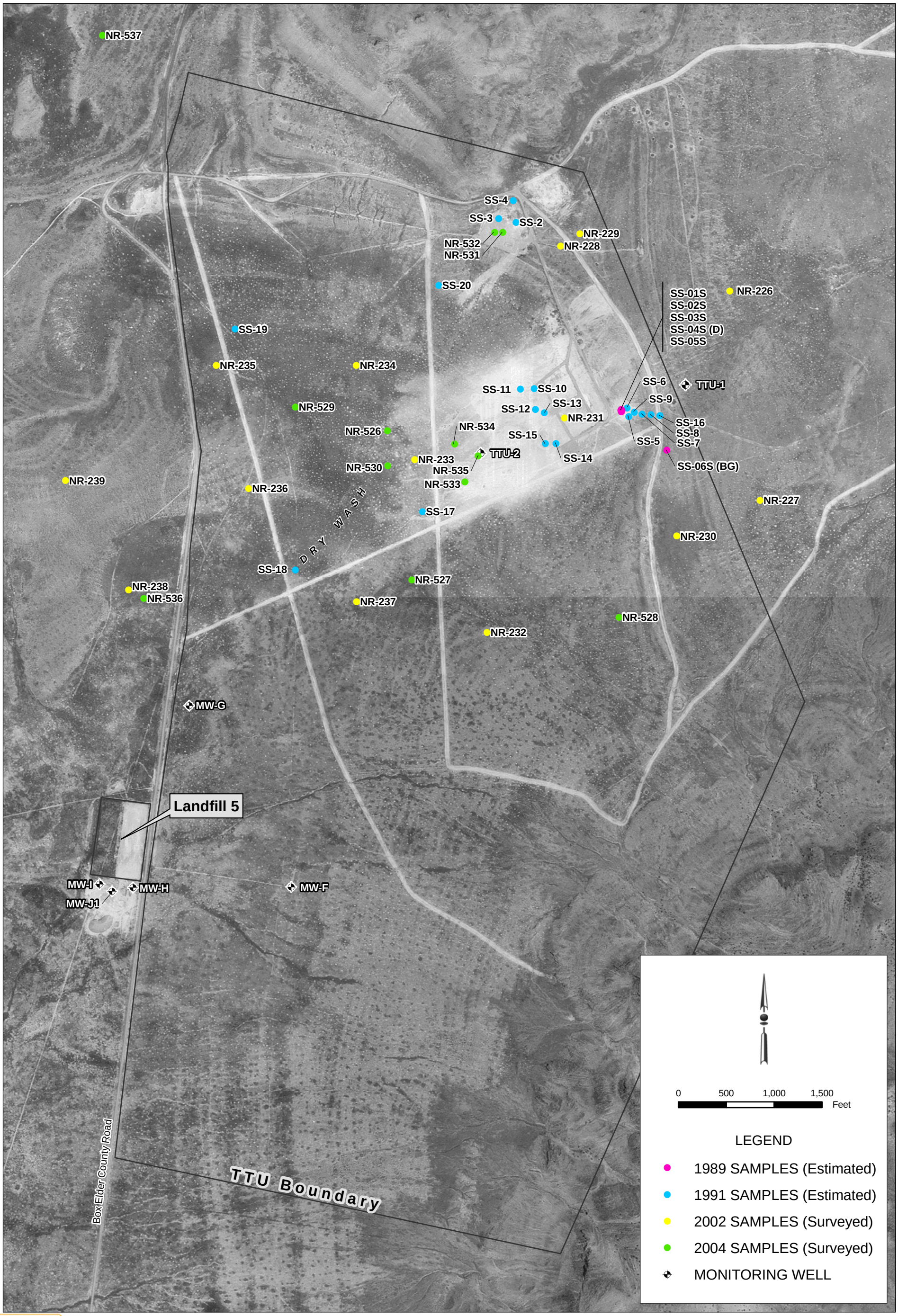

FIGURE 1
TTU SITE MAP
2005 HUMAN HEALTH RISK ASSESSMENT
HILL AIR FORCE BASE, UTAH

APPENDIX A

Descriptive Statistics for Surface Soil Samples

Appendix A

Descriptive Statistics for Surface Soil Samples

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Analyte	CASNo	Units	Total Samples	Total Detects	Detection Frequency	Maximum Detect	Minimum Detect	Average Detect	Mean[a]	Standard Deviation	Variance
1,1,1,2-Tetrachloroethane	630-20-6	mg/Kg	21						4.28E-04	1.35E-04	1.81E-08
1,1,1-Trichloroethane	71-55-6	mg/Kg	21						4.76E-04	8.02E-05	6.43E-09
1,1,2,2-Tetrachloroethane	79-34-5	mg/Kg	21						5.37E-04	9.16E-05	8.39E-09
1,1,2-Trichloroethane	79-00-5	mg/Kg	21						4.65E-04	9.53E-05	9.08E-09
1,1-Dichloroethane	75-34-3	mg/Kg	21						3.72E-04	6.05E-05	3.66E-09
1,1-Dichloroethene	75-35-4	mg/Kg	21						5.69E-04	3.39E-04	1.15E-07
1,2,3-Trichlorobenzene	87-61-6	mg/Kg	22	1	4.5%	0.003	0.003	0.003	5.38E-04	5.11E-04	2.62E-07
1,2,3-Trichloropropane	96-18-4	mg/Kg	21						5.70E-04	1.79E-04	3.20E-08
1,2,4-Trichlorobenzene	120-82-1	mg/Kg	27	1	3.7%	0.003	0.003	0.003	0.904	2.78	7.72
1,2-Dibromo-3-chloropropane	96-12-8	mg/Kg	21						0.002	5.50E-04	3.03E-07
1,2-Dibromoethane	106-93-4	mg/Kg	21						5.00E-04	1.58E-04	2.49E-08
1,2-Dichlorobenzene	95-50-1	mg/Kg	27	1	3.7%	0.001	0.001	0.001	0.904	2.78	7.73
1,2-Dichloroethane	107-06-2	mg/Kg	21						4.50E-04	9.81E-05	9.62E-09
1,2-Dichloropropane	78-87-5	mg/Kg	21						4.04E-04	7.13E-05	5.09E-09
1,3,5-Trinitrobenzene	99-35-4	mg/Kg	22						0.058	0.047	0.002
1,3-Dichlorobenzene	541-73-1	mg/Kg	27	1	3.7%	0.002	0.002	0.002	0.904	2.78	7.72
1,3-Dinitrobenzene	99-65-0	mg/Kg	22						0.050	0.030	8.92E-04
1,4-Dichlorobenzene	106-46-7	mg/Kg	27	1	3.7%	0.003	0.003	0.003	0.904	2.78	7.72
2,4,5-Trichlorophenol	95-95-4	mg/Kg	27						4.43	13.3	176
2,4,6-Trichlorophenol	88-06-2	mg/Kg	27						0.942	2.77	7.65
2,4,6-Trinitrophenyl-methylnitramine	479-45-8	mg/Kg	22						0.136	0.091	0.008
2,4,6-Trinitrotoluene	118-96-7	mg/Kg	32						0.962	0.706	0.498
2,4,6-Trinitrotolunene	118-96-7	mg/Kg	10						0.025	0.002	4.79E-06
2,4-Dichlorophenol	120-83-2	mg/Kg	27						0.946	2.77	7.65
2,4-Dimethylphenol	105-67-9	mg/Kg	27						0.945	2.77	7.65
2,4-Dinitrophenol	51-28-5	mg/Kg	27						4.44	13.3	176
2,4-Dinitrotoluene	121-14-2	mg/Kg	47	1	2.1%	2.00	2.00	2.00	0.931	2.09	4.36
2,6-Dinitrotoluene	606-20-2	mg/Kg	47						1.19	2.09	4.37
2-Amino-4,6-dinitrotoluene	1321-12-6	mg/Kg	30						1.04	0.667	0.445
2-Butanone	78-93-3	mg/Kg	22	4	18.2%	0.016	0.004	0.011	0.004	0.004	1.41E-05
2-Chloroethylvinylether	110-75-8	mg/Kg	12						0.005	0.001	1.12E-06
2-Chloronapthalene	91-58-7	mg/Kg	27						0.942	2.77	7.65
2-Chlorophenol	95-57-8	mg/Kg	27						0.941	2.77	7.66
2-Hexanone	591-78-6	mg/Kg	21						0.003	6.90E-04	4.76E-07
2-Methylnaphthalene	91-57-6	mg/Kg	27	3	11.1%	170	18.0	88.3	9.87	35.4	1,251
2-Methylphenol	95-48-7	mg/Kg	27						0.942	2.77	7.65
2-Nitroaniline	88-74-4	mg/Kg	27						4.44	13.3	176
2-Nitrophenol	88-75-5	mg/Kg	27						0.940	2.77	7.66
2-Nitrotoluene	88-72-2	mg/Kg	22						0.082	0.054	0.003
3,3'-Dichlorobenzidine	91-94-1	mg/Kg	27						1.87	5.53	30.6
3-Nitroaniline	99-09-2	mg/Kg	27						4.57	13.2	175
3-Nitrotoluene	99-08-1	mg/Kg	22						0.096	0.050	0.003
4,6-Dinitro-2-methylphenol	534-52-1	mg/Kg	27						4.43	13.3	176
4-Amino-2,6-Dinitrotoluene	1321-12-6	mg/Kg	10						0.088	0.007	5.49E-05
4-Bromophenylphenylether	101-55-3	mg/Kg	27						0.945	2.77	7.65
4-Chloro-3-methylphenol	59-50-7	mg/Kg	27						0.946	2.77	7.65
4-Chloroaniline	106-47-8	mg/Kg	27						1.09	2.72	7.39

Appendix A
Descriptive Statistics for Surface Soil Samples
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Analyte	CASNo	Units	Total Samples	Total Detects	Detection Frequency	Maximum Detect	Minimum Detect	Average Detect	Mean[a]	Standard Deviation	Variance
4-Chlorophenylphenylether	7005-72-3	mg/Kg	27						0.943	2.77	7.65
4-Methyl-2-pentanone	108-10-1	mg/Kg	21						0.003	4.92E-04	2.42E-07
4-Methylphenol	106-44-5	mg/Kg	27						0.944	2.77	7.65
4-Nitroaniline	100-01-6	mg/Kg	27						4.43	13.3	176
4-Nitrophenol	100-02-7	mg/Kg	27						4.43	13.3	176
4-Nitrotoluene	99-99-0	mg/Kg	22						0.122	0.065	0.004
Acenaphthene	83-32-9	mg/Kg	10						0.036	0.003	9.05E-06
Acenaphthylene	208-96-8	mg/Kg	27						0.942	2.77	7.65
Acetone	67-64-1	mg/Kg	27	9	33.3%	24.0	0.004	4.13	1.39	5.00	25.0
Aluminum	7429-90-5	mg/Kg	47	47	100.0%	54,000	5,390	13,321	13,321	6,997	4.90E+07
Anthracene	120-12-7	mg/Kg	27	1	3.7%	3.60	3.60	3.60	0.685	2.08	4.35
Antimony	7440-36-0	mg/Kg	27	22	81.5%	167	0.120	10.1	8.39	31.9	1,017
Arsenic	7440-38-2	mg/Kg	47	27	57.4%	41.3	1.90	7.51	6.44	5.40	29.2
Barium	7440-39-3	mg/Kg	47	47	100.0%	640	110	208	208	73.0	5,326
Benz(a)anthracene	56-55-3	mg/Kg	10						0.033	0.003	7.43E-06
Benzene	71-43-2	mg/Kg	22	3	13.6%	0.004	0.001	0.003	7.03E-04	9.05E-04	8.20E-07
Benzo(a)anthracene	56-55-3	mg/Kg	17						1.48	3.41	11.6
Benzo(a)pyrene	50-32-8	mg/Kg	27						0.943	2.77	7.65
Benzo(b)fluoranthene	205-99-2	mg/Kg	27						0.956	2.76	7.63
Benzo(g,h,i)perylene	191-24-2	mg/Kg	27						0.942	2.77	7.65
Benzo(k)fluoranthene	207-08-9	mg/Kg	27						0.952	2.76	7.64
Benzoic acid	65-85-0	mg/Kg	27						4.44	13.3	176
Benzyl alcohol	100-51-6	mg/Kg	27						0.945	2.77	7.65
Beryllium	7440-41-7	mg/Kg	47	23	48.9%	0.720	0.280	0.518	0.473	0.154	0.024
Bis(2-chloroethoxy)methane	111-91-1	mg/Kg	22						0.056	0.016	2.49E-04
Bis(2-chloroethyl)ether	111-44-4	mg/Kg	27						0.944	2.77	7.65
Bis(2-chloroisopropyl)ether	108-60-1	mg/Kg	27						0.943	2.77	7.65
bis(2-ethylhexyl)phthalate	117-81-7	mg/Kg	27	5	18.5%	1.50	0.083	0.661	0.170	0.348	0.121
Bromodichloromethane	75-27-4	mg/Kg	21						4.16E-04	8.92E-05	7.95E-09
Bromoform	75-25-2	mg/Kg	21						3.80E-04	1.63E-04	2.65E-08
Bromomethane	74-83-9	mg/Kg	21						6.83E-04	1.11E-04	1.23E-08
Butylbenzylphthalate	85-68-7	mg/Kg	27						0.948	2.76	7.64
Cadmium	7440-43-9	mg/Kg	47	21	44.7%	32.0	0.270	2.36	1.27	4.61	21.2
Calcium	7440-70-2	mg/Kg	42	42	100.0%	1.56E+06	15,400	188,148	188,148	296,587	8.80E+10
Carbon disulfide	75-15-0	mg/Kg	21						5.15E-04	1.09E-04	1.18E-08
Carbon tetrachloride	56-23-5	mg/Kg	21						4.70E-04	7.42E-05	5.51E-09
Chloride		mg/Kg	42	30	71.4%	120,000	0.100	4,082	2,916	18,509	3.43E+08
Chlorobenzene	108-90-7	mg/Kg	21						4.45E-04	8.38E-05	7.02E-09
Chloroethane	75-00-3	mg/Kg	21						5.40E-04	1.84E-04	3.40E-08
Chloroform	67-66-3	mg/Kg	21						4.13E-04	8.98E-05	8.07E-09
Chloromethane	74-87-3	mg/Kg	21						5.46E-04	1.61E-04	2.59E-08
Chromium	7440-47-3	mg/Kg	47	47	100.0%	55.3	6.50	14.5	14.5	7.82	61.2
Chrysene	218-01-9	mg/Kg	27						0.943	2.77	7.65
cis-1,2-Dichloroethene	156-59-2	mg/Kg	21						4.49E-04	1.18E-04	1.40E-08
cis-1,3-Dichloropropene	10061-01-5	mg/Kg	21						4.15E-04	1.11E-04	1.23E-08
Cobalt	7440-48-4	mg/Kg	27	22	81.5%	4.90	1.00	2.90	2.79	1.14	1.29
Copper	7440-50-8	mg/Kg	47	41	87.2%	18,000	6.00	498	438	2,622	6.87E+06

Appendix A
Descriptive Statistics for Surface Soil Samples
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Analyte	CASNo	Units	Total Samples	Total Detects	Detection Frequency	Maximum Detect	Minimum Detect	Average Detect	Mean[a]	Standard Deviation	Variance
Dibenz(a,h)anthracene	53-70-3	mg/Kg	27						0.947	2.76	7.64
Dibenzofuran	132-64-9	mg/Kg	27	3	11.1%	12.0	0.640	5.95	0.714	2.46	6.07
Dibromochloromethane	124-48-1	mg/Kg	21						4.18E-04	1.39E-04	1.94E-08
Dibromomethane	74-95-3	mg/Kg	21						3.98E-04	1.40E-04	1.96E-08
Dichlorodifluoromethane	75-71-8	mg/Kg	21						4.87E-04	9.62E-05	9.25E-09
Diethylphthalate	84-66-2	mg/Kg	27						0.952	2.76	7.64
Dimethylphthalate	131-11-3	mg/Kg	27						0.943	2.77	7.65
Di-n-butylphthalate	84-74-2	mg/Kg	27						0.949	2.76	7.64
Di-n-octylphthalate	117-84-0	mg/Kg	27						0.937	2.77	7.66
Ethylbenzene	100-41-4	mg/Kg	22	1	4.5%	0.001	0.001	0.001	4.89E-04	2.00E-04	4.00E-08
Fluoranthene	206-44-0	mg/Kg	27	1	3.7%	0.144	0.144	0.144	0.944	2.77	7.65
Fluorene	86-73-7	mg/Kg	27	3	11.1%	33.0	1.70	17.6	2.01	7.09	50.3
Hexachlorobenzene	118-74-1	mg/Kg	27						0.945	2.77	7.65
Hexachlorobutadiene	87-68-3	mg/Kg	26						0.939	2.83	8.00
Hexachlorocyclopentadiene	77-47-4	mg/Kg	27						0.998	2.75	7.56
Hexachloroethane	67-72-1	mg/Kg	27						0.944	2.77	7.65
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	mg/Kg	42						0.748	0.726	0.528
Indeno(1,2,3-cd)pyrene	193-39-5	mg/Kg	27						0.948	2.76	7.64
Iron	7439-89-6	mg/Kg	42	42	100.0%	15,000	4,510	10,606	10,606	2,787	7.77E+06
Isophorone	78-59-1	mg/Kg	27						0.945	2.77	7.65
Lead	7439-92-1	mg/Kg	47	40	85.1%	48,000	2.80	1,267	1,089	6,995	4.89E+07
m,p-Xylene	1330-20-7	mg/Kg	10	1	10.0%	0.002	0.002	0.002	6.95E-04	4.66E-04	2.17E-07
m,p-Xylenes	1330-20-7	mg/Kg	12						0.001	1.76E-04	3.11E-08
Magnesium	7439-95-4	mg/Kg	42	42	100.0%	24,300	9,700	16,695	16,695	4,004	1.60E+07
Manganese	7439-96-5	mg/Kg	47	47	100.0%	519	120	321	321	114	12,945
Mercury	7439-97-6	mg/Kg	47	13	27.7%	0.070	0.005	0.017	0.022	0.015	2.16E-04
Methylene chloride	75-09-2	mg/Kg	22	1	4.5%	0.003	0.003	0.003	8.78E-04	6.32E-04	3.99E-07
Molybdenum	7439-98-7	mg/Kg	22	20	90.9%	17.0	0.600	1.89	1.73	3.45	11.9
Naphthalene	91-20-3	mg/Kg	27	6	22.2%	53.0	6.00E-04	13.3	2.97	10.9	120
Nickel	7440-02-0	mg/Kg	47	47	100.0%	41.3	6.80	11.4	11.4	5.86	34.3
Nitrate	14797-55-8	mg/Kg	47	43	91.5%	22.8	0.004	4.64	4.33	5.97	35.6
Nitrobenzene	98-95-3	mg/Kg	47						1.18	2.10	4.40
Nitroglycerin	55-63-0	mg/Kg	41						0.238	0.054	0.003
Nitroguanidine	556-88-7	mg/Kg	42	2	4.8%	0.300	0.100	0.200	0.179	0.210	0.044
n-Nitroso-di-n-propylamine	621-64-7	mg/Kg	27						0.943	2.77	7.65
N-Nitrosodiphenylamine	86-30-6	mg/Kg	27						0.944	2.77	7.65
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	2691-41-0	mg/Kg	42	13	31.0%	25.0	0.230	4.36	1.91	4.04	16.4
o-Xylene	95-47-6	mg/Kg	22	3	13.6%	0.003	8.00E-04	0.002	5.91E-04	6.30E-04	3.97E-07
Pentachlorophenol	87-86-5	mg/Kg	27						4.41	13.3	176
Pentaerythritoltetranitrate	78-11-5	mg/Kg	30						0.433	0.097	0.009
Perchlorate	7601-90-3	mg/Kg	22	11	50.0%	4.50	0.016	0.833	0.422	1.09	1.18
pH			20						7.98	0.376	0.142
Phenanthrene	85-01-8	mg/Kg	27	4	14.8%	92.0	0.380	38.1	5.68	19.9	395
Phenol	108-95-2	mg/Kg	27						0.947	2.77	7.65
Phosphorus	7723-14-0	mg/Kg	20	20	100.0%	990	450	656	656	171	29,173
Picric acid	88-89-1	mg/Kg	42	3	7.1%	0.500	0.400	0.433	0.091	0.102	0.010

APPENDIX B

Toxicity and Dermal Absorption Factors

Appendix B
Toxicity and Dermal Absorption Factors
Toxicity Factors
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
ACETALDEHYDE	75-07-0	V		7.7E-03		2.57E-03		1.00
ACETOCHLOR	34256-82-1	SV			2E-02	2E-02		1.00
ACETONE	67-64-1	V			9.00E-01	9.00E-01		1.00
ACETONITRILE	75-05-8	V				1.7E-02		1.00
ACETOPHENONE	98-86-2	V			1.00E-01	1.00E-01		1.00
ACROLEIN	107-02-8	V			5.00E-04	5.70E-06		1.00
ACRYLAMIDE	79-06-1	SV	4.50E+00	4.50E+00	2.00E-04	2.00E-04		1.00
ACRYLONITRILE	107-13-1	V	5.40E-01	2.40E-01	1.00E-03	5.70E-04		1.00
ALACHLOR	15972-60-8	SV	8.00E-02	8.00E-02	1.00E-02	1.00E-02		1.00
ALAR	1596-84-5	SV			1.50E-01	1.50E-01		1.00
ALDICARB	116-06-3	SV			1.00E-03	1.00E-03		1.00
ALDICARB SULFONE	1646-88-4	SV			1.00E-03	1.00E-03		1.00
ALDRIN	309-00-2	SV	1.70E+01	1.70E+01	3.00E-05	3.00E-05		1.00
ALLYL CHLORIDE	107-05-1	SV				2.86E-04		1.00
ALUMINUM	7429-90-5	M			1.00E+00	1.00E-03		1.00
AMINODINITROTOLUENES	NA	SV			2.00E-03	2.00E-03		1.00
AMMONIA	7664-41-7	V				2.86E-02		1.00
ANILINE	62-53-3	SV	5.70E-03	5.70E-03	7.00E-03	2.90E-04		1.00
ANTIMONY	7440-36-0	M			4.00E-04	4.00E-04		0.15
ANTIMONY TRIOXIDE	1309-64-4	M			4.00E-04	5.70E-05		1.00
ARSENIC	7440-38-2	M	1.50E+00	1.51E+01	3.00E-04	3.00E-04	0.03	1.00
ARSINE	7784-42-1	V				1.40E-05		1.00
ASSURE	76578-14-8	SV			9.00E-03	9.00E-03		1.00
ATRAZINE	1912-24-9	SV	2.20E-01	2.20E-01	3.50E-02	3.50E-02		1.00
BARIUM	7440-39-3	M			7.00E-02	1.40E-04		0.07
BAYGON	114-26-1	SV			4.00E-03	4.00E-03		1.00
BAYTHROID	68359-37-5	SV			2.50E-02	2.50E-02		1.00
BENTAZON	25057-89-0	SV			3.00E-02	3.00E-02	0.13	1.00
BENZALDEHYDE	100-52-7	SV			1.00E-01	1.00E-01		1.00
BENZENE	71-43-2	V	5.5E-02	2.7E-02	4.00E-03	8.6E-03		1.00
BENZENETHIOL	108-98-5	V			1.00E-05	1.00E-05		1.00
BENZIDINE	92-87-5	SV	2.30E+02	2.30E+02	3.00E-03	3.00E-03		1.00
BENZOIC ACID	65-85-0	SV			4.00E+00	4.00E+00		1.00
BENZYL ALCOHOL	100-51-6	SV			3.00E-01	3.00E-01		1.00
BENZYL CHLORIDE	100-44-7	V	0.17	0.17	2.00E-03	2.00E-03		1.00
BERYLLIUM	7440-41-7	M		8.40E+00	2.00E-03	5.7E-06		0.01
BIPHENYL	92-52-4	V			5.00E-02	5.00E-02		1.00
BIS(2-CHLOROETHYL)ETHER	111-44-4	V	1.10E+00	1.10E+00				1.00
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	V	7.00E-02	3.50E-02	4.00E-02	4.00E-02		1.00
BIS(CHLOROMETHYL)ETHER	542-88-1	V	2.20E+02	2.20E+02				1.00
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	SV	1.40E-02	1.40E-02	2.00E-02	2.00E-02		1.00
BORON	7440-42-8	M			2.00E-01	5.70E-03		1.00
BROMOBENZENE	108-86-1	V			2.00E-02	3.00E-03		1.00
BROMODICHLOROMETHANE	75-27-4	V	6.20E-02	6.20E-02	2.00E-02	2.00E-02		1.00
BROMOETHENE	593-60-2	V		1.10E-01		8.6E-04		1.00
BROMOFORM	75-25-2	SV	7.90E-03	3.90E-03	2.00E-02	2.00E-02		1.00
BROMOMETHANE	74-83-9	V			1.40E-03	1.40E-03		1.00
BROMOPHOS	2104-96-3	SV			5.00E-03	5.00E-03		1.00
1,3-BUTADIENE	106-99-0	V		1.00E-01		5.7E-04		1.00
1-BUTANOL	71-36-3	SV			1.00E-01	1.00E-01		1.00
BUTYLBENZYLPHTHALATE	85-68-7	SV	1.9E-03	1.9E-03	2.00E-01	2.00E-01		1.00
CADMIUM-FOOD	7440-43-9	M		6.30E+00	1.00E-03	5.7E-05	0.001	0.03
CAPROLACTAM	105-60-2	SV			5.00E-01	5.00E-01		1.00
CARBARYL	63-25-2	SV			1.00E-01	1.00E-01		1.00
CARBON DISULFIDE	75-15-0	V			1.00E-01	2.00E-01		1.00
CARBON TETRACHLORIDE	56-23-5	V	1.30E-01	5.30E-02	7.00E-04	5.00E-02		1.00
CARBOSULFAN	55285-14-8	SV			1.00E-02	1.00E-02		1.00
CHLORAL HYDRATE	302-17-0	SV			1.00E-01	1.00E-01		1.00
CHLORANIL	118-75-2	SV	4.00E-01	4.00E-01				1.00
CHLORDANE	57-74-9	SV	3.5E-01	3.5E-01	5.00E-04	2.00E-04	0.04	1.00
CHLORINE	7782-50-5	V			1.00E-01	5.7E-05		1.00
CHLORINE DIOXIDE	10049-04-4	V			3.00E-02	5.70E-05		1.00
CHLOROACETIC ACID	79-11-8	SV			2.00E-03	2.00E-03		1.00
4-CHLOROANILINE	106-47-8	SV	5.4E-02	5.4E-02	4.00E-03	4.00E-03		1.00
CHLOROBENZENE	108-90-7	V			2.00E-02	1.7E-02		1.00
2-CHLORO-1,3-BUTADIENE	126-99-8	V			2.00E-02	2.00E-03		1.00
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	V				1.40E+01		1.00
CHLORODIFLUOROMETHANE	75-45-6	V				1.40E+01		1.00
CHLOROETHANE	75-00-3	V	2.90E-03	2.90E-03	4.00E-01	2.90E+00		1.00
CHLOROFORM	67-66-3	V		8.10E-02	1.00E-02	1.4E-02		1.00
CHLOROMETHANE	74-87-3	V				2.6E-02		1.00
4-CHLORO-2-METHYLANILINE	95-69-2	SV	5.80E-01	5.80E-01				1.00
BETA-CHLORONAPHTHALENE	91-58-7	V			8.00E-02	8.00E-02		1.00
O-CHLORONITROBENZENE	88-73-3	V	9.7E-03	9.7E-03	1.00E-03	2.00E-05		1.00
P-CHLORONITROBENZENE	100-00-5	V	6.7E-03	6.7E-03	1.00E-03	1.7E-04		1.00
2-CHLOROPHENOL	95-57-8	V			5.00E-03	5.00E-03		1.00

Appendix B
Toxicity and Dermal Absorption Factors
Toxicity Factors
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
2-CHLOROPROPANE	75-29-6	V				2.90E-02		1.00
O-CHLOROTOLUENE	95-49-8	V			2.00E-02	2.00E-02		1.00
CHLORPYRIFOS	2921-88-2	SV			3.00E-03	3.00E-03		1.00
CHLORPYRIFOS-METHYL	5598-13-0	SV			1.00E-02	1.00E-02		1.00
CHROMIUM	7440-47-3	M			1.50E+00	1.50E+00		1.00
CHROMIUM III	16065-83-1	M			1.50E+00	1.50E+00		0.01
CHROMIUM VI	18540-29-9	M		4.10E+01	3.00E-03	3.00E-05		0.03
COBALT	7440-48-4	M		9.8	2.00E-02	5.7E-06		1.00
COKE OVEN EMISSIONS (COAL TAR)	8007-45-2	SV		2.2				1.00
COPPER	7440-50-8	M			4.00E-02	4.00E-02		1.00
CUMENE	98-82-8	V			1.00E-01	1.10E-01		1.00
CYANIDE (FREE)	57-12-5	M			2.00E-02	2.00E-02		1.00
CALCIUM CYANIDE	592-01-8	M			4E-02	4E-02		1.00
COPPER CYANIDE	544-92-3	M			5.00E-03	5.00E-03		1.00
CYANOGEN	460-19-5	V			4.00E-02	4.00E-02		1.00
HYDROGEN CYANIDE	74-90-8	V			2.00E-02	8.60E-04		1.00
POTASSIUM CYANIDE	151-50-8	M			5.00E-02	5.00E-02		1.00
POTASSIUM SILVER CYANIDE	506-61-6	M			2.00E-01	2.00E-01		1.00
SILVER CYANIDE	506-64-9	M			1.00E-01	1.00E-01		1.00
SODIUM CYANIDE	143-33-9	M			4.00E-02	4.00E-02		1.00
THIOCYANATE	NA	M			1.00E-04	1.00E-04		1.00
ZINC CYANIDE	557-21-1	M			5.00E-02	5.00E-02		1.00
CYCLOHEXANE	110-82-7	V				1.70E+00		1.00
CYCLOHEXANONE	108-94-1	SV			5.00E+00	5.00E+00		1.00
CYHALOTHRIN/KARATE	68085-85-8	SV			5.00E-03	5.00E-03		1.00
CYPERMETHRIN	52315-07-8	SV			1.00E-02	1.00E-02		1.00
DACTHAL	1861-32-1	SV			1.00E-02	1.00E-02		1.00
DALAPON	75-99-0	SV			3.00E-02	3.00E-02		1.00
DDD	72-54-8	SV	2.40E-01	2.40E-01	2.00E-03	2.00E-03		1.00
DDE	72-55-9	SV	3.40E-01	3.40E-01				1.00
DDT	50-29-3	SV	3.40E-01	3.40E-01	5.00E-04	5.00E-04	0.03	1.00
DIAZINON	333-41-5	SV			9.00E-04	9.00E-04		1.00
DIBENZOFURAN	132-64-9	V			2.00E-03	2.00E-03		1.00
1,4-DIBROMOBENZENE	106-37-6	SV			1.00E-02	1.00E-02		1.00
DIBROMOCHLOROMETHANE	124-48-1	V	8.40E-02	8.40E-02	2.00E-02	2.00E-02		1.00
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	V	1.40E+00	2.40E-03		5.70E-05		1.00
1,2-DIBROMOETHANE	106-93-4	V	2.00E+00	2.00E+00	9.00E-03	2.6E-03		1.00
DIBUTYLPHTHALATE	84-74-2	SV			1.00E-01	1.00E-01		1.00
DICAMBA	1918-00-9	SV			3.00E-02	3.00E-02		1.00
1,2-DICHLOROBENZENE	95-50-1	V			9.00E-02	4.00E-02		1.00
1,3-DICHLOROBENZENE	541-73-1	V			3.00E-03	3.00E-03		1.00
1,4-DICHLOROBENZENE	106-46-7	V	2.40E-02	2.2E-02	3.00E-02	2.29E-01		1.00
3,3'-DICHLOROBENZIDINE	91-94-1	SV	4.50E-01	4.50E-01				1.00
DICHLORODIFLUOROMETHANE	75-71-8	V			2.00E-01	5.00E-02		1.00
1,1-DICHLOROETHANE	75-34-3	V			2.00E-01	1.40E-01		1.00
1,2-DICHLOROETHANE	107-06-2	V	9.10E-02	9.10E-02	2.00E-02	7.00E-01		1.00
1,1-DICHLOROETHENE	75-35-4	V			5.00E-02	6.00E-02		1.00
CIS-1,2-DICHLOROETHENE	156-59-2	V			1.00E-02	1.00E-02		1.00
TRANS-1,2-DICHLOROETHENE	156-60-5	V			2.00E-02	1.7E-02		1.00
TOTAL 1,2-DICHLOROETHENE	540-59-0	V			9.00E-03	9.00E-03		1.00
2,4-DICHLOROPHENOL	120-83-2	SV			3.00E-03	3.00E-03		1.00
2,4-D	94-75-7	SV			1.00E-02	1.00E-02	0.05	1.00
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94-82-6	SV			8E-03	8E-03		1.00
1,2-DICHLOROPROPANE	78-87-5	V	6.80E-02	6.80E-02		1.14E-03		1.00
1,3-DICHLOROPROPANE	142-28-9	V			2.00E-02	2.00E-02		1.00
2,3-DICHLOROPROPANOL	616-23-9	SV			3.00E-03	3.00E-03		1.00
1,3-DICHLOROPROPENE	542-75-6	V	1.00E-01	1.00E-02	3.00E-02	5.71E-03		1.00
DICHLORVOS	62-73-7	SV	0.29	0.29	5E-04	1.43E-04		1.00
DIELDRIN	60-57-1	SV	1.60E+01	1.60E+01	5.00E-05	5.00E-05		1.00
DIESEL EMISSIONS	NA	SV				1.40E-03		1.00
DIETHYLPHTHALATE	84-66-2	SV			8.00E-01	8.00E-01		1.00
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112-34-5	SV			1.00E-02	5.70E-03		1.00
DIETHYLENE GLYCOL, MONOETHYL ETHER	111-90-0	SV			6.00E-02	8.6E-04		1.00
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	SV	1.20E-03	1.20E-03	6.00E-01	6.00E-01		1.00
DIETHYLSTILBESTROL	56-53-1	SV	4.70E+03	4.70E+03				1.00
DIFENZOQUAT (AVENGE)	43222-48-6	SV			8.00E-02	8.00E-02		1.00
1,1-DIFLUOROETHANE	75-37-6	V				1.10E+01		1.00
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445-75-6	SV			8.00E-02	8.00E-02		1.00

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
3,3'-DIMETHOXYBENZIDINE	119-90-4	SV	1.40E-02	1.40E-02				1.00
N,N-DIMETHYLANILINE	121-69-7	SV			2.00E-03	2.00E-03		1.00
3,3'-DIMETHYLBENZIDINE	119-93-7	SV	2.30E+00	2.30E+00				1.00
2,4-DIMETHYLPHENOL	105-67-9	SV			2.00E-02	2.00E-02		1.00
2,6-DIMETHYLPHENOL	576-26-1	SV			6.00E-04	6.00E-04		1.00
3,4-DIMETHYLPHENOL	95-65-8	SV			1.00E-03	1.00E-03		1.00
DIMETHYLPHTHALATE	131-11-3	SV			1.00E+01	1.00E+01		1.00
1,2-DINITROBENZENE	528-29-0	SV			1.00E-04	1.00E-04		1.00
1,3-DINITROBENZENE	99-65-0	SV			1.00E-04	1.00E-04		1.00
1,4-DINITROBENZENE	100-25-4	SV			1.00E-04	1.00E-04		1.00
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131-89-5	SV			2.00E-03	2.00E-03		1.00
4,6-DINITRO-2-METHYLPHENOL	534-52-1	SV			1.00E-04	1.00E-04		1.00
2,4-DINITROPHENOL	51-28-5	SV			2.00E-03	2.00E-03		1.00
DINITROTOLUENE MIX	NA	SV	6.80E-01	6.80E-01				1.00
2,4-DINITROTOLUENE	121-14-2	SV			2.00E-03	2.00E-03		1.00
2,6-DINITROTOLUENE	606-20-2	SV			1.00E-03	1.00E-03		1.00
DINOSEB	88-85-7	SV			1.00E-03	1.00E-03		1.00
DIOCTYLPHTHALATE	117-84-0	SV			4.00E-02	4.00E-02		1.00
1,4-DIOXANE	123-91-1	SV	1.10E-02	1.10E-02				1.00
DIPHENYLAMINE	122-39-4	SV			2.50E-02	2.50E-02		1.00
1,2-DIPHENYLHYDRAZINE	122-66-7	SV	8.00E-01	8.00E-01				1.00
DIQUAT	85-00-7	SV			2.20E-03	2.20E-03		1.00
DISULFOTON	298-04-4	SV			4.00E-05	4.00E-05		1.00
1,4-DITHIANE	505-29-3	SV			1.00E-02	1.00E-02		1.00
DIURON	330-54-1	SV			2.00E-03	2.00E-03		1.00
ENDOSULFAN	115-29-7	SV			6.00E-03	6.00E-03		1.00
ENDRIN	72-20-8	SV			3.00E-04	3.00E-04		1.00
EPICHLOROHYDRIN	106-89-8	V	9.90E-03	4.20E-03	2.00E-03	2.86E-04		1.00
ETHION	563-12-2	SV			5.00E-04	5.00E-04	0.1	1.00
ETHYL ACETATE	141-78-6	V			9.00E-01	9.00E-01		1.00
ETHYLBENZENE	100-41-4	V			1.00E-01	2.90E-01		1.00
ETHYLENE DIAMINE	107-15-3	SV			9.00E-02	9.00E-02	0.1	1.00
ETHYLENE GLYCOL	107-21-1	SV			2.00E+00	2.00E+00	0.1	1.00
ETHYLENE GLYCOL, MONOBUTYL ETHER	111-76-2	SV			5.00E-01	3.70E+00	0.1	1.00
ETHYLENE OXIDE	75-21-8	V	1.00E+00	3.50E-01				1.00
ETHYL ETHER	60-29-7	V			2.00E-01	2.00E-01		1.00
FENAMIPHOS	22224-92-6	SV			2.50E-04	2.50E-04	0.1	1.00
FLUOMETURON	2164-17-2	SV			1.30E-02	1.30E-02	0.1	1.00
FLUORINE	7782-41-4	M			6.00E-02	6.00E-02		1.00
FOMESAFEN	72178-02-0	SV	1.90E-01	1.90E-01			0.1	1.00
FONOFOS	944-22-9	SV			2.00E-03	2.00E-03	0.1	1.00
FORMALDEHYDE	50-00-0	SV		4.50E-02	2.00E-01	2.00E-01	0.1	1.00
FURAN	110-00-9	V			1.00E-03	1.00E-03		1.00
FURFURAL	98-01-1	SV			3.00E-03	1.00E-02	0.1	1.00
GLYPHOSATE	1071-83-6	SV			1.00E-01	1.00E-01	0.1	1.00
HEPTACHLOR	76-44-8	SV	4.50E+00	4.50E+00	5.00E-04	5.00E-04	0.1	1.00
HEPTACHLOR EPOXIDE	1024-57-3	SV	9.10E+00	9.10E+00	1.30E-05	1.30E-05	0.1	1.00
HEXABROMOBENZENE	87-82-1	SV			2.00E-03	2.00E-03	0.1	1.00
HEXACHLOROBENZENE	118-74-1	SV	1.60E+00	1.60E+00	8.00E-04	8.00E-04	0.1	1.00
HEXACHLOROBUTADIENE	87-68-3	SV	7.80E-02	7.80E-02	2.00E-04	2.00E-04	0.1	1.00
ALPHA-HCH	319-84-6	SV	6.30E+00	6.30E+00			0.1	1.00
BETA-HCH	319-85-7	SV	1.80E+00	1.80E+00			0.1	1.00
GAMMA-HCH (LINDANE)	58-89-9	SV	1.30E+00	1.30E+00	3.00E-04	3.00E-04	0.04	1.00
TECHNICAL HCH	608-73-1	SV	1.80E+00	1.80E+00			0.1	1.00
HEXACHLOROCYCLOPENTADIENE	77-47-4	SV			6.00E-03	5.7E-05	0.1	1.00
HEXACHLORODIBENZODIOXIN MIX	19408-74-3	SV	6.20E+03	4.55E+03			0.1	1.00
HEXACHLOROETHANE	67-72-1	SV	1.40E-02	1.40E-02	1.00E-03	1.00E-03	0.1	1.00
HEXACHLOROPHENE	70-30-4	SV			3.00E-04	3.00E-04	0.1	1.00
1,6-HEXAMETHYLENE DIISOCYANATE	822-06-0	SV				2.90E-06	0.1	1.00
HEXANE	110-54-3	V			1.10E+01	5.71E-02		1.00
HMX	2691-41-0	SV			5.00E-02	5.00E-02	0.1	1.00
HYDRAZINE	302-01-2	V	3.00E+00	1.70E+01				1.00
HYDROGEN CHLORIDE	7647-01-0	V				5.70E-03		1.00
HYDROGEN SULFIDE	7783-06-4	V			3.00E-03	5.7E-04		1.00
HYDROQUINONE	123-31-9	SV	5.6E-02	5.6E-02	4.00E-02	4.00E-02	0.1	1.00
IRON	7439-89-6	M			3.00E-01	3.00E-01		1.00
ISOBUTANOL	78-83-1	V			3.00E-01	3.00E-01		1.00
ISOPHORONE	78-59-1	SV	9.50E-04	9.50E-04	2.00E-01	2.00E-01	0.1	1.00
TETRAETHYLLEAD	78-00-2	V			1.00E-07	1.00E-07		1.00
KEPONE	143-50-0	SV	8.00E+00	8.00E+00	2.00E-04	2.00E-04	0.1	1.00
LITHIUM	7439-93-2	M			2.00E-02	2.00E-02		1.00
MALATHION	121-75-5	SV			2.00E-02	2.00E-02	0.1	1.00

Appendix B
Toxicity and Dermal Absorption Factors
Toxicity Factors
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
MALEIC ANHYDRIDE	108-31-6	SV			1.00E-01	1.00E-01	0.1	1.00
MANGANESE-FOOD	7439-96-5	M			1.40E-01	1.43E-05		0.04
MEPHOSFOLAN	950-10-7	SV			9.00E-05	9.00E-05	0.1	1.00
MEPIQUAT CHLORIDE	24307-26-4	SV			3.00E-02	3.00E-02	0.1	1.00
MERCURIC CHLORIDE	7487-94-7	M			3.00E-04	3.00E-04		0.07
MERCURY (elemental)	7439-97-6	M				8.60E-05		1.00
METHYLMERCURY	22967-92-6	V			1.00E-04	1.00E-04		1.00
METHANOL	67-56-1	V			5.00E-01	5.00E-01		1.00
METHIDATHION	950-37-8	SV			1.00E-03	1.00E-03	0.1	1.00
METHOXYCHLOR	72-43-5	SV			5.00E-03	5.00E-03	0.1	1.00
METHYL ACETATE	79-20-9	V			1.00E+00	1.00E+00		1.00
METHYL ACRYLATE	96-33-3	V			3.00E-02	3.00E-02		1.00
2-METHYLANILINE	95-53-4	SV	2.40E-01	2.40E-01			0.1	1.00
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94-81-5	SV			1.00E-02	1.00E-02	0.1	1.00
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94-74-6	SV			5.00E-04	5.00E-04	0.1	1.00
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93-65-2	SV			1.00E-03	1.00E-03	0.1	1.00
METHYLCYCLOHEXANE	108-87-2	V				8.60E-01		1.00
METHYLENE BROMIDE	74-95-3	V			1.00E-02	1.00E-02		1.00
METHYLENE CHLORIDE	75-09-2	V	7.50E-03	1.65E-03	6.00E-02	3.00E-01		1.00
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	SV	1.30E-01	1.30E-01	7.00E-04	7.00E-04	0.1	1.00
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101-61-1	SV	4.60E-02	4.60E-02			0.1	1.00
4,4'-METHYLENEDIPHENYL ISOCYANATE	101-68-8	SV				1.7E-04	0.1	1.00
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	V			6.00E-01	1.40E+00		1.00
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	V				8.60E-01		1.00
METHYL METHACRYLATE	80-62-6	V			1.40E+00	2.00E-01		1.00
METHYL PARATHION	298-00-0	SV			2.50E-04	2.50E-04	0.1	1.00
2-METHYLPHENOL	95-48-7	SV			5.00E-02	5.00E-02	0.1	1.00
3-METHYLPHENOL	108-39-4	SV			5.00E-02	5.00E-02	0.1	1.00
4-METHYLPHENOL	106-44-5	SV			5.00E-03	5.00E-03	0.1	1.00
METHYLSTYRENE MIX	25013-15-4	V			6.00E-03	1.00E-02		1.00
ALPHA-METHYLSTYRENE	98-83-9	V			7.00E-02	7.00E-02		1.00
METHYL TERT-BUTYL ETHER	1634-04-4	V	4.00E-03	4.00E-03		8.57E-01		1.00
METOLACHLOR (DUAL)	51218-45-2	SV			1.50E-01	1.50E-01	0.1	1.00
MIREX	2385-85-5	SV			2.00E-04	2.00E-04	0.1	1.00
MOLYBDENUM	7439-98-7	M			5E-03	5E-03		1.00
MONOCHLORAMINE	10599-90-3	SV			1E-01	1.00E-01	0.1	1.00
NALED	300-76-5	SV			2E-03	2E-03	0.1	1.00
NICKEL REFINERY DUST	NA	M		8.4E-01				1.00
NICKEL	7440-02-0	M			2.00E-02	2.00E-02		1.00
NITRATE	14797-55-8	M			1.60E+00	1.60E+00		1.00
NITRITE	14797-65-0	M			1.00E-01	1.00E-01		1.00
2-NITROANILINE	88-74-4	SV			3.00E-03	3.00E-05	0.1	1.00
3-NITROANILINE	99-09-2	SV	2.00E-02	2.00E-02	3.00E-04	3.00E-04	0.1	1.00
4-NITROANILINE	100-01-6	SV	2.00E-02	2.00E-02	3.00E-03	1.00E-03	0.1	1.00
NITROBENZENE	98-95-3	V			5.00E-04	6.00E-04		1.00
NITROGLYCERIN	55-63-0	SV	1.4E-02	1.4E-02			0.1	1.00
NITROGUANIDINE	556-88-7	SV			1.00E-01	1.00E-01	0.1	1.00
2-NITROPROPANE	79-46-9	V		9.40E+00		5.70E-03		1.00
N-NITROSO-DI-N-BUTYLAMINE	924-16-3	V	5.40E+00	5.60E+00				1.00
N-NITROSODIETHANOLAMINE	1116-54-7	SV	2.80E+00	2.80E+00			0.1	1.00
N-NITROSODIETHYLAMINE	55-18-5	SV	1.50E+02	1.50E+02			0.1	1.00
N-NITROSODIMETHYLAMINE	62-75-9	SV	5.10E+01	5.10E+01	8.00E-06	8.00E-06	0.1	1.00
N-NITROSODIPHENYLAMINE	86-30-6	SV	4.90E-03	4.90E-03	2.00E-02	2.00E-02	0.1	1.00
N-NITROSODIPROPYLAMINE	621-64-7	SV	7.00E+00	7.00E+00			0.1	1.00
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6	SV	2.20E+01	2.20E+01			0.1	1.00
N-NITROSOPYRROLIDINE	930-55-2	SV	2.10E+00	2.10E+00			0.1	1.00
M-NITROTOLUENE	99-08-1	V			2.00E-02	2.00E-02		1.00
O-NITROTOLUENE	88-72-2	V	2.30E-01	2.30E-01	1.00E-02	1.00E-02		1.00
P-NITROTOLUENE	99-99-0	V	1.7E-02	1.7E-02	1.00E-02	1.00E-02		1.00
NUSTAR	85509-19-9	SV			7.00E-04	7.00E-04	0.1	1.00
ORYZALIN	19044-88-3	SV			5.00E-02	5.00E-02	0.1	1.00
OXADIAZON	19666-30-9	SV			5.00E-03	5.00E-03	0.1	1.00
OXAMYL	23135-22-0	SV			2.50E-02	2.50E-02	0.1	1.00
OXYFLUORFEN	42874-03-3	SV			3.00E-03	3.00E-03	0.1	1.00
PARAQUAT DICHLORIDE	1910-42-5	SV			4.50E-03	4.50E-03	0.1	1.00
PARATHION	56-38-2	SV			6.00E-03	6.00E-03	0.1	1.00
PENTACHLOROBENZENE	608-93-5	SV			8.00E-04	8.00E-04	0.1	1.00
PENTACHLORONITROBENZENE	82-68-8	SV	2.60E-01	2.60E-01	3.00E-03	3.00E-03	0.1	1.00
PENTACHLOROPHENOL	87-86-5	SV	1.20E-01	1.20E-01	3.00E-02	3.00E-02	0.25	1.00
Pentaerythritoltetranitrate	78-11-5	SV	1.10E-01	1.10E-01	3.00E-03	3.00E-03	0.1	1.00
PERCHLORATE	7601-90-3	M			7.00E-04	7.00E-04		1.00
PERMETHRIN	52645-53-1	SV			5.00E-02	5.00E-02	0.1	1.00

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
PHENOL	108-95-2	SV			3.00E-01	3.00E-01	0.1	1.00
M-PHENYLENEDIAMINE	108-45-2	SV			6.00E-03	6.00E-03	0.1	1.00
O-PHENYLENEDIAMINE	95-54-5	SV	4.70E-02	4.70E-02			0.1	1.00
P-PHENYLENEDIAMINE	106-50-3	SV			1.90E-01	1.90E-01	0.1	1.00
PHOSPHINE	7803-51-2	SV			3.00E-04	8.60E-05	0.1	1.00
PHOSPHORIC ACID	7664-38-2	M				2.90E-03		1.00
PHOSPHORUS (WHITE)	7723-14-0	M			2.00E-05	2.00E-05		1.00
PHTHALIC ANHYDRIDE	85-44-9	SV			2.00E+00	3.43E-02	0.1	1.00
POLYBROMINATED BIPHENYLS	NA	SV	8.90E+00	8.90E+00	7.00E-06	7.00E-06	0.1	1.00
POLYCHLORINATED BIPHENYLS	1336-36-3	SV	2.00E+00	2.00E+00			0.14	1.00
AROCLOR-1016	12674-11-2	SV	7.00E-02	7.00E-02	7.00E-05	7.00E-05	0.14	1.00
AROCLOR-1221	11104-28-2	SV	2.00E+00	2.00E+00			0.14	1.00
AROCLOR-1232	11141-16-5	SV	2.00E+00	2.00E+00			0.14	1.00
AROCLOR-1242	53469-21-9	SV	2.00E+00	2.00E+00			0.14	1.00
AROCLOR-1248	12672-29-6	SV	2.00E+00	2.00E+00			0.14	1.00
AROCLOR-1254	11097-69-1	SV	2.00E+00	2.00E+00	2.00E-05	2.00E-05	0.14	1.00
AROCLOR-1260	11096-82-5	SV	2.00E+00	2.00E+00			0.14	1.00
POLYCHLORINATED TERPHENYLS	61788-33-8	SV	4.50E+00	4.50E+00			0.1	1.00
POLYNUCLEAR AROMATIC HYDROCARBONS:	NA	SV					0.1	1.00
ACENAPHTHENE	83-32-9	V			6.00E-02	6.00E-02	0.13	1.00
ANTHRACENE	120-12-7	V			3.00E-01	3.00E-01	0.13	1.00
BENZ[A]ANTHRACENE	56-55-3	SV	7.30E-01	7.30E-01			0.13	1.00
BENZO[B]FLUORANTHENE	205-99-2	SV	7.30E-01	7.30E-01			0.13	1.00
BENZO[K]FLUORANTHENE	207-08-9	SV	7.30E-02	7.30E-02			0.13	1.00
BENZO[A]PYRENE	50-32-8	SV	7.30E+00	3.10E+00			0.13	1.00
CARBAZOLE	86-74-8	SV	2.00E-02	2.00E-02			0.13	1.00
CHRYSENE	218-01-9	SV	7.30E-03	7.30E-03			0.13	1.00
DIBENZ[A,H]ANTHRACENE	53-70-3	SV	7.30E+00	7.30E+00			0.13	1.00
FLUORANTHENE	206-44-0	SV			4.00E-02	4.00E-02	0.13	1.00
FLUORENE	86-73-7	V			4.00E-02	4.00E-02	0.13	1.00
INDENO[1,2,3-C,D]PYRENE	193-39-5	SV	7.30E-01	7.30E-01			0.13	1.00
2-METHYLNAPHTHALENE	91-57-6	V			4.00E-03	4.00E-03	0.13	1.00
NAPHTHALENE	91-20-3	V			2.00E-02	9.00E-04	0.13	1.00
PYRENE	129-00-0	V			3.00E-02	3.00E-02	0.13	1.00
PROMETON	1610-18-0	SV			1.50E-02	1.50E-02	0.1	1.00
PROMETRYN	7287-19-6	SV			4.00E-03	4.00E-03	0.1	1.00
PROPACHLOR	1918-16-7	SV			1.30E-02	1.30E-02	0.1	1.00
PROPARGITE	2312-35-8	SV			2.00E-02	2.00E-02	0.1	1.00
PROPYLENE GLYCOL	57-55-6	SV			5.00E-01	8.6E-04	0.1	1.00
PROPYLENE GLYCOL, MONOETHYL ETHER	52125-53-8	SV			7.00E-01	7.00E-01	0.1	1.00
PROPYLENE GLYCOL, MONOMETHYL ETHER	107-98-2	SV			7.00E-01	5.70E-01	0.1	1.00
PURSUIT	81335-77-5	SV			2.50E-01	2.50E-01	0.1	1.00
PYRIDINE	110-86-1	SV			1.00E-03	1.00E-03	0.1	1.00
QUINOLINE	91-22-5	SV	3.00E+00	3.00E+00			0.1	1.00
RDX	121-82-4	SV	1.10E-01	1.10E-01	3.00E-03	3.00E-03	0.1	1.00
RESMETHRIN	10453-86-8	SV			3.00E-02	3.00E-02	0.1	1.00
ROTENONE	83-79-4	SV			4.00E-03	4.00E-03	0.1	1.00
SELENIUM	7782-49-2	M			5.00E-03	5.00E-03		1.00
SILVER	7440-22-4	M			5.00E-03	5.00E-03		0.04
SIMAZINE	122-34-9	SV	1.20E-01	1.20E-01	5.00E-03	5.00E-03	0.1	1.00
SODIUM DIETHYLDITHIOCARBAMATE	148-18-5	SV	2.70E-01	2.70E-01	3.00E-02	3.00E-02	0.1	1.00
STRONTIUM, STABLE	7440-24-6	M			6.00E-01	6.00E-01		1.00
STRYCHNINE	57-24-9	SV			3.00E-04	3.00E-04	0.1	1.00
STYRENE	100-42-5	V			2.00E-01	2.86E-01		1.00
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746-01-6	SV	1.50E+05	1.50E+05			0.03	1.00
1,2,4,5-TETRACHLOROBENZENE	95-94-3	SV			3.00E-04	3.00E-04	0.1	1.00
1,1,1,2-TETRACHLOROETHANE	630-20-6	V	2.60E-02	2.60E-02	3.00E-02	3.00E-02		1.00
1,1,2,2-TETRACHLOROETHANE	79-34-5	V	2.00E-01	2.00E-01	6.00E-02	6.00E-02		1.00
TETRACHLOROETHENE	127-18-4	V	5.4E-01	2.00E-02	1.00E-02	1.4E-01		1.00
2,3,4,6-TETRACHLOROPHENOL	58-90-2	SV			3.00E-02	3.00E-02	0.1	1.00
P,A,A,A-TETRACHLOROTOLUENE	5216-25-1	SV	2.00E+01	2.00E+01			0.1	1.00
1,1,1,2-TETRAFLUOROETHANE	811-97-2	V				2.29E+01		1.00
TETRAHYDROFURAN	109-99-9	SV	7.6E-03	6.8E-03	2.00E-01	8.6E-02	0.1	1.00
TETRYL	479-45-8	SV			4.00E-03	4.00E-03	0.1	1.00
THALLIUM	7440-28-0	M			7.00E-05	7.00E-05		1.00
THALLIUM ACETATE	563-68-8	M			9.00E-05	9.00E-05		1.00
THALLIUM CARBONATE	6533-73-9	M			8.00E-05	8.00E-05		1.00
THALLIUM CHLORIDE	7791-12-0	M			8.00E-05	8.00E-05		1.00
THALLIUM NITRATE	10102-45-1	M			9.00E-05	9.00E-05		1.00
THALLIUM SULFATE (2:1)	7446-18-6	M			8.00E-05	8.00E-05		1.00
THIOBENCARB	28249-77-6	SV			1.00E-02	1.00E-02	0.1	1.00
TIN	7440-31-5	M			6.00E-01	6.00E-01		1.00

Yellow-highlighted inhalation toxicity factors adapted from the oral factors. Blue highlights from IRIS.

Chemical	StdCAS	Group	SFo (Kg-day/mg)	SFi (Kg-day/mg)	RfDo (mg/Kg-day)	RfDi (mg/Kg-day)	ABS	GI Factor
TITANIUM	7440-32-6	M			4.00E+00	8.60E-03		1.00
TITANIUM DIOXIDE	13463-67-7	M			4.00E+00	8.60E-03		1.00
TOLUENE	108-88-3	V			2.00E-01	1.14E-01		1.00
TOLUENE-2,4-DIAMINE	95-80-7	SV	3.20E+00	3.20E+00			0.1	1.00
TOLUENE-2,5-DIAMINE	95-70-5	SV			6.00E-01	6.00E-01	0.1	1.00
TOLUENE-2,6-DIAMINE	823-40-5	SV			2.00E-01	2.00E-01	0.1	1.00
P-TOLUIDINE	106-49-0	SV	1.90E-01	1.90E-01			0.1	1.00
TOXAPHENE	8001-35-2	SV	1.10E+00	1.10E+00			0.1	1.00
1,2,4-TRIBROMOBENZENE	615-54-3	SV			5.00E-03	5.00E-03	0.1	1.00
TRIBUTYLTIN OXIDE	56-35-9	SV			3.00E-04	3.00E-04	0.1	1.00
2,4,6-TRICHLOROANILINE	634-93-5	SV	3.40E-02	3.40E-02			0.1	1.00
1,2,4-TRICHLOROBENZENE	120-82-1	V			1.00E-02	1.00E-03		1.00
1,1,1-TRICHLOROETHANE	71-55-6	V			2.80E-01	6.30E-01		1.00
1,1,2-TRICHLOROETHANE	79-00-5	V	5.70E-02	5.60E-02	4.00E-03	4.00E-03		1.00
TRICHLOROETHENE	79-01-6	V	4.00E-01	4.00E-01	3.00E-04	1.00E-02		1.00
TRICHLOROFLUOROMETHANE	75-69-4	V			3.00E-01	2.00E-01		1.00
2,4,5-TRICHLOROPHENOL	95-95-4	SV			1.00E-01	1.00E-01	0.1	1.00
2,4,6-TRICHLOROPHENOL	88-06-2	SV	1.10E-02	1.00E-02			0.1	1.00
2,4,5-T	93-76-5	SV			1.00E-02	1.00E-02	0.1	1.00
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93-72-1	SV			8.00E-03	8.00E-03	0.1	1.00
1,1,2-TRICHLOROPROPANE	598-77-6	V			5.00E-03	5.00E-03		1.00
1,2,3-TRICHLOROPROPANE	96-18-4	V	2.00E+00	2.00E+00	6.00E-03	1.4E-03		1.00
1,2,3-TRICHLOROPROPENE	96-19-5	V			1.00E-02	3.00E-04		1.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	V			3.00E+01	8.60E+00		1.00
1,2,4-TRIMETHYLBENZENE	95-63-6	V			5.00E-02	1.70E-03		1.00
1,3,5-TRIMETHYLBENZENE	108-67-8	V			5.00E-02	1.70E-03		1.00
1,3,5-TRINITROBENZENE	99-35-4	SV			3.00E-02	3.00E-02	0.1	1.00
2,4,6-TRINITROTOLUENE	118-96-7	SV	3.00E-02	3.00E-02	5.00E-04	5.00E-04	0.1	1.00
URANIUM (SOLUBLE SALTS; from IRIS)	7440-61-1	M			3.00E-03	3.00E-03		1.00
URANIUM (SOLUBLE SALTS; provisional)	7440-61-1	M			2.00E-04	2.00E-04		1.00
VANADIUM	7440-62-2	M			1.00E-03	1.00E-03		0.03
VINCLOZOLIN	50471-44-8	SV			2.50E-02	2.50E-02	0.1	1.00
VINYL ACETATE	108-05-4	V			1.00E+00	5.71E-02		1.00
VINYL CHLORIDE: adult (see cover memos)	75-01-4	V	7.20E-01	1.5E-02	3.00E-03	2.8E-02		1.00
WARFARIN	81-81-2	SV			3.00E-04	3.00E-04	0.1	1.00
O-XYLENE	95-47-6	V			2.00E-01	3.00E-02		1.00
M,P-XYLENES	1330-20-7	V			2.00E-01	3.00E-02		1.00
XYLENES	1330-20-7	V			2.00E-01	3.00E-02		1.00
ZINC	7440-66-6	M			3.00E-01	3.00E-01		1.00
ZINEB	12122-67-7	SV			5E-02	5E-02	0.1	1.00

APPENDIX C

Risk-Based Soil Concentrations for the Industrial Worker

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
ACETALDEHYDE	75-07-0	V			1.90E+05	1.90E+05			6.71E+05	6.71E+05	1.90E+05	C
ACETOCHLOR	34256-82-1	SV					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
ACETONE	67-64-1	V					9.20E+05		2.35E+08	9.16E+05	9.16E+05	NC
ACETONITRILE	75-05-8	V							4.44E+06	4.44E+06	4.44E+06	NC
ACETOPHENONE	98-86-2	V					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
ACROLEIN	107-02-8	V					5.11E+02		1.49E+03	3.80E+02	3.80E+02	NC
ACRYLAMIDE	79-06-1	SV	6.36E-01		3.25E+02	6.35E-01	2.04E+02		5.22E+04	2.04E+02	6.35E-01	C
ACRYLONITRILE	107-13-1	V	5.30E+00		6.09E+03	5.29E+00	1.02E+03		1.49E+05	1.02E+03	5.29E+00	C
ALACHLOR	15972-60-8	SV	3.58E+01		1.83E+04	3.57E+01	1.02E+04		2.61E+06	1.02E+04	3.57E+01	C
ALAR	1596-84-5	SV					1.53E+05		3.92E+07	1.53E+05	1.53E+05	NC
ALDICARB	116-06-3	SV					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
ALDICARB SULFONE	1646-88-4	SV					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
ALDRIN	309-00-2	SV	1.68E-01		8.60E+01	1.68E-01	3.07E+01		7.83E+03	3.05E+01	1.68E-01	C
ALLYL CHLORIDE	107-05-1	V							7.46E+04	7.46E+04	7.46E+04	NC
ALUMINUM	7429-90-5	M					1.02E+06		2.61E+05	2.08E+05	2.08E+05	NC
AMINODINITROTOLUENES	NA	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
AMMONIA	7664-41-7	V							7.47E+06	7.47E+06	7.47E+06	NC
ANILINE	62-53-3	SV	5.02E+02		2.57E+05	5.01E+02	7.15E+03		7.57E+04	6.54E+03	5.01E+02	C
ANTIMONY	7440-36-0	M					4.09E+02		1.04E+05	4.07E+02	4.07E+02	NC
ANTIMONY TRIOXIDE	1309-64-4	M					4.09E+02		1.49E+04	3.98E+02	3.98E+02	NC
ARSENIC	7440-38-2	M	1.91E+00	9.64E+00	9.68E+01	1.57E+00	3.07E+02	1.55E+03	7.83E+04	2.55E+02	1.57E+00	C
ARSINE	7784-42-1	V							3.66E+03	3.66E+03	3.66E+03	NC
ASSURE	76578-14-8	SV					9.20E+03		2.35E+06	9.16E+03	9.16E+03	NC
ATRAZINE	1912-24-9	SV	1.30E+01		6.65E+03	1.30E+01	3.58E+04		9.14E+06	3.56E+04	1.30E+01	C
BARIUM	7440-39-3	M					7.15E+04		3.66E+04	2.42E+04	2.42E+04	NC
BAYGON	114-26-1	SV					4.09E+03		1.04E+06	4.07E+03	4.07E+03	NC
BAYTHROID	68359-37-5	SV					2.56E+04		6.53E+06	2.55E+04	2.55E+04	NC
BENTAZON	25057-89-0	SV					3.07E+04	3.57E+04	7.83E+06	1.65E+04	1.65E+04	NC
BENZALDEHYDE	100-52-7	SV					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
BENZENE	71-43-2	V	5.20E+01		5.42E+04	5.20E+01	4.09E+03		2.25E+06	4.08E+03	5.20E+01	C
BENZENETHIOL	108-98-5	V					1.02E+01		2.61E+03	1.02E+01	1.02E+01	NC
BENZIDINE	92-87-5	SV	1.24E-02		6.36E+00	1.24E-02	3.07E+03		7.83E+05	3.05E+03	1.24E-02	C
BENZOIC ACID	65-85-0	SV					4.09E+06		1.04E+09	4.07E+06	4.07E+06	NC
BENZYL ALCOHOL	100-51-6	SV					3.07E+05		7.83E+07	3.05E+05	3.05E+05	NC
BENZYL CHLORIDE	100-44-7	V	1.68E+01		8.60E+03	1.68E+01	2.04E+03		5.22E+05	2.04E+03	1.68E+01	C
BERYLLIUM	7440-41-7	M			1.74E+02	1.74E+02	2.04E+03		1.49E+03	8.61E+02	1.74E+02	C
BIPHENYL	92-52-4	V					5.11E+04		1.31E+07	5.09E+04	5.09E+04	NC
BIS(2-CHLOROETHYL)ETHER	111-44-4	V	2.60E+00		1.33E+03	2.60E+00					2.60E+00	C
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	V	4.09E+01		4.18E+04	4.08E+01	4.09E+04		1.04E+07	4.07E+04	4.08E+01	C
BIS(CHLOROMETHYL)ETHER	542-88-1	V	1.30E-02		6.65E+00	1.30E-02					1.30E-02	C
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	SV	2.04E+02		1.04E+05	2.04E+02	2.04E+04		5.22E+06	2.04E+04	2.04E+02	C
BORON	7440-42-8	M					2.04E+05		1.49E+06	1.80E+05	1.80E+05	NC
BROMOBENZENE	108-86-1	V					2.04E+04		7.83E+05	1.99E+04	1.99E+04	NC
BROMODICHLOROMETHANE	75-27-4	V	4.62E+01		2.36E+04	4.61E+01	2.04E+04		5.22E+06	2.04E+04	4.61E+01	C
BROMOETHENE	593-60-2	V			1.33E+04	1.33E+04			2.25E+05	2.25E+05	1.33E+04	C
BROMOFORM	75-25-2	SV	3.62E+02		3.75E+05	3.62E+02	2.04E+04		5.22E+06	2.04E+04	3.62E+02	C
BROMOMETHANE	74-83-9	V					1.43E+03		3.66E+05	1.43E+03	1.43E+03	NC
BROMOPHOS	2104-96-3	SV					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
1,3-BUTADIENE	106-99-0	V			1.46E+04	1.46E+04			1.49E+05	1.49E+05	1.46E+04	C
1-BUTANOL	71-36-3	SV					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
BUTYLBENZYLPHTHALATE	85-68-7	SV	1.51E+03		7.70E+05	1.50E+03	2.04E+05		5.22E+07	2.04E+05	1.50E+03	C
CADMIUM-FOOD	7440-43-9	M			2.32E+02	2.32E+02	1.02E+03	6.19E+06	1.49E+04	9.56E+02	2.32E+02	C
CAPROLACTAM	105-60-2	SV					5.11E+05		1.31E+08	5.09E+05	5.09E+05	NC
CARBARYL	63-25-2	SV					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
CARBON DISULFIDE	75-15-0	V					1.02E+05		5.22E+07	1.02E+05	1.02E+05	NC
CARBON TETRACHLORIDE	56-23-5	V	2.20E+01		2.76E+04	2.20E+01	7.15E+02		1.31E+07	7.15E+02	2.20E+01	C
CARBOSULFAN	55285-14-8	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
CHLORAL HYDRATE	302-17-0	SV					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
CHLORANIL	118-75-2	SV	7.15E+00		3.66E+03	7.14E+00					7.14E+00	C
CHLORDANE	57-74-9	SV	8.18E+00	3.10E+01	4.18E+03	6.46E+00	5.11E+02	1.94E+03	5.22E+04	4.01E+02	6.46E+00	C
CHLORINE	7782-50-5	V					1.02E+05		1.49E+04	1.30E+04	1.30E+04	NC
CHLORINE DIOXIDE	10049-04-4	V					3.07E+04		1.49E+04	1.00E+04	1.00E+04	NC
CHLOROACETIC ACID	79-11-8	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
4-CHLOROANILINE	106-47-8	SV	5.30E+01		2.71E+04	5.29E+01	4.09E+03		1.04E+06	4.07E+03	5.29E+01	C
CHLOROBENZENE	108-90-7	V					2.04E+04		4.44E+06	2.03E+04	2.03E+04	NC
2-CHLORO-1,3-BUTADIENE	126-99-8	V					2.04E+04		5.22E+05	1.97E+04	1.97E+04	NC
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	V							3.66E+09	3.66E+09	3.66E+09	NC
CHLORODIFLUOROMETHANE	75-45-6	V							3.66E+09	3.66E+09	3.66E+09	NC
CHLOROETHANE	75-00-3	V	9.87E+02		5.04E+05	9.85E+02	4.09E+05		7.57E+08	4.09E+05	9.85E+02	C
CHLOROFORM	67-66-3	V			1.81E+04	1.81E+04	1.02E+04		3.66E+06	1.02E+04	1.02E+04	NC
CHLOROMETHANE	74-87-3	V							6.79E+06	6.79E+06	6.79E+06	NC
4-CHLORO-2-METHYLANILINE	95-69-2	SV	4.93E+00		2.52E+03	4.92E+00					4.92E+00	C
BETA-CHLORONAPHTHALENE	91-58-7	V					8.18E+04		2.09E+07	8.14E+04	8.14E+04	NC
O-CHLORONITROBENZENE	88-73-3	V	2.95E+02		1.51E+05	2.94E+02	1.02E+03		5.22E+03	8.55E+02	2.94E+02	C
P-CHLORONITROBENZENE	100-00-5	V	4.27E+02		2.18E+05	4.26E+02	1.02E+03		4.44E+04	9.99E+02	4.26E+02	C
2-CHLOROPHENOL	95-57-8	V					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
2-CHLOROPROPANE	75-29-6	V							7.57E+06	7.57E+06	7.57E+06	NC
O-CHLOROTOLUENE	95-49-8	V					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
CHLORPYRIFOS	2921-88-2	SV					3.07E+03		7.83E+05	3.05E+03	3.05E+03	NC
CHLORPYRIFOS-METHYL	5598-13-0	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
CHROMIUM	7440-47-3	M					1.53E+06		3.92E+08	1.53E+06	1.53E+06	NC
CHROMIUM III	16065-83-1	M					1.53E+06		3.92E+08	1.53E+06	1.53E+06	NC
CHROMIUM VI	18540-29-9	M			3.57E+01	3.57E+01	3.07E+03		7.83E+03	2.20E+03	3.57E+01	C
COBALT	7440-48-4	M			1.49E+02	1.49E+02	2.04E+04		1.49E+03	1.39E+03	1.49E+02	C
COKE OVEN EMISSIONS (COAL TAR)	8007-45-2	SV			6.65E+02	6.65E+02					6.65E+02	C
COPPER	7440-50-8	M					4.09E+04		1.04E+07	4.07E+04	4.07E+04	NC
CUMENE	98-82-8	V					1.02E+05		2.87E+07	1.02E+05	1.02E+05	NC
CYANIDE (FREE)	57-12-5	M					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
CALCIUM CYANIDE	592-01-8	M					4.09E+04		1.04E+07	4.07E+04	4.07E+04	NC
COPPER CYANIDE	544-92-3	M					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
CYANOGEN	460-19-5	V					4.09E+04		1.04E+07	4.07E+04	4.07E+04	NC
HYDROGEN CYANIDE	74-90-8	V					2.04E+04		2.25E+05	1.87E+04	1.87E+04	NC
POTASSIUM CYANIDE	151-50-8	M					5.11E+04		1.31E+07	5.09E+04	5.09E+04	NC
POTASSIUM SILVER CYANIDE	506-61-6	M					2.04E+05		5.22E+07	2.04E+05	2.04E+05	NC
SILVER CYANIDE	506-64-9	M					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
SODIUM CYANIDE	143-33-9	M					4.09E+04		1.04E+07	4.07E+04	4.07E+04	NC
THIOCYANATE	NA	M					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
ZINC CYANIDE	557-21-1	M					5.11E+04		1.31E+07	5.09E+04	5.09E+04	NC
CYCLOHEXANE	110-82-7	V							4.44E+08	4.44E+08	4.44E+08	NC
CYCLOHEXANONE	108-94-1	SV					5.11E+06		1.31E+09	5.09E+06	5.09E+06	NC
CYHALOTHRIN/KARATE	68085-85-8	SV					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
CYPERMETHRIN	52315-07-8	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
DACTHAL	1861-32-1	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
DALAPON	75-99-0	SV					3.07E+04		7.83E+06	3.05E+04	3.05E+04	NC
DDD	72-54-8	SV	1.19E+01		6.09E+03	1.19E+01	2.04E+03		5.22E+05	2.04E+03	1.19E+01	C
DDE	72-55-9	SV	8.42E+00		4.30E+03	8.40E+00					8.40E+00	C
DDT	50-29-3	SV	8.42E+00	4.25E+01	4.30E+03	7.01E+00	5.11E+02	2.58E+03	1.31E+05	4.25E+02	7.01E+00	C
DIAZINON	333-41-5	SV					9.20E+02		2.35E+05	9.16E+02	9.16E+02	NC

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
DIBENZOFURAN	132-64-9	V					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
1,4-DIBROMOBENZENE	106-37-6	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
DIBROMOCHLOROMETHANE	124-48-1	V	3.41E+01		1.74E+04	3.40E+01	2.04E+04		5.22E+06	2.04E+04	3.40E+01	C
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	V	2.04E+00		6.09E+05	2.04E+00			1.49E+04	1.49E+04	2.04E+00	C
1,2-DIBROMOETHANE	106-93-4	V	1.43E+00		7.31E+02	1.43E+00	9.20E+03		6.79E+05	9.08E+03	1.43E+00	C
DIBUTYLPHTHALATE	84-74-2	SV					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
DICAMBA	1918-00-9	SV					3.07E+04		7.83E+06	3.05E+04	3.05E+04	NC
1,2-DICHLOROBENZENE	95-50-1	V					9.20E+04		1.04E+07	9.12E+04	9.12E+04	NC
1,3-DICHLOROBENZENE	541-73-1	V					3.07E+03		7.83E+05	3.05E+03	3.05E+03	NC
1,4-DICHLOROBENZENE	106-46-7	V	1.19E+02		6.65E+04	1.19E+02	3.07E+04		5.98E+07	3.06E+04	1.19E+02	C
3,3'-DICHLOROBENZIDINE	91-94-1	SV	6.36E+00		3.25E+03	6.35E+00					6.35E+00	C
DICHLORODIFLUOROMETHANE	75-71-8	V					2.04E+05		1.31E+07	2.01E+05	2.01E+05	NC
1,1-DICHLOROETHANE	75-34-3	V					2.04E+05		3.66E+07	2.03E+05	2.03E+05	NC
1,2-DICHLOROETHANE	107-06-2	V	3.14E+01		1.61E+04	3.14E+01	2.04E+04		1.83E+08	2.04E+04	3.14E+01	C
1,1-DICHLOROETHENE	75-35-4	V					5.11E+04		1.57E+07	5.09E+04	5.09E+04	NC
CIS-1,2-DICHLOROETHENE	156-59-2	V					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
TRANS-1,2-DICHLOROETHENE	156-60-5	V					2.04E+04		4.44E+06	2.03E+04	2.03E+04	NC
TOTAL 1,2-DICHLOROETHENE	540-59-0	V					9.20E+03		2.35E+06	9.16E+03	9.16E+03	NC
2,4-DICHLOROPHENOL	120-83-2	SV					3.07E+03		7.83E+05	3.05E+03	3.05E+03	NC
2,4-D	94-75-7	SV					1.02E+04	3.10E+04	2.61E+06	7.66E+03	7.66E+03	NC
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94-82-6	SV					8.18E+03		2.09E+06	8.14E+03	8.14E+03	NC
1,2-DICHLOROPROPANE	78-87-5	V	4.21E+01		2.15E+04	4.20E+01			2.98E+05	2.98E+05	4.20E+01	C
1,3-DICHLOROPROPANE	142-28-9	V					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
2,3-DICHLOROPROPANOL	616-23-9	SV					3.07E+03		7.83E+05	3.05E+03	3.05E+03	NC
1,3-DICHLOROPROPENE	542-75-6	V	2.86E+01		1.46E+05	2.86E+01	3.07E+04		1.49E+06	3.00E+04	2.86E+01	C
DICHLORVOS	62-73-7	SV	9.87E+00		5.04E+03	9.85E+00	5.11E+02		3.73E+04	5.04E+02	9.85E+00	C
DIELDRIN	60-57-1	SV	1.79E-01		9.14E+01	1.79E-01	5.11E+01		1.31E+04	5.09E+01	1.79E-01	C
DIESEL EMISSIONS	NA	SV							3.66E+05	3.66E+05	3.66E+05	NC
DIETHYLPHTHALATE	84-66-2	SV					8.18E+05		2.09E+08	8.14E+05	8.14E+05	NC
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112-34-5	SV					1.02E+04		1.49E+06	1.02E+04	1.02E+04	NC
DIETHYLENE GLYCOL, MONOETHYL ETHER	111-90-0	SV					6.13E+04		2.25E+05	4.82E+04	4.82E+04	NC
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	SV	2.38E+03		1.22E+06	2.38E+03	6.13E+05		1.57E+08	6.11E+05	2.38E+03	C
DIETHYLSTILBESTROL	56-53-1	SV	6.09E-04		3.11E-01	6.08E-04					6.08E-04	C
DIFENZOQUAT (AVENGE)	43222-48-6	SV					8.18E+04		2.09E+07	8.14E+04	8.14E+04	NC
1,1-DIFLUOROETHANE	75-37-6	V							2.87E+09	2.87E+09	2.87E+09	NC
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445-75-6	SV					8.18E+04		2.09E+07	8.14E+04	8.14E+04	NC
3,3'-DIMETHOXYBENZIDINE	119-90-4	SV	2.04E+02		1.04E+05	2.04E+02					2.04E+02	C
N,N-DIMETHYLANILINE	121-69-7	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
3,3'-DIMETHYLBENZIDINE	119-93-7	SV	1.24E+00		6.36E+02	1.24E+00					1.24E+00	C
2,4-DIMETHYLPHENOL	105-67-9	SV					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
2,6-DIMETHYLPHENOL	576-26-1	SV					6.13E+02		1.57E+05	6.11E+02	6.11E+02	NC
3,4-DIMETHYLPHENOL	95-65-8	SV					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
DIMETHYLPHTHALATE	131-11-3	SV					1.02E+07		2.61E+09	1.02E+07	1.02E+07	NC
1,2-DINITROBENZENE	528-29-0	SV					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
1,3-DINITROBENZENE	99-65-0	SV					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
1,4-DINITROBENZENE	100-25-4	SV					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131-89-5	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
4,6-DINITRO-2-METHYLPHENOL	534-52-1	SV					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
2,4-DINITROPHENOL	51-28-5	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
DINITROTOLUENE MIX	NA	SV	4.21E+00		2.15E+03	4.20E+00					4.20E+00	C
2,4-DINITROTOLUENE	121-14-2	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
2,6-DINITROTOLUENE	606-20-2	SV					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
DINOSEB	88-85-7	SV					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
DIOCTYLPHTHALATE	117-84-0	SV					4.09E+04		1.04E+07	4.07E+04	4.07E+04	NC

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
1,4-DIOXANE	123-91-1	SV	2.60E+02		1.33E+05	2.60E+02					2.60E+02	C
DIPHENYLAMINE	122-39-4	SV					2.56E+04		6.53E+06	2.55E+04	2.55E+04	NC
1,2-DIPHENYLHYDRAZINE	122-66-7	SV	3.58E+00		1.83E+03	3.57E+00					3.57E+00	C
DIQUAT	85-00-7	SV					2.25E+03		5.74E+05	2.24E+03	2.24E+03	NC
DISULFOTON	298-04-4	SV					4.09E+01		1.04E+04	4.07E+01	4.07E+01	NC
1,4-DITHIANE	505-29-3	SV					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
DIURON	330-54-1	SV					2.04E+03		5.22E+05	2.04E+03	2.04E+03	NC
ENDOSULFAN	115-29-7	SV					6.13E+03		1.57E+06	6.11E+03	6.11E+03	NC
ENDRIN	72-20-8	SV					3.07E+02		7.83E+04	3.05E+02	3.05E+02	NC
EPICHLOROHYDRIN	106-89-8	V	2.89E+02		3.48E+05	2.89E+02	2.04E+03		7.47E+04	1.99E+03	2.89E+02	C
ETHION	563-12-2	SV					5.11E+02	7.74E+02	1.31E+05	3.07E+02	3.07E+02	NC
ETHYL ACETATE	141-78-6	V					9.20E+05		2.35E+08	9.16E+05	9.16E+05	NC
ETHYLBENZENE	100-41-4	V					1.02E+05		7.57E+07	1.02E+05	1.02E+05	NC
ETHYLENE DIAMINE	107-15-3	SV					9.20E+04	1.39E+05	2.35E+07	5.53E+04	5.53E+04	NC
ETHYLENE GLYCOL	107-21-1	SV					2.04E+06	3.10E+06	5.22E+08	1.23E+06	1.23E+06	NC
ETHYLENE GLYCOL, MONOBUTYL ETHER	111-76-2	SV					5.11E+05	7.74E+05	9.66E+08	3.08E+05	3.08E+05	NC
ETHYLENE OXIDE	75-21-8	V	2.86E+00		4.18E+03	2.86E+00					2.86E+00	C
ETHYL ETHER	60-29-7	V					2.04E+05		5.22E+07	2.04E+05	2.04E+05	NC
FENAMIPHOS	22224-92-6	SV					2.56E+02	3.87E+02	6.53E+04	1.54E+02	1.54E+02	NC
FLUOMETURON	2164-17-2	SV					1.33E+04	2.01E+04	3.39E+06	7.98E+03	7.98E+03	NC
FLUORINE	7782-41-4	M					6.13E+04		1.57E+07	6.11E+04	6.11E+04	NC
FOMESAFEN	72178-02-0	SV	1.51E+01	2.28E+01	7.70E+03	9.06E+00					9.06E+00	C
FONOFOS	944-22-9	SV					2.04E+03	3.10E+03	5.22E+05	1.23E+03	1.23E+03	NC
FORMALDEHYDE	50-00-0	SV			3.25E+04	3.25E+04	2.04E+05	3.10E+05	5.22E+07	1.23E+05	3.25E+04	C
FURAN	110-00-9	V					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
FURFURAL	98-01-1	SV					3.07E+03	4.65E+03	2.61E+06	1.85E+03	1.85E+03	NC
GLYPHOSATE	1071-83-6	SV					1.02E+05	1.55E+05	2.61E+07	6.14E+04	6.14E+04	NC
HEPTACHLOR	76-44-8	SV	6.36E-01	9.64E-01	3.25E+02	3.83E-01	5.11E+02	7.74E+02	1.31E+05	3.07E+02	3.83E-01	C
HEPTACHLOR EPOXIDE	1024-57-3	SV	3.14E-01	4.76E-01	1.61E+02	1.89E-01	1.33E+01	2.01E+01	3.39E+03	7.98E+00	1.89E-01	C
HEXABROMOBENZENE	87-82-1	SV					2.04E+03	3.10E+03	5.22E+05	1.23E+03	1.23E+03	NC
HEXACHLOROBENZENE	118-74-1	SV	1.79E+00	2.71E+00	9.14E+02	1.08E+00	8.18E+02	1.24E+03	2.09E+05	4.91E+02	1.08E+00	C
HEXACHLOROBUTADIENE	87-68-3	SV	3.67E+01	5.56E+01	1.87E+04	2.21E+01	2.04E+02	3.10E+02	5.22E+04	1.23E+02	2.21E+01	C
ALPHA-HCH	319-84-6	SV	4.54E-01	6.88E-01	2.32E+02	2.73E-01					2.73E-01	C
BETA-HCH	319-85-7	SV	1.59E+00	2.41E+00	8.12E+02	9.57E-01					9.57E-01	C
GAMMA-HCH (LINDANE)	58-89-9	SV	2.20E+00	8.34E+00	1.12E+03	1.74E+00	3.07E+02	1.16E+03	7.83E+04	2.42E+02	1.74E+00	C
TECHNICAL HCH	608-73-1	SV	1.59E+00	2.41E+00	8.12E+02	9.57E-01					9.57E-01	C
HEXACHLOROCYCLOPENTADIENE	77-47-4	SV					6.13E+03	9.29E+03	1.49E+04	2.96E+03	2.96E+03	NC
HEXACHLORODIBENZODIOXIN MIX	19408-74-3	SV	4.62E-04	6.99E-04	3.21E-01	2.78E-04					2.78E-04	C
HEXACHLOROETHANE	67-72-1	SV	2.04E+02	3.10E+02	1.04E+05	1.23E+02	1.02E+03	1.55E+03	2.61E+05	6.14E+02	1.23E+02	C
HEXACHLOROPHENE	70-30-4	SV					3.07E+02	4.65E+02	7.83E+04	1.84E+02	1.84E+02	NC
1,6-HEXAMETHYLENE DIISOCYANATE	822-06-0	SV							7.57E+02	7.57E+02	7.57E+02	NC
HEXANE	110-54-3	V					1.12E+07		1.49E+07	6.41E+06	6.41E+06	NC
HMX	2691-41-0	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC
HYDRAZINE	302-01-2	V	9.54E-01		8.60E+01	9.43E-01					9.43E-01	C
HYDROGEN CHLORIDE	7647-01-0	V							1.49E+06	1.49E+06	1.49E+06	NC
HYDROGEN SULFIDE	7783-06-4	V					3.07E+03		1.49E+05	3.00E+03	3.00E+03	NC
HYDROQUINONE	123-31-9	SV	5.11E+01	7.74E+01	2.61E+04	3.07E+01	4.09E+04	6.19E+04	1.04E+07	2.46E+04	3.07E+01	C
IRON	7439-89-6	M					3.07E+05		7.83E+07	3.05E+05	3.05E+05	NC
ISOBUTANOL	78-83-1	V					3.07E+05		7.83E+07	3.05E+05	3.05E+05	NC
ISOPHORONE	78-59-1	SV	3.01E+03	4.56E+03	1.54E+06	1.81E+03	2.04E+05	3.10E+05	5.22E+07	1.23E+05	1.81E+03	C
TETRAETHYLLEAD	78-00-2	V					1.02E-01		2.61E+01	1.02E-01	1.02E-01	NC
KEPONE	143-50-0	SV	3.58E-01	5.42E-01	1.83E+02	2.15E-01	2.04E+02	3.10E+02	5.22E+04	1.23E+02	2.15E-01	C
LITHIUM	7439-93-2	M					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
MALATHION	121-75-5	SV					2.04E+04	3.10E+04	5.22E+06	1.23E+04	1.23E+04	NC

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
MALEIC ANHYDRIDE	108-31-6	SV					1.02E+05	1.55E+05	2.61E+07	6.14E+04	6.14E+04	NC
MANGANESE-FOOD	7439-96-5	M					1.43E+05		3.73E+03	3.64E+03	3.64E+03	NC
MEPHOSFOLAN	950-10-7	SV					9.20E+01	1.39E+02	2.35E+04	5.53E+01	5.53E+01	NC
MEPIQUAT CHLORIDE	24307-26-4	SV					3.07E+04	4.65E+04	7.83E+06	1.84E+04	1.84E+04	NC
MERCURIC CHLORIDE	7487-94-7	M					3.07E+02		7.83E+04	3.05E+02	3.05E+02	NC
MERCURY (elemental)	7439-97-6	M							2.25E+04	2.25E+04	2.25E+04	NC
METHYLMERCURY	22967-92-6	V					1.02E+02		2.61E+04	1.02E+02	1.02E+02	NC
METHANOL	67-56-1	V					5.11E+05		1.31E+08	5.09E+05	5.09E+05	NC
METHIDATHION	950-37-8	SV					1.02E+03	1.55E+03	2.61E+05	6.14E+02	6.14E+02	NC
METHOXYCHLOR	72-43-5	SV					5.11E+03	7.74E+03	1.31E+06	3.07E+03	3.07E+03	NC
METHYL ACETATE	79-20-9	V					1.02E+06		2.61E+08	1.02E+06	1.02E+06	NC
METHYL ACRYLATE	96-33-3	V					3.07E+04		7.83E+06	3.05E+04	3.05E+04	NC
2-METHYLANILINE	95-53-4	SV	1.19E+01	1.81E+01	6.09E+03	7.17E+00					7.17E+00	C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94-81-5	SV					1.02E+04	1.55E+04	2.61E+06	6.14E+03	6.14E+03	NC
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94-74-6	SV					5.11E+02	7.74E+02	1.31E+05	3.07E+02	3.07E+02	NC
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93-65-2	SV					1.02E+03	1.55E+03	2.61E+05	6.14E+02	6.14E+02	NC
METHYLCYCLOHEXANE	108-87-2	V							2.25E+08	2.25E+08	2.25E+08	NC
METHYLENE BROMIDE	74-95-3	V					1.02E+04		2.61E+06	1.02E+04	1.02E+04	NC
METHYLENE CHLORIDE	75-09-2	V	3.82E+02		8.86E+05	3.81E+02	6.13E+04		7.83E+07	6.13E+04	3.81E+02	C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	SV	2.20E+01	3.34E+01	1.12E+04	1.32E+01	7.15E+02	1.08E+03	1.83E+05	4.30E+02	1.32E+01	C
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101-61-1	SV	6.22E+01	9.43E+01	3.18E+04	3.74E+01					3.74E+01	C
4,4'-METHYLENEDIPHENYL ISOCYANATE	101-68-8	SV							4.44E+04	4.44E+04	4.44E+04	NC
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	V					6.13E+05		3.66E+08	6.12E+05	6.12E+05	NC
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	V							2.25E+08	2.25E+08	2.25E+08	NC
METHYL METHACRYLATE	80-62-6	V					1.43E+06		5.22E+07	1.39E+06	1.39E+06	NC
METHYL PARATHION	298-00-0	SV					2.56E+02	3.87E+02	6.53E+04	1.54E+02	1.54E+02	NC
2-METHYLPHENOL	95-48-7	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC
3-METHYLPHENOL	108-39-4	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC
4-METHYLPHENOL	106-44-5	SV					5.11E+03	7.74E+03	1.31E+06	3.07E+03	3.07E+03	NC
METHYLSTYRENE MIX	25013-15-4	V					6.13E+03		2.61E+06	6.12E+03	6.12E+03	NC
ALPHA-METHYLSTYRENE	98-83-9	V					7.15E+04		1.83E+07	7.13E+04	7.13E+04	NC
METHYL TERT-BUTYL ETHER	1634-04-4	V	7.15E+02		3.66E+05	7.14E+02			2.24E+08	2.24E+08	7.14E+02	C
METOLACHLOR (DUAL)	51218-45-2	SV					1.53E+05	2.32E+05	3.92E+07	9.21E+04	9.21E+04	NC
MIREX	2385-85-5	SV					2.04E+02	3.10E+02	5.22E+04	1.23E+02	1.23E+02	NC
MOLYBDENUM	7439-98-7	M					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
MONOCHLORAMINE	10599-90-3	SV					1.02E+05	1.55E+05	2.61E+07	6.14E+04	6.14E+04	NC
NALED	300-76-5	SV					2.04E+03	3.10E+03	5.22E+05	1.23E+03	1.23E+03	NC
NICKEL REFINERY DUST	NA	M			1.74E+03	1.74E+03					1.74E+03	C
NICKEL	7440-02-0	M					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
NITRATE	14797-55-8	M					1.64E+06		4.18E+08	1.63E+06	1.63E+06	NC
NITRITE	14797-65-0	M					1.02E+05		2.61E+07	1.02E+05	1.02E+05	NC
2-NITROANILINE	88-74-4	SV					3.07E+03	4.65E+03	7.83E+03	1.49E+03	1.49E+03	NC
3-NITROANILINE	99-09-2	SV	1.43E+02	2.17E+02	7.31E+04	8.61E+01	3.07E+02	4.65E+02	7.83E+04	1.84E+02	8.61E+01	C
4-NITROANILINE	100-01-6	SV	1.43E+02	2.17E+02	7.31E+04	8.61E+01	3.07E+03	4.65E+03	2.61E+05	1.83E+03	8.61E+01	C
NITROBENZENE	98-95-3	V					5.11E+02		1.57E+05	5.09E+02	5.09E+02	NC
NITROGLYCERIN	55-63-0	SV	2.04E+02	3.10E+02	1.04E+05	1.23E+02					1.23E+02	C
NITROGUANIDINE	556-88-7	SV					1.02E+05	1.55E+05	2.61E+07	6.14E+04	6.14E+04	NC
2-NITROPROPANE	79-46-9	V			1.56E+02	1.56E+02			1.49E+06	1.49E+06	1.56E+02	C
N-NITROSO-DI-N-BUTYLAMINE	924-16-3	V	5.30E-01		2.61E+02	5.29E-01					5.29E-01	C
N-NITROSODIETHANOLAMINE	1116-54-7	SV	1.02E+00	1.55E+00	5.22E+02	6.15E-01					6.15E-01	C
N-NITROSODIETHYLAMINE	55-18-5	SV	1.91E-02	2.89E-02	9.75E+00	1.15E-02					1.15E-02	C
N-NITROSODIMETHYLAMINE	62-75-9	SV	5.61E-02	8.50E-02	2.87E+01	3.38E-02	8.18E+00	1.24E+01	2.09E+03	4.91E+00	3.38E-02	C
N-NITROSODIPHENYLAMINE	86-30-6	SV	5.84E+02	8.85E+02	2.98E+05	3.51E+02	2.04E+04	3.10E+04	5.22E+06	1.23E+04	3.51E+02	C
N-NITROSODIPROPYLAMINE	621-64-7	SV	4.09E-01	6.19E-01	2.09E+02	2.46E-01					2.46E-01	C

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6	SV	1.30E-01	1.97E-01	6.65E+01	7.83E-02					7.83E-02	C
N-NITROSOPYRROLIDINE	930-55-2	SV	1.36E+00	2.06E+00	6.96E+02	8.20E-01					8.20E-01	C
M-NITROTOLUENE	99-08-1	V					2.04E+04		5.22E+06	2.04E+04	2.04E+04	NC
O-NITROTOLUENE	88-72-2	V	1.24E+01		6.36E+03	1.24E+01	1.02E+04		2.61E+06	1.02E+04	1.24E+01	C
P-NITROTOLUENE	99-99-0	V	1.68E+02		8.60E+04	1.68E+02	1.02E+04		2.61E+06	1.02E+04	1.68E+02	C
NUSTAR	85509-19-9	SV					7.15E+02	1.08E+03	1.83E+05	4.30E+02	4.30E+02	NC
ORYZALIN	19044-88-3	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC
OXADIAZON	19666-30-9	SV					5.11E+03	7.74E+03	1.31E+06	3.07E+03	3.07E+03	NC
OXAMYL	23135-22-0	SV					2.56E+04	3.87E+04	6.53E+06	1.54E+04	1.54E+04	NC
OXYFLUORFEN	42874-03-3	SV					3.07E+03	4.65E+03	7.83E+05	1.84E+03	1.84E+03	NC
PARAQUAT DICHLORIDE	1910-42-5	SV					4.60E+03	6.97E+03	1.18E+06	2.76E+03	2.76E+03	NC
PARATHION	56-38-2	SV					6.13E+03	9.29E+03	1.57E+06	3.69E+03	3.69E+03	NC
PENTACHLOROBENZENE	608-93-5	SV					8.18E+02	1.24E+03	2.09E+05	4.91E+02	4.91E+02	NC
PENTACHLORONITROBENZENE	82-68-8	SV	1.10E+01	1.67E+01	5.62E+03	6.62E+00	3.07E+03	4.65E+03	7.83E+05	1.84E+03	6.62E+00	C
PENTACHLOROPHENOL	87-86-5	SV	2.38E+01	1.45E+01	1.22E+04	8.99E+00	3.07E+04	1.86E+04	7.83E+06	1.16E+04	8.99E+00	C
Pentaerythritoltetranitrate	78-11-5	SV	2.60E+01	3.94E+01	1.33E+04	1.57E+01	3.07E+03	4.65E+03	7.83E+05	1.84E+03	1.57E+01	C
PERCHLORATE	7601-90-3	M					7.15E+02		1.83E+05	7.13E+02	7.13E+02	NC
PERMETHRIN	52645-53-1	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC
PHENOL	108-95-2	SV					3.07E+05	4.65E+05	7.83E+07	1.84E+05	1.84E+05	NC
M-PHENYLENEDIAMINE	108-45-2	SV					6.13E+03	9.29E+03	1.57E+06	3.69E+03	3.69E+03	NC
O-PHENYLENEDIAMINE	95-54-5	SV	6.09E+01	9.23E+01	3.11E+04	3.66E+01					3.66E+01	C
P-PHENYLENEDIAMINE	106-50-3	SV					1.94E+05	2.94E+05	4.96E+07	1.17E+05	1.17E+05	NC
PHOSPHINE	7803-51-2	SV					3.07E+02	4.65E+02	2.25E+04	1.83E+02	1.83E+02	NC
PHOSPHORIC ACID	7664-38-2	M							7.57E+05	7.57E+05	7.57E+05	NC
PHOSPHORUS (WHITE)	7723-14-0	M					2.04E+01		5.22E+03	2.04E+01	2.04E+01	NC
PHTHALIC ANHYDRIDE	85-44-9	SV					2.04E+06	3.10E+06	8.96E+06	1.08E+06	1.08E+06	NC
POLYBROMINATED BIPHENYLS	NA	SV	3.22E-01	4.87E-01	1.64E+02	1.93E-01	7.15E+00	1.08E+01	1.83E+03	4.30E+00	1.93E-01	C
POLYCHLORINATED BIPHENYLS	1336-36-3	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
AROCLOR-1016	12674-11-2	SV	4.09E+01	4.42E+01	2.09E+04	2.12E+01	7.15E+01	7.74E+01	1.83E+04	3.71E+01	2.12E+01	C
AROCLOR-1221	11104-28-2	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
AROCLOR-1232	11141-16-5	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
AROCLOR-1242	53469-21-9	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
AROCLOR-1248	12672-29-6	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
AROCLOR-1254	11097-69-1	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01	2.04E+01	2.21E+01	5.22E+03	1.06E+01	7.43E-01	C
AROCLOR-1260	11096-82-5	SV	1.43E+00	1.55E+00	7.31E+02	7.43E-01					7.43E-01	C
POLYCHLORINATED TERPHENYLS	61788-33-8	SV	6.36E-01	9.64E-01	3.25E+02	3.83E-01					3.83E-01	C
POLYNUCLEAR AROMATIC HYDROCARBONS:	NA	SV										
ACENAPHTHENE	83-32-9	V					6.13E+04	7.15E+04	1.57E+07	3.29E+04	3.29E+04	NC
ANTHRACENE	120-12-7	V					3.07E+05	3.57E+05	7.83E+07	1.65E+05	1.65E+05	NC
BENZ[A]ANTHRACENE	56-55-3	SV	3.92E+00	4.57E+00	2.00E+03	2.11E+00					2.11E+00	C
BENZO[B]FLUORANTHENE	205-99-2	SV	3.92E+00	4.57E+00	2.00E+03	2.11E+00					2.11E+00	C
BENZO[K]FLUORANTHENE	207-08-9	SV	3.92E+01	4.57E+01	2.00E+04	2.11E+01					2.11E+01	C
BENZO[A]PYRENE	50-32-8	SV	3.92E-01	4.57E-01	4.72E+02	2.11E-01					2.11E-01	C
CARBAZOLE	86-74-8	SV	1.43E+02	1.67E+02	7.31E+04	7.69E+01					7.69E+01	C
CHRYSENE	218-01-9	SV	3.92E+02	4.57E+02	2.00E+05	2.11E+02					2.11E+02	C
DIBENZ[A,H]ANTHRACENE	53-70-3	SV	3.92E-01	4.57E-01	2.00E+02	2.11E-01					2.11E-01	C
FLUORANTHENE	206-44-0	SV					4.09E+04	4.76E+04	1.04E+07	2.20E+04	2.20E+04	NC
FLUORENE	86-73-7	V					4.09E+04	4.76E+04	1.04E+07	2.20E+04	2.20E+04	NC
INDENO[1,2,3-C,D]PYRENE	193-39-5	SV	3.92E+00	4.57E+00	2.00E+03	2.11E+00					2.11E+00	C
2-METHYLNAPHTHALENE	91-57-6	V					4.09E+03	4.76E+03	1.04E+06	2.20E+03	2.20E+03	NC
NAPHTHALENE	91-20-3	V					2.04E+04	2.38E+04	2.35E+05	1.05E+04	1.05E+04	NC
PYRENE	129-00-0	V					3.07E+04	3.57E+04	7.83E+06	1.65E+04	1.65E+04	NC
PROMETON	1610-18-0	SV					1.53E+04	2.32E+04	3.92E+06	9.21E+03	9.21E+03	NC
PROMETRYN	7287-19-6	SV					4.09E+03	6.19E+03	1.04E+06	2.46E+03	2.46E+03	NC

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
PROPACHLOR	1918-16-7	SV					1.33E+04	2.01E+04	3.39E+06	7.98E+03	7.98E+03	NC
PROPARGITE	2312-35-8	SV					2.04E+04	3.10E+04	5.22E+06	1.23E+04	1.23E+04	NC
PROPYLENE GLYCOL	57-55-6	SV					5.11E+05	7.74E+05	2.25E+05	1.30E+05	1.30E+05	NC
PROPYLENE GLYCOL, MONOETHYL ETHER	52125-53-8	SV					7.15E+05	1.08E+06	1.83E+08	4.30E+05	4.30E+05	NC
PROPYLENE GLYCOL, MONOMETHYL ETHER	107-98-2	SV					7.15E+05	1.08E+06	1.49E+08	4.30E+05	4.30E+05	NC
PURSUIT	81335-77-5	SV					2.56E+05	3.87E+05	6.53E+07	1.54E+05	1.54E+05	NC
PYRIDINE	110-86-1	SV					1.02E+03	1.55E+03	2.61E+05	6.14E+02	6.14E+02	NC
QUINOLINE	91-22-5	SV	9.54E-01	1.45E+00	4.87E+02	5.74E-01					5.74E-01	C
RDX	121-82-4	SV	2.60E+01	3.94E+01	1.33E+04	1.57E+01	3.07E+03	4.65E+03	7.83E+05	1.84E+03	1.57E+01	C
RESMETHRIN	10453-86-8	SV					3.07E+04	4.65E+04	7.83E+06	1.84E+04	1.84E+04	NC
ROTENONE	83-79-4	SV					4.09E+03	6.19E+03	1.04E+06	2.46E+03	2.46E+03	NC
SELENIUM	7782-49-2	M					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
SILVER	7440-22-4	M					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
SIMAZINE	122-34-9	SV	2.38E+01	3.61E+01	1.22E+04	1.43E+01	5.11E+03	7.74E+03	1.31E+06	3.07E+03	1.43E+01	C
SODIUM DIETHYLDITHIOCARBAMATE	148-18-5	SV	1.06E+01	1.61E+01	5.42E+03	6.38E+00	3.07E+04	4.65E+04	7.83E+06	1.84E+04	6.38E+00	C
STRONTIUM, STABLE	7440-24-6	M					6.13E+05		1.57E+08	6.11E+05	6.11E+05	NC
STRYCHNINE	57-24-9	SV					3.07E+02	4.65E+02	7.83E+04	1.84E+02	1.84E+02	NC
STYRENE	100-42-5	V					2.04E+05		7.47E+07	2.04E+05	2.04E+05	NC
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746-01-6	SV	1.91E-05	9.64E-05	9.75E-03	1.59E-05					1.59E-05	C
1,2,4,5-TETRACHLOROBENZENE	95-94-3	SV					3.07E+02	4.65E+02	7.83E+04	1.84E+02	1.84E+02	NC
1,1,1,2-TETRACHLOROETHANE	630-20-6	V	1.10E+02		5.62E+04	1.10E+02	3.07E+04		7.83E+06	3.05E+04	1.10E+02	C
1,1,2,2-TETRACHLOROETHANE	79-34-5	V	1.43E+01		7.31E+03	1.43E+01	6.13E+04		1.57E+07	6.11E+04	1.43E+01	C
TETRACHLOROETHENE	127-18-4	V	5.30E+00		7.31E+04	5.30E+00	1.02E+04		3.66E+07	1.02E+04	5.30E+00	C
2,3,4,6-TETRACHLOROPHENOL	58-90-2	SV					3.07E+04	4.65E+04	7.83E+06	1.84E+04	1.84E+04	NC
P,A,A,A-TETRACHLOROTOLUENE	5216-25-1	SV	1.43E-01	2.17E-01	7.31E+01	8.61E-02					8.61E-02	C
1,1,1,2-TETRAFLUOROETHANE	811-97-2	V							5.98E+09	5.98E+09	5.98E+09	NC
TETRAHYDROFURAN	109-99-9	SV	3.77E+02	5.70E+02	2.15E+05	2.27E+02	2.04E+05	3.10E+05	2.25E+07	1.22E+05	2.27E+02	C
TETRYL	479-45-8	SV					4.09E+03	6.19E+03	1.04E+06	2.46E+03	2.46E+03	NC
THALLIUM	7440-28-0	M					7.15E+01		1.83E+04	7.13E+01	7.13E+01	NC
THALLIUM ACETATE	563-68-8	M					9.20E+01		2.35E+04	9.16E+01	9.16E+01	NC
THALLIUM CARBONATE	6533-73-9	M					8.18E+01		2.09E+04	8.14E+01	8.14E+01	NC
THALLIUM CHLORIDE	7791-12-0	M					8.18E+01		2.09E+04	8.14E+01	8.14E+01	NC
THALLIUM NITRATE	10102-45-1	M					9.20E+01		2.35E+04	9.16E+01	9.16E+01	NC
THALLIUM SULFATE (2:1)	7446-18-6	M					8.18E+01		2.09E+04	8.14E+01	8.14E+01	NC
THIOBENCARB	28249-77-6	SV					1.02E+04	1.55E+04	2.61E+06	6.14E+03	6.14E+03	NC
TIN	7440-31-5	M					6.13E+05		1.57E+08	6.11E+05	6.11E+05	NC
TITANIUM	7440-32-6	M					4.09E+06		2.25E+06	1.45E+06	1.45E+06	NC
TITANIUM DIOXIDE	13463-67-7	M					4.09E+06		2.25E+06	1.45E+06	1.45E+06	NC
TOLUENE	108-88-3	V					2.04E+05		2.98E+07	2.03E+05	2.03E+05	NC
TOLUENE-2,4-DIAMINE	95-80-7	SV	8.94E-01	1.35E+00	4.57E+02	5.38E-01					5.38E-01	C
TOLUENE-2,5-DIAMINE	95-70-5	SV					6.13E+05	9.29E+05	1.57E+08	3.69E+05	3.69E+05	NC
TOLUENE-2,6-DIAMINE	823-40-5	SV					2.04E+05	3.10E+05	5.22E+07	1.23E+05	1.23E+05	NC
P-TOLUIDINE	106-49-0	SV	1.51E+01	2.28E+01	7.70E+03	9.06E+00					9.06E+00	C
TOXAPHENE	8001-35-2	SV	2.60E+00	3.94E+00	1.33E+03	1.57E+00					1.57E+00	C
1,2,4-TRIBROMOBENZENE	615-54-3	SV					5.11E+03	7.74E+03	1.31E+06	3.07E+03	3.07E+03	NC
TRIBUTYLTIN OXIDE	56-35-9	SV					3.07E+02	4.65E+02	7.83E+04	1.84E+02	1.84E+02	NC
2,4,6-TRICHLOROANILINE	634-93-5	SV	8.42E+01	1.28E+02	4.30E+04	5.06E+01					5.06E+01	C
1,2,4-TRICHLOROBENZENE	120-82-1	V					1.02E+04		2.61E+05	9.84E+03	9.84E+03	NC
1,1,1-TRICHLOROETHANE	71-55-6	V					2.86E+05		1.65E+08	2.86E+05	2.86E+05	NC
1,1,2-TRICHLOROETHANE	79-00-5	V	5.02E+01		2.61E+04	5.01E+01	4.09E+03		1.04E+06	4.07E+03	5.01E+01	C
TRICHLOROETHENE	79-01-6	V	7.15E+00		3.66E+03	7.14E+00	3.07E+02		2.61E+06	3.07E+02	7.14E+00	C
TRICHLOROFLUOROMETHANE	75-69-4	V					3.07E+05		5.22E+07	3.05E+05	3.05E+05	NC
2,4,5-TRICHLOROPHENOL	95-95-4	SV					1.02E+05	1.55E+05	2.61E+07	6.14E+04	6.14E+04	NC
2,4,6-TRICHLOROPHENOL	88-06-2	SV	2.60E+02	3.94E+02	1.46E+05	1.57E+02					1.57E+02	C

Appendix C
Risk-based Soil Concentrations for the Industrial Worker
Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

			Carcinogenic Risk-based Concentration (mg/Kg)				Non-carcinogenic Risk-based Concentration (mg/Kg)					
Chemical	**CAS No.**	**Group**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Oral**	**Dermal**	**Inhalation**	**Combined**	**Final**	**Basis**
2,4,5-T	93-76-5	SV					1.02E+04	1.55E+04	2.61E+06	6.14E+03	6.14E+03	NC
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93-72-1	SV					8.18E+03	1.24E+04	2.09E+06	4.91E+03	4.91E+03	NC
1,1,2-TRICHLOROPROPANE	598-77-6	V					5.11E+03		1.31E+06	5.09E+03	5.09E+03	NC
1,2,3-TRICHLOROPROPANE	96-18-4	V	1.43E+00		7.31E+02	1.43E+00	6.13E+03		3.66E+05	6.03E+03	1.43E+00	C
1,2,3-TRICHLOROPROPENE	96-19-5	V					1.02E+04		7.83E+04	9.04E+03	9.04E+03	NC
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	V					3.07E+07		2.25E+09	3.02E+07	3.02E+07	NC
1,2,4-TRIMETHYLBENZENE	95-63-6	V					5.11E+04		4.44E+05	4.58E+04	4.58E+04	NC
1,3,5-TRIMETHYLBENZENE	108-67-8	V					5.11E+04		4.44E+05	4.58E+04	4.58E+04	NC
1,3,5-TRINITROBENZENE	99-35-4	SV					3.07E+04	4.65E+04	7.83E+06	1.84E+04	1.84E+04	NC
2,4,6-TRINITROTOLUENE	118-96-7	SV	9.54E+01	1.45E+02	4.87E+04	5.74E+01	5.11E+02	7.74E+02	1.31E+05	3.07E+02	5.74E+01	C
URANIUM (SOLUBLE SALTS; from IRIS)	7440-61-1	M					3.07E+03		7.83E+05	3.05E+03	3.05E+03	NC
URANIUM (SOLUBLE SALTS; provisional)	7440-61-1	M					2.04E+02		5.22E+04	2.04E+02	2.04E+02	NC
VANADIUM	7440-62-2	M					1.02E+03		2.61E+05	1.02E+03	1.02E+03	NC
VINCLOZOLIN	50471-44-8	SV					2.56E+04	3.87E+04	6.53E+06	1.54E+04	1.54E+04	NC
VINYL ACETATE	108-05-4	V					1.02E+06		1.49E+07	9.56E+05	9.56E+05	NC
VINYL CHLORIDE: adult (see cover memos)	75-01-4	V	3.97E+00		9.75E+04	3.97E+00	3.07E+03		7.31E+06	3.06E+03	3.97E+00	C
WARFARIN	81-81-2	SV					3.07E+02	4.65E+02	7.83E+04	1.84E+02	1.84E+02	NC
O-XYLENE	95-47-6	V					2.04E+05		7.83E+06	1.99E+05	1.99E+05	NC
M,P-XYLENES	1330-20-7	V					2.04E+05		7.83E+06	1.99E+05	1.99E+05	NC
XYLENES	1330-20-7	V					2.04E+05		7.83E+06	1.99E+05	1.99E+05	NC
ZINC	7440-66-6	M					3.07E+05		7.83E+07	3.05E+05	3.05E+05	NC
ZINEB	12122-67-7	SV					5.11E+04	7.74E+04	1.31E+07	3.07E+04	3.07E+04	NC

APPENDIX D

Risk-Based Air Concentrations for the EOD Personnel

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10.B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
ACETALDEHYDE	75-07-0	V	2.15E+00	1.22E+01	2.15E+00	C
ACETOCHLOR	34256-82-1	SV		9.46E+01	9.46E+01	NC
ACETONE	67-64-1	V		4.26E+03	4.26E+03	NC
ACETONITRILE	75-05-8	V		8.04E+01	8.04E+01	NC
ACETOPHENONE	98-86-2	V		4.73E+02	4.73E+02	NC
ACROLEIN	107-02-8	V		2.70E-02	2.70E-02	NC
ACRYLAMIDE	79-06-1	SV	3.68E-03	9.46E-01	3.68E-03	C
ACRYLONITRILE	107-13-1	V	6.90E-02	2.70E+00	6.90E-02	C
ALACHLOR	15972-60-8	SV	2.07E-01	4.73E+01	2.07E-01	C
ALAR	1596-84-5	SV		7.10E+02	7.10E+02	NC
ALDICARB	116-06-3	SV		4.73E+00	4.73E+00	NC
ALDICARB SULFONE	1646-88-4	SV		4.73E+00	4.73E+00	NC
ALDRIN	309-00-2	SV	9.74E-04	1.42E-01	9.74E-04	C
ALLYL CHLORIDE	107-05-1	V		1.35E+00	1.35E+00	NC
ALUMINUM	7429-90-5	M		4.73E+00	4.73E+00	NC
AMINODINITROTOLUENES	NA	SV		9.46E+00	9.46E+00	NC
AMMONIA	7664-41-7	V		1.35E+02	1.35E+02	NC
ANILINE	62-53-3	SV	2.91E+00	1.37E+00	1.37E+00	NC
ANTIMONY	7440-36-0	M		1.89E+00	1.89E+00	NC
ANTIMONY TRIOXIDE	1309-64-4	M		2.70E-01	2.70E-01	NC
ARSENIC	7440-38-2	M	1.10E-03	1.42E+00	1.10E-03	C
ARSINE	7784-42-1	V		6.62E-02	6.62E-02	NC
ASSURE	76578-14-8	SV		4.26E+01	4.26E+01	NC
ATRAZINE	1912-24-9	SV	7.53E-02	1.66E+02	7.53E-02	C
BARIUM	7440-39-3	M		6.62E-01	6.62E-01	NC
BAYGON	114-26-1	SV		1.89E+01	1.89E+01	NC
BAYTHROID	68359-37-5	SV		1.18E+02	1.18E+02	NC
BENTAZON	25057-89-0	SV		1.42E+02	1.42E+02	NC
BENZALDEHYDE	100-52-7	SV		4.73E+02	4.73E+02	NC
BENZENE	71-43-2	V	6.13E-01	4.07E+01	6.13E-01	C
BENZENETHIOL	108-98-5	V		4.73E-02	4.73E-02	NC
BENZIDINE	92-87-5	SV	7.20E-05	1.42E+01	7.20E-05	C
BENZOIC ACID	65-85-0	SV		1.89E+04	1.89E+04	NC
BENZYL ALCOHOL	100-51-6	SV		1.42E+03	1.42E+03	NC
BENZYL CHLORIDE	100-44-7	V	9.74E-02	9.46E+00	9.74E-02	C
BERYLLIUM	7440-41-7	M	1.97E-03	2.70E-02	1.97E-03	C
BIPHENYL	92-52-4	V		2.37E+02	2.37E+02	NC
BIS(2-CHLOROETHYL)ETHER	111-44-4	V	1.51E-02		1.51E-02	C
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	V	4.73E-01	1.89E+02	4.73E-01	C
BIS(CHLOROMETHYL)ETHER	542-88-1	V	7.53E-05		7.53E-05	C
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	SV	1.18E+00	9.46E+01	1.18E+00	C
BORON	7440-42-8	M		2.70E+01	2.70E+01	NC
BROMOBENZENE	108-86-1	V		1.42E+01	1.42E+01	NC
BROMODICHLOROMETHANE	75-27-4	V	2.67E-01	9.46E+01	2.67E-01	C
BROMOETHENE	593-60-2	V	1.51E-01	4.07E+00	1.51E-01	C
BROMOFORM	75-25-2	SV	4.25E+00	9.46E+01	4.25E+00	C
BROMOMETHANE	74-83-9	V		6.62E+00	6.62E+00	NC
BROMOPHOS	2104-96-3	SV		2.37E+01	2.37E+01	NC
1,3-BUTADIENE	106-99-0	V	1.66E-01	2.70E+00	1.66E-01	C
1-BUTANOL	71-36-3	SV		4.73E+02	4.73E+02	NC
BUTYLBENZYLPHTHALATE	85-68-7	SV	8.72E+00	9.46E+02	8.72E+00	C
CADMIUM-FOOD	7440-43-9	M	2.63E-03	2.70E-01	2.63E-03	C
CAPROLACTAM	105-60-2	SV		2.37E+03	2.37E+03	NC
CARBARYL	63-25-2	SV		4.73E+02	4.73E+02	NC
CARBON DISULFIDE	75-15-0	V		9.46E+02	9.46E+02	NC
CARBON TETRACHLORIDE	56-23-5	V	3.12E-01	2.37E+02	3.12E-01	C
CARBOSULFAN	55285-14-8	SV		4.73E+01	4.73E+01	NC
CHLORAL HYDRATE	302-17-0	SV		4.73E+02	4.73E+02	NC
CHLORANIL	118-75-2	SV	4.14E-02		4.14E-02	C

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
CHLORDANE	57-74-9	SV	4.73E-02	9.46E-01	4.73E-02	C
CHLORINE	7782-50-5	V		2.70E-01	2.70E-01	NC
CHLORINE DIOXIDE	10049-04-4	V		2.70E-01	2.70E-01	NC
CHLOROACETIC ACID	79-11-8	SV		9.46E+00	9.46E+00	NC
4-CHLOROANILINE	106-47-8	SV	3.07E-01	1.89E+01	3.07E-01	C
CHLOROBENZENE	108-90-7	V		8.04E+01	8.04E+01	NC
2-CHLORO-1,3-BUTADIENE	126-99-8	V		9.46E+00	9.46E+00	NC
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	V		6.62E+04	6.62E+04	NC
CHLORODIFLUOROMETHANE	75-45-6	V		6.62E+04	6.62E+04	NC
CHLOROETHANE	75-00-3	V	5.71E+00	1.37E+04	5.71E+00	C
CHLOROFORM	67-66-3	V	2.04E-01	6.62E+01	2.04E-01	C
CHLOROMETHANE	74-87-3	V		1.23E+02	1.23E+02	NC
4-CHLORO-2-METHYLANILINE	95-69-2	SV	2.86E-02		2.86E-02	C
BETA-CHLORONAPHTHALENE	91-58-7	V		3.79E+02	3.79E+02	NC
O-CHLORONITROBENZENE	88-73-3	V	1.71E+00	9.46E-02	9.46E-02	NC
P-CHLORONITROBENZENE	100-00-5	V	2.47E+00	8.04E-01	8.04E-01	NC
2-CHLOROPHENOL	95-57-8	V		2.37E+01	2.37E+01	NC
2-CHLOROPROPANE	75-29-6	V		1.37E+02	1.37E+02	NC
O-CHLOROTOLUENE	95-49-8	V		9.46E+01	9.46E+01	NC
CHLORPYRIFOS	2921-88-2	SV		1.42E+01	1.42E+01	NC
CHLORPYRIFOS-METHYL	5598-13-0	SV		4.73E+01	4.73E+01	NC
CHROMIUM	7440-47-3	M		7.10E+03	7.10E+03	NC
CHROMIUM III	16065-83-1	M		7.10E+03	7.10E+03	NC
CHROMIUM VI	18540-29-9	M	4.04E-04	1.42E-01	4.04E-04	C
COBALT	7440-48-4	M	1.69E-03	2.70E-02	1.69E-03	C
COKE OVEN EMISSIONS (COAL TAR)	8007-45-2	SV	7.53E-03		7.53E-03	C
COPPER	7440-50-8	M		1.89E+02	1.89E+02	NC
CUMENE	98-82-8	V		5.20E+02	5.20E+02	NC
CYANIDE (FREE)	57-12-5	M		9.46E+01	9.46E+01	NC
CALCIUM CYANIDE	592-01-8	M		1.89E+02	1.89E+02	NC
COPPER CYANIDE	544-92-3	M		2.37E+01	2.37E+01	NC
CYANOGEN	460-19-5	V		1.89E+02	1.89E+02	NC
HYDROGEN CYANIDE	74-90-8	V		4.07E+00	4.07E+00	NC
POTASSIUM CYANIDE	151-50-8	M		2.37E+02	2.37E+02	NC
POTASSIUM SILVER CYANIDE	506-61-6	M		9.46E+02	9.46E+02	NC
SILVER CYANIDE	506-64-9	M		4.73E+02	4.73E+02	NC
SODIUM CYANIDE	143-33-9	M		1.89E+02	1.89E+02	NC
THIOCYANATE	NA	M		4.73E-01	4.73E-01	NC
ZINC CYANIDE	557-21-1	M		2.37E+02	2.37E+02	NC
CYCLOHEXANE	110-82-7	V		8.04E+03	8.04E+03	NC
CYCLOHEXANONE	108-94-1	SV		2.37E+04	2.37E+04	NC
CYHALOTHRIN/KARATE	68085-85-8	SV		2.37E+01	2.37E+01	NC
CYPERMETHRIN	52315-07-8	SV		4.73E+01	4.73E+01	NC
DACTHAL	1861-32-1	SV		4.73E+01	4.73E+01	NC
DALAPON	75-99-0	SV		1.42E+02	1.42E+02	NC
DDD	72-54-8	SV	6.90E-02	9.46E+00	6.90E-02	C
DDE	72-55-9	SV	4.87E-02		4.87E-02	C
DDT	50-29-3	SV	4.87E-02	2.37E+00	4.87E-02	C
DIAZINON	333-41-5	SV		4.26E+00	4.26E+00	NC
DIBENZOFURAN	132-64-9	V		9.46E+00	9.46E+00	NC
1,4-DIBROMOBENZENE	106-37-6	SV		4.73E+01	4.73E+01	NC
DIBROMOCHLOROMETHANE	124-48-1	V	1.97E-01	9.46E+01	1.97E-01	C
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	V	6.90E+00	2.70E-01	2.70E-01	NC
1,2-DIBROMOETHANE	106-93-4	V	8.28E-03	1.23E+01	8.28E-03	C
DIBUTYLPHTHALATE	84-74-2	SV		4.73E+02	4.73E+02	NC
DICAMBA	1918-00-9	SV		1.42E+02	1.42E+02	NC
1,2-DICHLOROBENZENE	95-50-1	V		1.89E+02	1.89E+02	NC
1,3-DICHLOROBENZENE	541-73-1	V		1.42E+01	1.42E+01	NC
1,4-DICHLOROBENZENE	106-46-7	V	7.53E-01	1.08E+03	7.53E-01	C

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
3,3'-DICHLOROBENZIDINE	91-94-1	SV	3.68E-02		3.68E-02	C
DICHLORODIFLUOROMETHANE	75-71-8	V		2.37E+02	2.37E+02	NC
1,1-DICHLOROETHANE	75-34-3	V		6.62E+02	6.62E+02	NC
1,2-DICHLOROETHANE	107-06-2	V	1.82E-01	3.31E+03	1.82E-01	C
1,1-DICHLOROETHENE	75-35-4	V		2.84E+02	2.84E+02	NC
CIS-1,2-DICHLOROETHENE	156-59-2	V		4.73E+01	4.73E+01	NC
TRANS-1,2-DICHLOROETHENE	156-60-5	V		8.04E+01	8.04E+01	NC
TOTAL 1,2-DICHLOROETHENE	540-59-0	V		4.26E+01	4.26E+01	NC
2,4-DICHLOROPHENOL	120-83-2	SV		1.42E+01	1.42E+01	NC
2,4-D	94-75-7	SV		4.73E+01	4.73E+01	NC
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94-82-6	SV		3.79E+01	3.79E+01	NC
1,2-DICHLOROPROPANE	78-87-5	V	2.44E-01	5.39E+00	2.44E-01	C
1,3-DICHLOROPROPANE	142-28-9	V		9.46E+01	9.46E+01	NC
2,3-DICHLOROPROPANOL	616-23-9	SV		1.42E+01	1.42E+01	NC
1,3-DICHLOROPROPENE	542-75-6	V	1.66E+00	2.70E+01	1.66E+00	C
DICHLORVOS	62-73-7	SV	5.71E-02	6.77E-01	5.71E-02	C
DIELDRIN	60-57-1	SV	1.04E-03	2.37E-01	1.04E-03	C
DIESEL EMISSIONS	NA	SV		6.62E+00	6.62E+00	NC
DIETHYLPHTHALATE	84-66-2	SV		3.79E+03	3.79E+03	NC
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112-34-5	SV		2.70E+01	2.70E+01	NC
DIETHYLENE GLYCOL, MONOETHYL ETHER	111-90-0	SV		4.07E+00	4.07E+00	NC
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	SV	1.38E+01	2.84E+03	1.38E+01	C
DIETHYLSTILBESTROL	56-53-1	SV	3.52E-06		3.52E-06	C
DIFENZOQUAT (AVENGE)	43222-48-6	SV		3.79E+02	3.79E+02	NC
1,1-DIFLUOROETHANE	75-37-6	V		5.20E+04	5.20E+04	NC
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445-75-6	SV		3.79E+02	3.79E+02	NC
3,3'-DIMETHOXYBENZIDINE	119-90-4	SV	1.18E+00		1.18E+00	C
N,N-DIMETHYLANILINE	121-69-7	SV		9.46E+00	9.46E+00	NC
3,3'-DIMETHYLBENZIDINE	119-93-7	SV	7.20E-03		7.20E-03	C
2,4-DIMETHYLPHENOL	105-67-9	SV		9.46E+01	9.46E+01	NC
2,6-DIMETHYLPHENOL	576-26-1	SV		2.84E+00	2.84E+00	NC
3,4-DIMETHYLPHENOL	95-65-8	SV		4.73E+00	4.73E+00	NC
DIMETHYLPHTHALATE	131-11-3	SV		4.73E+04	4.73E+04	NC
1,2-DINITROBENZENE	528-29-0	SV		4.73E-01	4.73E-01	NC
1,3-DINITROBENZENE	99-65-0	SV		4.73E-01	4.73E-01	NC
1,4-DINITROBENZENE	100-25-4	SV		4.73E-01	4.73E-01	NC
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131-89-5	SV		9.46E+00	9.46E+00	NC
4,6-DINITRO-2-METHYLPHENOL	534-52-1	SV		4.73E-01	4.73E-01	NC
2,4-DINITROPHENOL	51-28-5	SV		9.46E+00	9.46E+00	NC
DINITROTOLUENE MIX	NA	SV	2.44E-02		2.44E-02	C
2,4-DINITROTOLUENE	121-14-2	SV		9.46E+00	9.46E+00	NC
2,6-DINITROTOLUENE	606-20-2	SV		4.73E+00	4.73E+00	NC
DINOSEB	88-85-7	SV		4.73E+00	4.73E+00	NC
DIOCTYLPHTHALATE	117-84-0	SV		1.89E+02	1.89E+02	NC
1,4-DIOXANE	123-91-1	SV	1.51E+00		1.51E+00	C
DIPHENYLAMINE	122-39-4	SV		1.18E+02	1.18E+02	NC
1,2-DIPHENYLHYDRAZINE	122-66-7	SV	2.07E-02		2.07E-02	C
DIQUAT	85-00-7	SV		1.04E+01	1.04E+01	NC
DISULFOTON	298-04-4	SV		1.89E-01	1.89E-01	NC
1,4-DITHIANE	505-29-3	SV		4.73E+01	4.73E+01	NC
DIURON	330-54-1	SV		9.46E+00	9.46E+00	NC
ENDOSULFAN	115-29-7	SV		2.84E+01	2.84E+01	NC
ENDRIN	72-20-8	SV		1.42E+00	1.42E+00	NC
EPICHLOROHYDRIN	106-89-8	V	3.94E+00	1.35E+00	1.35E+00	NC
ETHION	563-12-2	SV		2.37E+00	2.37E+00	NC
ETHYL ACETATE	141-78-6	V		4.26E+03	4.26E+03	NC
ETHYLBENZENE	100-41-4	V		1.37E+03	1.37E+03	NC
ETHYLENE DIAMINE	107-15-3	SV		4.26E+02	4.26E+02	NC
ETHYLENE GLYCOL	107-21-1	SV		9.46E+03	9.46E+03	NC

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
ETHYLENE GLYCOL, MONOBUTYL ETHER	111-76-2	SV		1.75E+04	1.75E+04	NC
ETHYLENE OXIDE	75-21-8	V	4.73E-02		4.73E-02	C
ETHYL ETHER	60-29-7	V		9.46E+02	9.46E+02	NC
FENAMIPHOS	22224-92-6	SV		1.18E+00	1.18E+00	NC
FLUOMETURON	2164-17-2	SV		6.15E+01	6.15E+01	NC
FLUORINE	7782-41-4	M		2.84E+02	2.84E+02	NC
FOMESAFEN	72178-02-0	SV	8.72E-02		8.72E-02	C
FONOFOS	944-22-9	SV		9.46E+00	9.46E+00	NC
FORMALDEHYDE	50-00-0	SV	3.68E-01	9.46E+02	3.68E-01	C
FURAN	110-00-9	V		4.73E+00	4.73E+00	NC
FURFURAL	98-01-1	SV		4.73E+01	4.73E+01	NC
GLYPHOSATE	1071-83-6	SV		4.73E+02	4.73E+02	NC
HEPTACHLOR	76-44-8	SV	3.68E-03	2.37E+00	3.68E-03	C
HEPTACHLOR EPOXIDE	1024-57-3	SV	1.82E-03	6.15E-02	1.82E-03	C
HEXABROMOBENZENE	87-82-1	SV		9.46E+00	9.46E+00	NC
HEXACHLOROBENZENE	118-74-1	SV	1.04E-02	3.79E+00	1.04E-02	C
HEXACHLOROBUTADIENE	87-68-3	SV	2.12E-01	9.46E-01	2.12E-01	C
ALPHA-HCH	319-84-6	SV	2.63E-03		2.63E-03	C
BETA-HCH	319-85-7	SV	9.20E-03		9.20E-03	C
GAMMA-HCH (LINDANE)	58-89-9	SV	1.27E-02	1.42E+00	1.27E-02	C
TECHNICAL HCH	608-73-1	SV	9.20E-03		9.20E-03	C
HEXACHLOROCYCLOPENTADIENE	77-47-4	SV		2.70E-01	2.70E-01	NC
HEXACHLORODIBENZODIOXIN MIX	19408-74-3	SV	3.64E-06		3.64E-06	C
HEXACHLOROETHANE	67-72-1	SV	1.18E+00	4.73E+00	1.18E+00	C
HEXACHLOROPHENE	70-30-4	SV		1.42E+00	1.42E+00	NC
1,6-HEXAMETHYLENE DIISOCYANATE	822-06-0	SV		1.37E-02	1.37E-02	NC
HEXANE	110-54-3	V		2.70E+02	2.70E+02	NC
HMX	2691-41-0	SV		2.37E+02	2.37E+02	NC
HYDRAZINE	302-01-2	V	9.74E-04		9.74E-04	C
HYDROGEN CHLORIDE	7647-01-0	V		2.70E+01	2.70E+01	NC
HYDROGEN SULFIDE	7783-06-4	V		2.70E+00	2.70E+00	NC
HYDROQUINONE	123-31-9	SV	2.96E-01	1.89E+02	2.96E-01	C
IRON	7439-89-6	M		1.42E+03	1.42E+03	NC
ISOBUTANOL	78-83-1	V		1.42E+03	1.42E+03	NC
ISOPHORONE	78-59-1	SV	1.74E+01	9.46E+02	1.74E+01	C
TETRAETHYLLEAD	78-00-2	V		4.73E-04	4.73E-04	NC
KEPONE	143-50-0	SV	2.07E-03	9.46E-01	2.07E-03	C
LITHIUM	7439-93-2	M		9.46E+01	9.46E+01	NC
MALATHION	121-75-5	SV		9.46E+01	9.46E+01	NC
MALEIC ANHYDRIDE	108-31-6	SV		4.73E+02	4.73E+02	NC
MANGANESE-FOOD	7439-96-5	M		6.77E-02	6.77E-02	NC
MEPHOSFOLAN	950-10-7	SV		4.26E-01	4.26E-01	NC
MEPIQUAT CHLORIDE	24307-26-4	SV		1.42E+02	1.42E+02	NC
MERCURIC CHLORIDE	7487-94-7	M		1.42E+00	1.42E+00	NC
MERCURY (elemental)	7439-97-6	M		4.07E-01	4.07E-01	NC
METHYLMERCURY	22967-92-6	V		4.73E-01	4.73E-01	NC
METHANOL	67-56-1	V		2.37E+03	2.37E+03	NC
METHIDATHION	950-37-8	SV		4.73E+00	4.73E+00	NC
METHOXYCHLOR	72-43-5	SV		2.37E+01	2.37E+01	NC
METHYL ACETATE	79-20-9	V		4.73E+03	4.73E+03	NC
METHYL ACRYLATE	96-33-3	V		1.42E+02	1.42E+02	NC
2-METHYLANILINE	95-53-4	SV	6.90E-02		6.90E-02	C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94-81-5	SV		4.73E+01	4.73E+01	NC
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94-74-6	SV		2.37E+00	2.37E+00	NC
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93-65-2	SV		4.73E+00	4.73E+00	NC
METHYLCYCLOHEXANE	108-87-2	V		4.07E+03	4.07E+03	NC
METHYLENE BROMIDE	74-95-3	V		4.73E+01	4.73E+01	NC
METHYLENE CHLORIDE	75-09-2	V	1.00E+01	1.42E+03	1.00E+01	C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	SV	1.27E-01	3.31E+00	1.27E-01	C

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10.B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101-61-1	SV	3.60E-01		3.60E-01	C
4,4'-METHYLENEDIPHENYL ISOCYANATE	101-68-8	SV		8.04E-01	8.04E-01	NC
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	V		6.62E+03	6.62E+03	NC
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	V		4.07E+03	4.07E+03	NC
METHYL METHACRYLATE	80-62-6	V		9.46E+02	9.46E+02	NC
METHYL PARATHION	298-00-0	SV		1.18E+00	1.18E+00	NC
2-METHYLPHENOL	95-48-7	SV		2.37E+02	2.37E+02	NC
3-METHYLPHENOL	108-39-4	SV		2.37E+02	2.37E+02	NC
4-METHYLPHENOL	106-44-5	SV		2.37E+01	2.37E+01	NC
METHYLSTYRENE MIX	25013-15-4	V		4.73E+01	4.73E+01	NC
ALPHA-METHYLSTYRENE	98-83-9	V		3.31E+02	3.31E+02	NC
METHYL TERT-BUTYL ETHER	1634-04-4	V	4.14E+00	4.05E+03	4.14E+00	C
METOLACHLOR (DUAL)	51218-45-2	SV		7.10E+02	7.10E+02	NC
MIREX	2385-85-5	SV		9.46E-01	9.46E-01	NC
MOLYBDENUM	7439-98-7	M		2.37E+01	2.37E+01	NC
MONOCHLORAMINE	10599-90-3	SV		4.73E+02	4.73E+02	NC
NALED	300-76-5	SV		9.46E+00	9.46E+00	NC
NICKEL REFINERY DUST	NA	M	1.97E-02		1.97E-02	C
NICKEL	7440-02-0	M		9.46E+01	9.46E+01	NC
NITRATE	14797-55-8	M		7.57E+03	7.57E+03	NC
NITRITE	14797-65-0	M		4.73E+02	4.73E+02	NC
2-NITROANILINE	88-74-4	SV		1.42E-01	1.42E-01	NC
3-NITROANILINE	99-09-2	SV	8.28E-01	1.42E+00	8.28E-01	C
4-NITROANILINE	100-01-6	SV	8.28E-01	4.73E+00	8.28E-01	C
NITROBENZENE	98-95-3	V		2.84E+00	2.84E+00	NC
NITROGLYCERIN	55-63-0	SV	1.18E+00		1.18E+00	C
NITROGUANIDINE	556-88-7	SV		4.73E+02	4.73E+02	NC
2-NITROPROPANE	79-46-9	V	1.76E-03	2.70E+01	1.76E-03	C
N-NITROSO-DI-N-BUTYLAMINE	924-16-3	V	2.96E-03		2.96E-03	C
N-NITROSODIETHANOLAMINE	1116-54-7	SV	5.91E-03		5.91E-03	C
N-NITROSODIETHYLAMINE	55-18-5	SV	1.10E-04		1.10E-04	C
N-NITROSODIMETHYLAMINE	62-75-9	SV	3.25E-04	3.79E-02	3.25E-04	C
N-NITROSODIPHENYLAMINE	86-30-6	SV	3.38E+00	9.46E+01	3.38E+00	C
N-NITROSODIPROPYLAMINE	621-64-7	SV	2.37E-03		2.37E-03	C
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6	SV	7.53E-04		7.53E-04	C
N-NITROSOPYRROLIDINE	930-55-2	SV	7.89E-03		7.89E-03	C
M-NITROTOLUENE	99-08-1	V		9.46E+01	9.46E+01	NC
O-NITROTOLUENE	88-72-2	V	7.20E-02	4.73E+01	7.20E-02	C
P-NITROTOLUENE	99-99-0	V	9.74E-01	4.73E+01	9.74E-01	C
NUSTAR	85509-19-9	SV		3.31E+00	3.31E+00	NC
ORYZALIN	19044-88-3	SV		2.37E+02	2.37E+02	NC
OXADIAZON	19666-30-9	SV		2.37E+01	2.37E+01	NC
OXAMYL	23135-22-0	SV		1.18E+02	1.18E+02	NC
OXYFLUORFEN	42874-03-3	SV		1.42E+01	1.42E+01	NC
PARAQUAT DICHLORIDE	1910-42-5	SV		2.13E+01	2.13E+01	NC
PARATHION	56-38-2	SV		2.84E+01	2.84E+01	NC
PENTACHLOROBENZENE	608-93-5	SV		3.79E+00	3.79E+00	NC
PENTACHLORONITROBENZENE	82-68-8	SV	6.37E-02	1.42E+01	6.37E-02	C
PENTACHLOROPHENOL	87-86-5	SV	1.38E-01	1.42E+02	1.38E-01	C
Pentaerythritoltetranitrate	78-11-5	SV	1.51E-01	1.42E+01	1.51E-01	C
PERCHLORATE	7601-90-3	M		3.31E+00	3.31E+00	NC
PERMETHRIN	52645-53-1	SV		2.37E+02	2.37E+02	NC
PHENOL	108-95-2	SV		1.42E+03	1.42E+03	NC
M-PHENYLENEDIAMINE	108-45-2	SV		2.84E+01	2.84E+01	NC
O-PHENYLENEDIAMINE	95-54-5	SV	3.52E-01		3.52E-01	C
P-PHENYLENEDIAMINE	106-50-3	SV		8.99E+02	8.99E+02	NC
PHOSPHINE	7803-51-2	SV		4.07E-01	4.07E-01	NC
PHOSPHORIC ACID	7664-38-2	M		1.37E+01	1.37E+01	NC
PHOSPHORUS (WHITE)	7723-14-0	M		9.46E-02	9.46E-02	NC

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10.B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
PHTHALIC ANHYDRIDE	85-44-9	SV		1.62E+02	1.62E+02	NC
POLYBROMINATED BIPHENYLS	NA	SV	1.86E-03	3.31E-02	1.86E-03	C
POLYCHLORINATED BIPHENYLS	1336-36-3	SV	8.28E-03		8.28E-03	C
AROCLOR-1016	12674-11-2	SV	2.37E-01	3.31E-01	2.37E-01	C
AROCLOR-1221	11104-28-2	SV	8.28E-03		8.28E-03	C
AROCLOR-1232	11141-16-5	SV	8.28E-03		8.28E-03	C
AROCLOR-1242	53469-21-9	SV	8.28E-03		8.28E-03	C
AROCLOR-1248	12672-29-6	SV	8.28E-03		8.28E-03	C
AROCLOR-1254	11097-69-1	SV	8.28E-03	9.46E-02	8.28E-03	C
AROCLOR-1260	11096-82-5	SV	8.28E-03		8.28E-03	C
POLYCHLORINATED TERPHENYLS	61788-33-8	SV	3.68E-03		3.68E-03	C
POLYNUCLEAR AROMATIC HYDROCARBONS:	NA	SV				
ACENAPHTHENE	83-32-9	V		2.84E+02	2.84E+02	NC
ANTHRACENE	120-12-7	V		1.42E+03	1.42E+03	NC
BENZ[A]ANTHRACENE	56-55-3	SV	2.27E-02		2.27E-02	C
BENZO[B]FLUORANTHENE	205-99-2	SV	2.27E-02		2.27E-02	C
BENZO[K]FLUORANTHENE	207-08-9	SV	2.27E-01		2.27E-01	C
BENZO[A]PYRENE	50-32-8	SV	5.34E-03		5.34E-03	C
CARBAZOLE	86-74-8	SV	8.28E-01		8.28E-01	C
CHRYSENE	218-01-9	SV	2.27E+00		2.27E+00	C
DIBENZ[A,H]ANTHRACENE	53-70-3	SV	2.27E-03		2.27E-03	C
FLUORANTHENE	206-44-0	SV		1.89E+02	1.89E+02	NC
FLUORENE	86-73-7	V		1.89E+02	1.89E+02	NC
INDENO[1,2,3-C,D]PYRENE	193-39-5	SV	2.27E-02		2.27E-02	C
2-METHYLNAPHTHALENE	91-57-6	V		1.89E+01	1.89E+01	NC
NAPHTHALENE	91-20-3	V		4.26E+00	4.26E+00	NC
PYRENE	129-00-0	V		1.42E+02	1.42E+02	NC
PROMETON	1610-18-0	SV		7.10E+01	7.10E+01	NC
PROMETRYN	7287-19-6	SV		1.89E+01	1.89E+01	NC
PROPACHLOR	1918-16-7	SV		6.15E+01	6.15E+01	NC
PROPARGITE	2312-35-8	SV		9.46E+01	9.46E+01	NC
PROPYLENE GLYCOL	57-55-6	SV		4.07E+00	4.07E+00	NC
PROPYLENE GLYCOL, MONOETHYL ETHER	52125-53-8	SV		3.31E+03	3.31E+03	NC
PROPYLENE GLYCOL, MONOMETHYL ETHER	107-98-2	SV		2.70E+03	2.70E+03	NC
PURSUIT	81335-77-5	SV		1.18E+03	1.18E+03	NC
PYRIDINE	110-86-1	SV		4.73E+00	4.73E+00	NC
QUINOLINE	91-22-5	SV	5.52E-03		5.52E-03	C
RDX	121-82-4	SV	1.51E-01	1.42E+01	1.51E-01	C
RESMETHRIN	10453-86-8	SV		1.42E+02	1.42E+02	NC
ROTENONE	83-79-4	SV		1.89E+01	1.89E+01	NC
SELENIUM	7782-49-2	M		2.37E+01	2.37E+01	NC
SILVER	7440-22-4	M		2.37E+01	2.37E+01	NC
SIMAZINE	122-34-9	SV	1.38E-01	2.37E+01	1.38E-01	C
SODIUM DIETHYLDITHIOCARBAMATE	148-18-5	SV	6.13E-02	1.42E+02	6.13E-02	C
STRONTIUM, STABLE	7440-24-6	M		2.84E+03	2.84E+03	NC
STRYCHNINE	57-24-9	SV		1.42E+00	1.42E+00	NC
STYRENE	100-42-5	V		1.35E+03	1.35E+03	NC
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746-01-6	SV	1.10E-07		1.10E-07	C
1,2,4,5-TETRACHLOROBENZENE	95-94-3	SV		1.42E+00	1.42E+00	NC
1,1,1,2-TETRACHLOROETHANE	630-20-6	V	6.37E-01	1.42E+02	6.37E-01	C
1,1,2,2-TETRACHLOROETHANE	79-34-5	V	8.28E-02	2.84E+02	8.28E-02	C
TETRACHLOROETHENE	127-18-4	V	8.28E-01	6.62E+02	8.28E-01	C
2,3,4,6-TETRACHLOROPHENOL	58-90-2	SV		1.42E+02	1.42E+02	NC
P,A,A,A-TETRACHLOROTOLUENE	5216-25-1	SV	8.28E-04		8.28E-04	C
1,1,1,2-TETRAFLUOROETHANE	811-97-2	V		1.08E+05	1.08E+05	NC
TETRAHYDROFURAN	109-99-9	SV	2.44E+00	4.07E+02	2.44E+00	C
TETRYL	479-45-8	SV		1.89E+01	1.89E+01	NC
THALLIUM	7440-28-0	M		3.31E-01	3.31E-01	NC
THALLIUM ACETATE	563-68-8	M		4.26E-01	4.26E-01	NC

Appendix D

Risk-based Air Concentrations for the EOD Personnel

Attachment 10.B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-Based Concentration (mg/M^3) Inhalation	Final Risk-Based Concentration (mg/M^3) Final	Final Risk-Based Concentration (mg/M^3) Basis
THALLIUM CARBONATE	6533-73-9	M		3.79E-01	3.79E-01	NC
THALLIUM CHLORIDE	7791-12-0	M		3.79E-01	3.79E-01	NC
THALLIUM NITRATE	10102-45-1	M		4.26E-01	4.26E-01	NC
THALLIUM SULFATE (2:1)	7446-18-6	M		3.79E-01	3.79E-01	NC
THIOBENCARB	28249-77-6	SV		4.73E+01	4.73E+01	NC
TIN	7440-31-5	M		2.84E+03	2.84E+03	NC
TITANIUM	7440-32-6	M		4.07E+01	4.07E+01	NC
TITANIUM DIOXIDE	13463-67-7	M		4.07E+01	4.07E+01	NC
TOLUENE	108-88-3	V		5.39E+02	5.39E+02	NC
TOLUENE-2,4-DIAMINE	95-80-7	SV	5.18E-03		5.18E-03	C
TOLUENE-2,5-DIAMINE	95-70-5	SV		2.84E+03	2.84E+03	NC
TOLUENE-2,6-DIAMINE	823-40-5	SV		9.46E+02	9.46E+02	NC
P-TOLUIDINE	106-49-0	SV	8.72E-02		8.72E-02	C
TOXAPHENE	8001-35-2	SV	1.51E-02		1.51E-02	C
1,2,4-TRIBROMOBENZENE	615-54-3	SV		2.37E+01	2.37E+01	NC
TRIBUTYLTIN OXIDE	56-35-9	SV		1.42E+00	1.42E+00	NC
2,4,6-TRICHLOROANILINE	634-93-5	SV	4.87E-01		4.87E-01	C
1,2,4-TRICHLOROBENZENE	120-82-1	V		4.73E+00	4.73E+00	NC
1,1,1-TRICHLOROETHANE	71-55-6	V		2.98E+03	2.98E+03	NC
1,1,2-TRICHLOROETHANE	79-00-5	V	2.96E-01	1.89E+01	2.96E-01	C
TRICHLOROETHENE	79-01-6	V	4.14E-02	4.73E+01	4.14E-02	C
TRICHLOROFLUOROMETHANE	75-69-4	V		9.46E+02	9.46E+02	NC
2,4,5-TRICHLOROPHENOL	95-95-4	SV		4.73E+02	4.73E+02	NC
2,4,6-TRICHLOROPHENOL	88-06-2	SV	1.66E+00		1.66E+00	C
2,4,5-T	93-76-5	SV		4.73E+01	4.73E+01	NC
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93-72-1	SV		3.79E+01	3.79E+01	NC
1,1,2-TRICHLOROPROPANE	598-77-6	V		2.37E+01	2.37E+01	NC
1,2,3-TRICHLOROPROPANE	96-18-4	V	8.28E-03	6.62E+00	8.28E-03	C
1,2,3-TRICHLOROPROPENE	96-19-5	V		1.42E+00	1.42E+00	NC
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	V		4.07E+04	4.07E+04	NC
1,2,4-TRIMETHYLBENZENE	95-63-6	V		8.04E+00	8.04E+00	NC
1,3,5-TRIMETHYLBENZENE	108-67-8	V		8.04E+00	8.04E+00	NC
1,3,5-TRINITROBENZENE	99-35-4	SV		1.42E+02	1.42E+02	NC
2,4,6-TRINITROTOLUENE	118-96-7	SV	5.52E-01	2.37E+00	5.52E-01	C
URANIUM (SOLUBLE SALTS; from IRIS)	7440-61-1	M		1.42E+01	1.42E+01	NC
URANIUM (SOLUBLE SALTS; provisional)	7440-61-1	M		9.46E-01	9.46E-01	NC
VANADIUM	7440-62-2	M		4.73E+00	4.73E+00	NC
VINCLOZOLIN	50471-44-8	SV		1.18E+02	1.18E+02	NC
VINYL ACETATE	108-05-4	V		2.70E+02	2.70E+02	NC
VINYL CHLORIDE: adult (see cover memos)	75-01-4	V	1.10E+00	1.32E+02	1.10E+00	C
WARFARIN	81-81-2	SV		1.42E+00	1.42E+00	NC
O-XYLENE	95-47-6	V		1.42E+02	1.42E+02	NC
M,P-XYLENES	1330-20-7	V		1.42E+02	1.42E+02	NC
XYLENES	1330-20-7	V		1.42E+02	1.42E+02	NC
ZINC	7440-66-6	M		1.42E+03	1.42E+03	NC
ZINEB	12122-67-7	SV		2.37E+02	2.37E+02	NC

APPENDIX E

Risk-Based Air Concentrations for the Boater

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
ACETALDEHYDE	75-07-0	V	1.16E-01	6.58E-01	1.16E-01	C
ACETOCHLOR	34256-82-1	SV		5.12E+00	5.12E+00	NC
ACETONE	67-64-1	V		2.30E+02	2.30E+02	NC
ACETONITRILE	75-05-8	V		4.35E+00	4.35E+00	NC
ACETOPHENONE	98-86-2	V		2.56E+01	2.56E+01	NC
ACROLEIN	107-02-8	V		1.46E-03	1.46E-03	NC
ACRYLAMIDE	79-06-1	SV	1.99E-04	5.12E-02	1.99E-04	C
ACRYLONITRILE	107-13-1	V	3.73E-03	1.46E-01	3.73E-03	C
ALACHLOR	15972-60-8	SV	1.12E-02	2.56E+00	1.12E-02	C
ALAR	1596-84-5	SV		3.84E+01	3.84E+01	NC
ALDICARB	116-06-3	SV		2.56E-01	2.56E-01	NC
ALDICARB SULFONE	1646-88-4	SV		2.56E-01	2.56E-01	NC
ALDRIN	309-00-2	SV	5.27E-05	7.68E-03	5.27E-05	C
ALLYL CHLORIDE	107-05-1	V		7.31E-02	7.31E-02	NC
ALUMINUM	7429-90-5	M		2.56E-01	2.56E-01	NC
AMINODINITROTOLUENES	NA	SV		5.12E-01	5.12E-01	NC
AMMONIA	7664-41-7	V		7.32E+00	7.32E+00	NC
ANILINE	62-53-3	SV	1.57E-01	7.42E-02	7.42E-02	NC
ANTIMONY	7440-36-0	M		1.02E-01	1.02E-01	NC
ANTIMONY TRIOXIDE	1309-64-4	M		1.46E-02	1.46E-02	NC
ARSENIC	7440-38-2	M	5.93E-05	7.68E-02	5.93E-05	C
ARSINE	7784-42-1	V		3.58E-03	3.58E-03	NC
ASSURE	76578-14-8	SV		2.30E+00	2.30E+00	NC
ATRAZINE	1912-24-9	SV	4.07E-03	8.96E+00	4.07E-03	C
BARIUM	7440-39-3	M		3.58E-02	3.58E-02	NC
BAYGON	114-26-1	SV		1.02E+00	1.02E+00	NC
BAYTHROID	68359-37-5	SV		6.40E+00	6.40E+00	NC
BENTAZON	25057-89-0	SV		7.68E+00	7.68E+00	NC
BENZALDEHYDE	100-52-7	SV		2.56E+01	2.56E+01	NC
BENZENE	71-43-2	V	3.32E-02	2.20E+00	3.32E-02	C
BENZENETHIOL	108-98-5	V		2.56E-03	2.56E-03	NC
BENZIDINE	92-87-5	SV	3.89E-06	7.68E-01	3.89E-06	C
BENZOIC ACID	65-85-0	SV		1.02E+03	1.02E+03	NC
BENZYL ALCOHOL	100-51-6	SV		7.68E+01	7.68E+01	NC
BENZYL CHLORIDE	100-44-7	V	5.27E-03	5.12E-01	5.27E-03	C
BERYLLIUM	7440-41-7	M	1.07E-04	1.46E-03	1.07E-04	C
BIPHENYL	92-52-4	V		1.28E+01	1.28E+01	NC
BIS(2-CHLOROETHYL)ETHER	111-44-4	V	8.14E-04		8.14E-04	C
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	V	2.56E-02	1.02E+01	2.56E-02	C
BIS(CHLOROMETHYL)ETHER	542-88-1	V	4.07E-06		4.07E-06	C
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	SV	6.40E-02	5.12E+00	6.40E-02	C
BORON	7440-42-8	M		1.46E+00	1.46E+00	NC
BROMOBENZENE	108-86-1	V		7.68E-01	7.68E-01	NC
BROMODICHLOROMETHANE	75-27-4	V	1.44E-02	5.12E+00	1.44E-02	C
BROMOETHENE	593-60-2	V	8.14E-03	2.20E-01	8.14E-03	C
BROMOFORM	75-25-2	SV	2.30E-01	5.12E+00	2.30E-01	C
BROMOMETHANE	74-83-9	V		3.58E-01	3.58E-01	NC
BROMOPHOS	2104-96-3	SV		1.28E+00	1.28E+00	NC
1,3-BUTADIENE	106-99-0	V	8.96E-03	1.46E-01	8.96E-03	C
1-BUTANOL	71-36-3	SV		2.56E+01	2.56E+01	NC
BUTYLBENZYLPHTHALATE	85-68-7	SV	4.71E-01	5.12E+01	4.71E-01	C
CADMIUM-FOOD	7440-43-9	M	1.42E-04	1.46E-02	1.42E-04	C
CAPROLACTAM	105-60-2	SV		1.28E+02	1.28E+02	NC
CARBARYL	63-25-2	SV		2.56E+01	2.56E+01	NC
CARBON DISULFIDE	75-15-0	V		5.12E+01	5.12E+01	NC
CARBON TETRACHLORIDE	56-23-5	V	1.69E-02	1.28E+01	1.69E-02	C
CARBOSULFAN	55285-14-8	SV		2.56E+00	2.56E+00	NC
CHLORAL HYDRATE	302-17-0	SV		2.56E+01	2.56E+01	NC
CHLORANIL	118-75-2	SV	2.24E-03		2.24E-03	C
CHLORDANE	57-74-9	SV	2.56E-03	5.12E-02	2.56E-03	C

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
CHLORINE	7782-50-5	V		1.46E-02	1.46E-02	NC
CHLORINE DIOXIDE	10049-04-4	V		1.46E-02	1.46E-02	NC
CHLOROACETIC ACID	79-11-8	SV		5.12E-01	5.12E-01	NC
4-CHLOROANILINE	106-47-8	SV	1.66E-02	1.02E+00	1.66E-02	C
CHLOROBENZENE	108-90-7	V		4.35E+00	4.35E+00	NC
2-CHLORO-1,3-BUTADIENE	126-99-8	V		5.12E-01	5.12E-01	NC
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	V		3.58E+03	3.58E+03	NC
CHLORODIFLUOROMETHANE	75-45-6	V		3.58E+03	3.58E+03	NC
CHLOROETHANE	75-00-3	V	3.09E-01	7.42E+02	3.09E-01	C
CHLOROFORM	67-66-3	V	1.11E-02	3.58E+00	1.11E-02	C
CHLOROMETHANE	74-87-3	V		6.65E+00	6.65E+00	NC
4-CHLORO-2-METHYLANILINE	95-69-2	SV	1.54E-03		1.54E-03	C
BETA-CHLORONAPHTHALENE	91-58-7	V		2.05E+01	2.05E+01	NC
O-CHLORONITROBENZENE	88-73-3	V	9.23E-02	5.12E-03	5.12E-03	NC
P-CHLORONITROBENZENE	100-00-5	V	1.34E-01	4.35E-02	4.35E-02	NC
2-CHLOROPHENOL	95-57-8	V		1.28E+00	1.28E+00	NC
2-CHLOROPROPANE	75-29-6	V		7.42E+00	7.42E+00	NC
O-CHLOROTOLUENE	95-49-8	V		5.12E+00	5.12E+00	NC
CHLORPYRIFOS	2921-88-2	SV		7.68E-01	7.68E-01	NC
CHLORPYRIFOS-METHYL	5598-13-0	SV		2.56E+00	2.56E+00	NC
CHROMIUM	7440-47-3	M		3.84E+02	3.84E+02	NC
CHROMIUM III	16065-83-1	M		3.84E+02	3.84E+02	NC
CHROMIUM VI	18540-29-9	M	2.18E-05	7.68E-03	2.18E-05	C
COBALT	7440-48-4	M	9.14E-05	1.46E-03	9.14E-05	C
COKE OVEN EMISSIONS (COAL TAR)	8007-45-2	SV	4.07E-04		4.07E-04	C
COPPER	7440-50-8	M		1.02E+01	1.02E+01	NC
CUMENE	98-82-8	V		2.82E+01	2.82E+01	NC
CYANIDE (FREE)	57-12-5	M		5.12E+00	5.12E+00	NC
CALCIUM CYANIDE	592-01-8	M		1.02E+01	1.02E+01	NC
COPPER CYANIDE	544-92-3	M		1.28E+00	1.28E+00	NC
CYANOGEN	460-19-5	V		1.02E+01	1.02E+01	NC
HYDROGEN CYANIDE	74-90-8	V		2.20E-01	2.20E-01	NC
POTASSIUM CYANIDE	151-50-8	M		1.28E+01	1.28E+01	NC
POTASSIUM SILVER CYANIDE	506-61-6	M		5.12E+01	5.12E+01	NC
SILVER CYANIDE	506-64-9	M		2.56E+01	2.56E+01	NC
SODIUM CYANIDE	143-33-9	M		1.02E+01	1.02E+01	NC
THIOCYANATE	NA	M		2.56E-02	2.56E-02	NC
ZINC CYANIDE	557-21-1	M		1.28E+01	1.28E+01	NC
CYCLOHEXANE	110-82-7	V		4.35E+02	4.35E+02	NC
CYCLOHEXANONE	108-94-1	SV		1.28E+03	1.28E+03	NC
CYHALOTHRIN/KARATE	68085-85-8	SV		1.28E+00	1.28E+00	NC
CYPERMETHRIN	52315-07-8	SV		2.56E+00	2.56E+00	NC
DACTHAL	1861-32-1	SV		2.56E+00	2.56E+00	NC
DALAPON	75-99-0	SV		7.68E+00	7.68E+00	NC
DDD	72-54-8	SV	3.73E-03	5.12E-01	3.73E-03	C
DDE	72-55-9	SV	2.63E-03		2.63E-03	C
DDT	50-29-3	SV	2.63E-03	1.28E-01	2.63E-03	C
DIAZINON	333-41-5	SV		2.30E-01	2.30E-01	NC
DIBENZOFURAN	132-64-9	V		5.12E-01	5.12E-01	NC
1,4-DIBROMOBENZENE	106-37-6	SV		2.56E+00	2.56E+00	NC
DIBROMOCHLOROMETHANE	124-48-1	V	1.07E-02	5.12E+00	1.07E-02	C
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	V	3.73E-01	1.46E-02	1.46E-02	NC
1,2-DIBROMOETHANE	106-93-4	V	4.48E-04	6.65E-01	4.48E-04	C
DIBUTYLPHTHALATE	84-74-2	SV		2.56E+01	2.56E+01	NC
DICAMBA	1918-00-9	SV		7.68E+00	7.68E+00	NC
1,2-DICHLOROBENZENE	95-50-1	V		1.02E+01	1.02E+01	NC
1,3-DICHLOROBENZENE	541-73-1	V		7.68E-01	7.68E-01	NC
1,4-DICHLOROBENZENE	106-46-7	V	4.07E-02	5.86E+01	4.07E-02	C
3,3'-DICHLOROBENZIDINE	91-94-1	SV	1.99E-03		1.99E-03	C
DICHLORODIFLUOROMETHANE	75-71-8	V		1.28E+01	1.28E+01	NC

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
1,1-DICHLOROETHANE	75-34-3	V		3.58E+01	3.58E+01	NC
1,2-DICHLOROETHANE	107-06-2	V	9.84E-03	1.79E+02	9.84E-03	C
1,1-DICHLOROETHENE	75-35-4	V		1.54E+01	1.54E+01	NC
CIS-1,2-DICHLOROETHENE	156-59-2	V		2.56E+00	2.56E+00	NC
TRANS-1,2-DICHLOROETHENE	156-60-5	V		4.35E+00	4.35E+00	NC
TOTAL 1,2-DICHLOROETHENE	540-59-0	V		2.30E+00	2.30E+00	NC
2,4-DICHLOROPHENOL	120-83-2	SV		7.68E-01	7.68E-01	NC
2,4-D	94-75-7	SV		2.56E+00	2.56E+00	NC
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94-82-6	SV		2.05E+00	2.05E+00	NC
1,2-DICHLOROPROPANE	78-87-5	V	1.32E-02	2.92E-01	1.32E-02	C
1,3-DICHLOROPROPANE	142-28-9	V		5.12E+00	5.12E+00	NC
2,3-DICHLOROPROPANOL	616-23-9	SV		7.68E-01	7.68E-01	NC
1,3-DICHLOROPROPENE	542-75-6	V	8.96E-02	1.46E+00	8.96E-02	C
DICHLORVOS	62-73-7	SV	3.09E-03	3.66E-02	3.09E-03	C
DIELDRIN	60-57-1	SV	5.60E-05	1.28E-02	5.60E-05	C
DIESEL EMISSIONS	NA	SV		3.58E-01	3.58E-01	NC
DIETHYLPHTHALATE	84-66-2	SV		2.05E+02	2.05E+02	NC
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112-34-5	SV		1.46E+00	1.46E+00	NC
DIETHYLENE GLYCOL, MONOETHYL ETHER	111-90-0	SV		2.20E-01	2.20E-01	NC
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	SV	7.46E-01	1.54E+02	7.46E-01	C
DIETHYLSTILBESTROL	56-53-1	SV	1.91E-07		1.91E-07	C
DIFENZOQUAT (AVENGE)	43222-48-6	SV		2.05E+01	2.05E+01	NC
1,1-DIFLUOROETHANE	75-37-6	V		2.82E+03	2.82E+03	NC
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445-75-6	SV		2.05E+01	2.05E+01	NC
3,3'-DIMETHOXYBENZIDINE	119-90-4	SV	6.40E-02		6.40E-02	C
N,N-DIMETHYLANILINE	121-69-7	SV		5.12E-01	5.12E-01	NC
3,3'-DIMETHYLBENZIDINE	119-93-7	SV	3.89E-04		3.89E-04	C
2,4-DIMETHYLPHENOL	105-67-9	SV		5.12E+00	5.12E+00	NC
2,6-DIMETHYLPHENOL	576-26-1	SV		1.54E-01	1.54E-01	NC
3,4-DIMETHYLPHENOL	95-65-8	SV		2.56E-01	2.56E-01	NC
DIMETHYLPHTHALATE	131-11-3	SV		2.56E+03	2.56E+03	NC
1,2-DINITROBENZENE	528-29-0	SV		2.56E-02	2.56E-02	NC
1,3-DINITROBENZENE	99-65-0	SV		2.56E-02	2.56E-02	NC
1,4-DINITROBENZENE	100-25-4	SV		2.56E-02	2.56E-02	NC
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131-89-5	SV		5.12E-01	5.12E-01	NC
4,6-DINITRO-2-METHYLPHENOL	534-52-1	SV		2.56E-02	2.56E-02	NC
2,4-DINITROPHENOL	51-28-5	SV		5.12E-01	5.12E-01	NC
DINITROTOLUENE MIX	NA	SV	1.32E-03		1.32E-03	C
2,4-DINITROTOLUENE	121-14-2	SV		5.12E-01	5.12E-01	NC
2,6-DINITROTOLUENE	606-20-2	SV		2.56E-01	2.56E-01	NC
DINOSEB	88-85-7	SV		2.56E-01	2.56E-01	NC
DIOCTYLPHTHALATE	117-84-0	SV		1.02E+01	1.02E+01	NC
1,4-DIOXANE	123-91-1	SV	8.14E-02		8.14E-02	C
DIPHENYLAMINE	122-39-4	SV		6.40E+00	6.40E+00	NC
1,2-DIPHENYLHYDRAZINE	122-66-7	SV	1.12E-03		1.12E-03	C
DIQUAT	85-00-7	SV		5.63E-01	5.63E-01	NC
DISULFOTON	298-04-4	SV		1.02E-02	1.02E-02	NC
1,4-DITHIANE	505-29-3	SV		2.56E+00	2.56E+00	NC
DIURON	330-54-1	SV		5.12E-01	5.12E-01	NC
ENDOSULFAN	115-29-7	SV		1.54E+00	1.54E+00	NC
ENDRIN	72-20-8	SV		7.68E-02	7.68E-02	NC
EPICHLOROHYDRIN	106-89-8	V	2.13E-01	7.32E-02	7.32E-02	NC
ETHION	563-12-2	SV		1.28E-01	1.28E-01	NC
ETHYL ACETATE	141-78-6	V		2.30E+02	2.30E+02	NC
ETHYLBENZENE	100-41-4	V		7.42E+01	7.42E+01	NC
ETHYLENE DIAMINE	107-15-3	SV		2.30E+01	2.30E+01	NC
ETHYLENE GLYCOL	107-21-1	SV		5.12E+02	5.12E+02	NC
ETHYLENE GLYCOL, MONOBUTYL ETHER	111-76-2	SV		9.47E+02	9.47E+02	NC
ETHYLENE OXIDE	75-21-8	V	2.56E-03		2.56E-03	C
ETHYL ETHER	60-29-7	V		5.12E+01	5.12E+01	NC

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
FENAMIPHOS	22224-92-6	SV		6.40E-02	6.40E-02	NC
FLUOMETURON	2164-17-2	SV		3.33E+00	3.33E+00	NC
FLUORINE	7782-41-4	M		1.54E+01	1.54E+01	NC
FOMESAFEN	72178-02-0	SV	4.71E-03		4.71E-03	C
FONOFOS	944-22-9	SV		5.12E-01	5.12E-01	NC
FORMALDEHYDE	50-00-0	SV	1.99E-02	5.12E+01	1.99E-02	C
FURAN	110-00-9	V		2.56E-01	2.56E-01	NC
FURFURAL	98-01-1	SV		2.56E+00	2.56E+00	NC
GLYPHOSATE	1071-83-6	SV		2.56E+01	2.56E+01	NC
HEPTACHLOR	76-44-8	SV	1.99E-04	1.28E-01	1.99E-04	C
HEPTACHLOR EPOXIDE	1024-57-3	SV	9.84E-05	3.33E-03	9.84E-05	C
HEXABROMOBENZENE	87-82-1	SV		5.12E-01	5.12E-01	NC
HEXACHLOROBENZENE	118-74-1	SV	5.60E-04	2.05E-01	5.60E-04	C
HEXACHLOROBUTADIENE	87-68-3	SV	1.15E-02	5.12E-02	1.15E-02	C
ALPHA-HCH	319-84-6	SV	1.42E-04		1.42E-04	C
BETA-HCH	319-85-7	SV	4.98E-04		4.98E-04	C
GAMMA-HCH (LINDANE)	58-89-9	SV	6.89E-04	7.68E-02	6.89E-04	C
TECHNICAL HCH	608-73-1	SV	4.98E-04		4.98E-04	C
HEXACHLOROCYCLOPENTADIENE	77-47-4	SV		1.46E-02	1.46E-02	NC
HEXACHLORODIBENZODIOXIN MIX	19408-74-3	SV	1.97E-07		1.97E-07	C
HEXACHLOROETHANE	67-72-1	SV	6.40E-02	2.56E-01	6.40E-02	C
HEXACHLOROPHENE	70-30-4	SV		7.68E-02	7.68E-02	NC
1,6-HEXAMETHYLENE DIISOCYANATE	822-06-0	SV		7.42E-04	7.42E-04	NC
HEXANE	110-54-3	V		1.46E+01	1.46E+01	NC
HMX	2691-41-0	SV		1.28E+01	1.28E+01	NC
HYDRAZINE	302-01-2	V	5.27E-05		5.27E-05	C
HYDROGEN CHLORIDE	7647-01-0	V		1.46E+00	1.46E+00	NC
HYDROGEN SULFIDE	7783-06-4	V		1.46E-01	1.46E-01	NC
HYDROQUINONE	123-31-9	SV	1.60E-02	1.02E+01	1.60E-02	C
IRON	7439-89-6	M		7.68E+01	7.68E+01	NC
ISOBUTANOL	78-83-1	V		7.68E+01	7.68E+01	NC
ISOPHORONE	78-59-1	SV	9.43E-01	5.12E+01	9.43E-01	C
TETRAETHYLLEAD	78-00-2	V		2.56E-05	2.56E-05	NC
KEPONE	143-50-0	SV	1.12E-04	5.12E-02	1.12E-04	C
LITHIUM	7439-93-2	M		5.12E+00	5.12E+00	NC
MALATHION	121-75-5	SV		5.12E+00	5.12E+00	NC
MALEIC ANHYDRIDE	108-31-6	SV		2.56E+01	2.56E+01	NC
MANGANESE-FOOD	7439-96-5	M		3.66E-03	3.66E-03	NC
MEPHOSFOLAN	950-10-7	SV		2.30E-02	2.30E-02	NC
MEPIQUAT CHLORIDE	24307-26-4	SV		7.68E+00	7.68E+00	NC
MERCURIC CHLORIDE	7487-94-7	M		7.68E-02	7.68E-02	NC
MERCURY (elemental)	7439-97-6	M		2.20E-02	2.20E-02	NC
METHYLMERCURY	22967-92-6	V		2.56E-02	2.56E-02	NC
METHANOL	67-56-1	V		1.28E+02	1.28E+02	NC
METHIDATHION	950-37-8	SV		2.56E-01	2.56E-01	NC
METHOXYCHLOR	72-43-5	SV		1.28E+00	1.28E+00	NC
METHYL ACETATE	79-20-9	V		2.56E+02	2.56E+02	NC
METHYL ACRYLATE	96-33-3	V		7.68E+00	7.68E+00	NC
2-METHYLANILINE	95-53-4	SV	3.73E-03		3.73E-03	C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94-81-5	SV		2.56E+00	2.56E+00	NC
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94-74-6	SV		1.28E-01	1.28E-01	NC
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93-65-2	SV		2.56E-01	2.56E-01	NC
METHYLCYCLOHEXANE	108-87-2	V		2.20E+02	2.20E+02	NC
METHYLENE BROMIDE	74-95-3	V		2.56E+00	2.56E+00	NC
METHYLENE CHLORIDE	75-09-2	V	5.43E-01	7.68E+01	5.43E-01	C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	SV	6.89E-03	1.79E-01	6.89E-03	C
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101-61-1	SV	1.95E-02		1.95E-02	C
4,4'-METHYLENEDIPHENYL ISOCYANATE	101-68-8	SV		4.35E-02	4.35E-02	NC
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	V		3.58E+02	3.58E+02	NC
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	V		2.20E+02	2.20E+02	NC

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
METHYL METHACRYLATE	80-62-6	V		5.12E+01	5.12E+01	NC
METHYL PARATHION	298-00-0	SV		6.40E-02	6.40E-02	NC
2-METHYLPHENOL	95-48-7	SV		1.28E+01	1.28E+01	NC
3-METHYLPHENOL	108-39-4	SV		1.28E+01	1.28E+01	NC
4-METHYLPHENOL	106-44-5	SV		1.28E+00	1.28E+00	NC
METHYLSTYRENE MIX	25013-15-4	V		2.56E+00	2.56E+00	NC
ALPHA-METHYLSTYRENE	98-83-9	V		1.79E+01	1.79E+01	NC
METHYL TERT-BUTYL ETHER	1634-04-4	V	2.24E-01	2.19E+02	2.24E-01	C
METOLACHLOR (DUAL)	51218-45-2	SV		3.84E+01	3.84E+01	NC
MIREX	2385-85-5	SV		5.12E-02	5.12E-02	NC
MOLYBDENUM	7439-98-7	M		1.28E+00	1.28E+00	NC
MONOCHLORAMINE	10599-90-3	SV		2.56E+01	2.56E+01	NC
NALED	300-76-5	SV		5.12E-01	5.12E-01	NC
NICKEL REFINERY DUST	NA	M	1.07E-03		1.07E-03	C
NICKEL	7440-02-0	M		5.12E+00	5.12E+00	NC
NITRATE	14797-55-8	M		4.09E+02	4.09E+02	NC
NITRITE	14797-65-0	M		2.56E+01	2.56E+01	NC
2-NITROANILINE	88-74-4	SV		7.68E-03	7.68E-03	NC
3-NITROANILINE	99-09-2	SV	4.48E-02	7.68E-02	4.48E-02	C
4-NITROANILINE	100-01-6	SV	4.48E-02	2.56E-01	4.48E-02	C
NITROBENZENE	98-95-3	V		1.54E-01	1.54E-01	NC
NITROGLYCERIN	55-63-0	SV	6.40E-02		6.40E-02	C
NITROGUANIDINE	556-88-7	SV		2.56E+01	2.56E+01	NC
2-NITROPROPANE	79-46-9	V	9.53E-05	1.46E+00	9.53E-05	C
N-NITROSO-DI-N-BUTYLAMINE	924-16-3	V	1.60E-04		1.60E-04	C
N-NITROSODIETHANOLAMINE	1116-54-7	SV	3.20E-04		3.20E-04	C
N-NITROSODIETHYLAMINE	55-18-5	SV	5.97E-06		5.97E-06	C
N-NITROSODIMETHYLAMINE	62-75-9	SV	1.76E-05	2.05E-03	1.76E-05	C
N-NITROSODIPHENYLAMINE	86-30-6	SV	1.83E-01	5.12E+00	1.83E-01	C
N-NITROSODIPROPYLAMINE	621-64-7	SV	1.28E-04		1.28E-04	C
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6	SV	4.07E-05		4.07E-05	C
N-NITROSOPYRROLIDINE	930-55-2	SV	4.27E-04		4.27E-04	C
M-NITROTOLUENE	99-08-1	V		5.12E+00	5.12E+00	NC
O-NITROTOLUENE	88-72-2	V	3.89E-03	2.56E+00	3.89E-03	C
P-NITROTOLUENE	99-99-0	V	5.27E-02	2.56E+00	5.27E-02	C
NUSTAR	85509-19-9	SV		1.79E-01	1.79E-01	NC
ORYZALIN	19044-88-3	SV		1.28E+01	1.28E+01	NC
OXADIAZON	19666-30-9	SV		1.28E+00	1.28E+00	NC
OXAMYL	23135-22-0	SV		6.40E+00	6.40E+00	NC
OXYFLUORFEN	42874-03-3	SV		7.68E-01	7.68E-01	NC
PARAQUAT DICHLORIDE	1910-42-5	SV		1.15E+00	1.15E+00	NC
PARATHION	56-38-2	SV		1.54E+00	1.54E+00	NC
PENTACHLOROBENZENE	608-93-5	SV		2.05E-01	2.05E-01	NC
PENTACHLORONITROBENZENE	82-68-8	SV	3.44E-03	7.68E-01	3.44E-03	C
PENTACHLOROPHENOL	87-86-5	SV	7.46E-03	7.68E+00	7.46E-03	C
Pentaerythritoltetranitrate	78-11-5	SV	8.14E-03	7.68E-01	8.14E-03	C
PERCHLORATE	7601-90-3	M		1.79E-01	1.79E-01	NC
PERMETHRIN	52645-53-1	SV		1.28E+01	1.28E+01	NC
PHENOL	108-95-2	SV		7.68E+01	7.68E+01	NC
M-PHENYLENEDIAMINE	108-45-2	SV		1.54E+00	1.54E+00	NC
O-PHENYLENEDIAMINE	95-54-5	SV	1.91E-02		1.91E-02	C
P-PHENYLENEDIAMINE	106-50-3	SV		4.86E+01	4.86E+01	NC
PHOSPHINE	7803-51-2	SV		2.20E-02	2.20E-02	NC
PHOSPHORIC ACID	7664-38-2	M		7.42E-01	7.42E-01	NC
PHOSPHORUS (WHITE)	7723-14-0	M		5.12E-03	5.12E-03	NC
PHTHALIC ANHYDRIDE	85-44-9	SV		8.78E+00	8.78E+00	NC
POLYBROMINATED BIPHENYLS	NA	SV	1.01E-04	1.79E-03	1.01E-04	C
POLYCHLORINATED BIPHENYLS	1336-36-3	SV	4.48E-04		4.48E-04	C
AROCLOR-1016	12674-11-2	SV	1.28E-02	1.79E-02	1.28E-02	C
AROCLOR-1221	11104-28-2	SV	4.48E-04		4.48E-04	C

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
AROCLOR-1232	11141-16-5	SV	4.48E-04		4.48E-04	C
AROCLOR-1242	53469-21-9	SV	4.48E-04		4.48E-04	C
AROCLOR-1248	12672-29-6	SV	4.48E-04		4.48E-04	C
AROCLOR-1254	11097-69-1	SV	4.48E-04	5.12E-03	4.48E-04	C
AROCLOR-1260	11096-82-5	SV	4.48E-04		4.48E-04	C
POLYCHLORINATED TERPHENYLS	61788-33-8	SV	1.99E-04		1.99E-04	C
POLYNUCLEAR AROMATIC HYDROCARBONS:	NA	SV				
ACENAPHTHENE	83-32-9	V		1.54E+01	1.54E+01	NC
ANTHRACENE	120-12-7	V		7.68E+01	7.68E+01	NC
BENZ[A]ANTHRACENE	56-55-3	SV	1.23E-03		1.23E-03	C
BENZO[B]FLUORANTHENE	205-99-2	SV	1.23E-03		1.23E-03	C
BENZO[K]FLUORANTHENE	207-08-9	SV	1.23E-02		1.23E-02	C
BENZO[A]PYRENE	50-32-8	SV	2.89E-04		2.89E-04	C
CARBAZOLE	86-74-8	SV	4.48E-02		4.48E-02	C
CHRYSENE	218-01-9	SV	1.23E-01		1.23E-01	C
DIBENZ[A,H]ANTHRACENE	53-70-3	SV	1.23E-04		1.23E-04	C
FLUORANTHENE	206-44-0	SV		1.02E+01	1.02E+01	NC
FLUORENE	86-73-7	V		1.02E+01	1.02E+01	NC
INDENO[1,2,3-C,D]PYRENE	193-39-5	SV	1.23E-03		1.23E-03	C
2-METHYLNAPHTHALENE	91-57-6	V		1.02E+00	1.02E+00	NC
NAPHTHALENE	91-20-3	V		2.30E-01	2.30E-01	NC
PYRENE	129-00-0	V		7.68E+00	7.68E+00	NC
PROMETON	1610-18-0	SV		3.84E+00	3.84E+00	NC
PROMETRYN	7287-19-6	SV		1.02E+00	1.02E+00	NC
PROPACHLOR	1918-16-7	SV		3.33E+00	3.33E+00	NC
PROPARGITE	2312-35-8	SV		5.12E+00	5.12E+00	NC
PROPYLENE GLYCOL	57-55-6	SV		2.20E-01	2.20E-01	NC
PROPYLENE GLYCOL, MONOETHYL ETHER	52125-53-8	SV		1.79E+02	1.79E+02	NC
PROPYLENE GLYCOL, MONOMETHYL ETHER	107-98-2	SV		1.46E+02	1.46E+02	NC
PURSUIT	81335-77-5	SV		6.40E+01	6.40E+01	NC
PYRIDINE	110-86-1	SV		2.56E-01	2.56E-01	NC
QUINOLINE	91-22-5	SV	2.99E-04		2.99E-04	C
RDX	121-82-4	SV	8.14E-03	7.68E-01	8.14E-03	C
RESMETHRIN	10453-86-8	SV		7.68E+00	7.68E+00	NC
ROTENONE	83-79-4	SV		1.02E+00	1.02E+00	NC
SELENIUM	7782-49-2	M		1.28E+00	1.28E+00	NC
SILVER	7440-22-4	M		1.28E+00	1.28E+00	NC
SIMAZINE	122-34-9	SV	7.46E-03	1.28E+00	7.46E-03	C
SODIUM DIETHYLDITHIOCARBAMATE	148-18-5	SV	3.32E-03	7.68E+00	3.32E-03	C
STRONTIUM, STABLE	7440-24-6	M		1.54E+02	1.54E+02	NC
STRYCHNINE	57-24-9	SV		7.68E-02	7.68E-02	NC
STYRENE	100-42-5	V		7.32E+01	7.32E+01	NC
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746-01-6	SV	5.97E-09		5.97E-09	C
1,2,4,5-TETRACHLOROBENZENE	95-94-3	SV		7.68E-02	7.68E-02	NC
1,1,1,2-TETRACHLOROETHANE	630-20-6	V	3.44E-02	7.68E+00	3.44E-02	C
1,1,2,2-TETRACHLOROETHANE	79-34-5	V	4.48E-03	1.54E+01	4.48E-03	C
TETRACHLOROETHENE	127-18-4	V	4.48E-02	3.58E+01	4.48E-02	C
2,3,4,6-TETRACHLOROPHENOL	58-90-2	SV		7.68E+00	7.68E+00	NC
P,A,A,A-TETRACHLOROTOLUENE	5216-25-1	SV	4.48E-05		4.48E-05	C
1,1,1,2-TETRAFLUOROETHANE	811-97-2	V		5.86E+03	5.86E+03	NC
TETRAHYDROFURAN	109-99-9	SV	1.32E-01	2.20E+01	1.32E-01	C
TETRYL	479-45-8	SV		1.02E+00	1.02E+00	NC
THALLIUM	7440-28-0	M		1.79E-02	1.79E-02	NC
THALLIUM ACETATE	563-68-8	M		2.30E-02	2.30E-02	NC
THALLIUM CARBONATE	6533-73-9	M		2.05E-02	2.05E-02	NC
THALLIUM CHLORIDE	7791-12-0	M		2.05E-02	2.05E-02	NC
THALLIUM NITRATE	10102-45-1	M		2.30E-02	2.30E-02	NC
THALLIUM SULFATE (2:1)	7446-18-6	M		2.05E-02	2.05E-02	NC
THIOBENCARB	28249-77-6	SV		2.56E+00	2.56E+00	NC
TIN	7440-31-5	M		1.54E+02	1.54E+02	NC

Appendix E

Risk-based Air Concentrations for the Boater

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
TITANIUM	7440-32-6	M		2.20E+00	2.20E+00	NC
TITANIUM DIOXIDE	13463-67-7	M		2.20E+00	2.20E+00	NC
TOLUENE	108-88-3	V		2.92E+01	2.92E+01	NC
TOLUENE-2,4-DIAMINE	95-80-7	SV	2.80E-04		2.80E-04	C
TOLUENE-2,5-DIAMINE	95-70-5	SV		1.54E+02	1.54E+02	NC
TOLUENE-2,6-DIAMINE	823-40-5	SV		5.12E+01	5.12E+01	NC
P-TOLUIDINE	106-49-0	SV	4.71E-03		4.71E-03	C
TOXAPHENE	8001-35-2	SV	8.14E-04		8.14E-04	C
1,2,4-TRIBROMOBENZENE	615-54-3	SV		1.28E+00	1.28E+00	NC
TRIBUTYLTIN OXIDE	56-35-9	SV		7.68E-02	7.68E-02	NC
2,4,6-TRICHLOROANILINE	634-93-5	SV	2.63E-02		2.63E-02	C
1,2,4-TRICHLOROBENZENE	120-82-1	V		2.56E-01	2.56E-01	NC
1,1,1-TRICHLOROETHANE	71-55-6	V		1.61E+02	1.61E+02	NC
1,1,2-TRICHLOROETHANE	79-00-5	V	1.60E-02	1.02E+00	1.60E-02	C
TRICHLOROETHENE	79-01-6	V	2.24E-03	2.56E+00	2.24E-03	C
TRICHLOROFLUOROMETHANE	75-69-4	V		5.12E+01	5.12E+01	NC
2,4,5-TRICHLOROPHENOL	95-95-4	SV		2.56E+01	2.56E+01	NC
2,4,6-TRICHLOROPHENOL	88-06-2	SV	8.96E-02		8.96E-02	C
2,4,5-T	93-76-5	SV		2.56E+00	2.56E+00	NC
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93-72-1	SV		2.05E+00	2.05E+00	NC
1,1,2-TRICHLOROPROPANE	598-77-6	V		1.28E+00	1.28E+00	NC
1,2,3-TRICHLOROPROPANE	96-18-4	V	4.48E-04	3.58E-01	4.48E-04	C
1,2,3-TRICHLOROPROPENE	96-19-5	V		7.68E-02	7.68E-02	NC
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	V		2.20E+03	2.20E+03	NC
1,2,4-TRIMETHYLBENZENE	95-63-6	V		4.35E-01	4.35E-01	NC
1,3,5-TRIMETHYLBENZENE	108-67-8	V		4.35E-01	4.35E-01	NC
1,3,5-TRINITROBENZENE	99-35-4	SV		7.68E+00	7.68E+00	NC
2,4,6-TRINITROTOLUENE	118-96-7	SV	2.99E-02	1.28E-01	2.99E-02	C
URANIUM (SOLUBLE SALTS; from IRIS)	7440-61-1	M		7.68E-01	7.68E-01	NC
URANIUM (SOLUBLE SALTS; provisional)	7440-61-1	M		5.12E-02	5.12E-02	NC
VANADIUM	7440-62-2	M		2.56E-01	2.56E-01	NC
VINCLOZOLIN	50471-44-8	SV		6.40E+00	6.40E+00	NC
VINYL ACETATE	108-05-4	V		1.46E+01	1.46E+01	NC
VINYL CHLORIDE: adult (see cover memos)	75-01-4	V	5.97E-02	7.17E+00	5.97E-02	C
WARFARIN	81-81-2	SV		7.68E-02	7.68E-02	NC
O-XYLENE	95-47-6	V		7.68E+00	7.68E+00	NC
M,P-XYLENES	1330-20-7	V		7.68E+00	7.68E+00	NC
XYLENES	1330-20-7	V		7.68E+00	7.68E+00	NC
ZINC	7440-66-6	M		7.68E+01	7.68E+01	NC
ZINEB	12122-67-7	SV		1.28E+01	1.28E+01	NC

APPENDIX F

Risk-Based Air Concentrations for the Oasis Resident

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
ACETALDEHYDE	75-07-0	V	2.24E-02	1.90E-01	2.24E-02	C
ACETOCHLOR	34256-82-1	SV		1.48E+00	1.48E+00	NC
ACETONE	67-64-1	V		6.67E+01	6.67E+01	NC
ACETONITRILE	75-05-8	V		1.26E+00	1.26E+00	NC
ACETOPHENONE	98-86-2	V		7.41E+00	7.41E+00	NC
ACROLEIN	107-02-8	V		4.22E-04	4.22E-04	NC
ACRYLAMIDE	79-06-1	SV	3.84E-05	1.48E-02	3.84E-05	C
ACRYLONITRILE	107-13-1	V	7.20E-04	4.22E-02	7.20E-04	C
ALACHLOR	15972-60-8	SV	2.16E-03	7.41E-01	2.16E-03	C
ALAR	1596-84-5	SV		1.11E+01	1.11E+01	NC
ALDICARB	116-06-3	SV		7.41E-02	7.41E-02	NC
ALDICARB SULFONE	1646-88-4	SV		7.41E-02	7.41E-02	NC
ALDRIN	309-00-2	SV	1.02E-05	2.22E-03	1.02E-05	C
ALLYL CHLORIDE	107-05-1	V		2.12E-02	2.12E-02	NC
ALUMINUM	7429-90-5	M		7.41E-02	7.41E-02	NC
AMINODINITROTOLUENES	NA	SV		1.48E-01	1.48E-01	NC
AMMONIA	7664-41-7	V		2.12E+00	2.12E+00	NC
ANILINE	62-53-3	SV	3.03E-02	2.15E-02	2.15E-02	NC
ANTIMONY	7440-36-0	M		2.96E-02	2.96E-02	NC
ANTIMONY TRIOXIDE	1309-64-4	M		4.22E-03	4.22E-03	NC
ARSENIC	7440-38-2	M	1.14E-05	2.22E-02	1.14E-05	C
ARSINE	7784-42-1	V		1.04E-03	1.04E-03	NC
ASSURE	76578-14-8	SV		6.67E-01	6.67E-01	NC
ATRAZINE	1912-24-9	SV	7.85E-04	2.59E+00	7.85E-04	C
BARIUM	7440-39-3	M		1.04E-02	1.04E-02	NC
BAYGON	114-26-1	SV		2.96E-01	2.96E-01	NC
BAYTHROID	68359-37-5	SV		1.85E+00	1.85E+00	NC
BENTAZON	25057-89-0	SV		2.22E+00	2.22E+00	NC
BENZALDEHYDE	100-52-7	SV		7.41E+00	7.41E+00	NC
BENZENE	71-43-2	V	6.40E-03	6.37E-01	6.40E-03	C
BENZENETHIOL	108-98-5	V		7.41E-04	7.41E-04	NC
BENZIDINE	92-87-5	SV	7.51E-07	2.22E-01	7.51E-07	C
BENZOIC ACID	65-85-0	SV		2.96E+02	2.96E+02	NC
BENZYL ALCOHOL	100-51-6	SV		2.22E+01	2.22E+01	NC
BENZYL CHLORIDE	100-44-7	V	1.02E-03	1.48E-01	1.02E-03	C
BERYLLIUM	7440-41-7	M	2.06E-05	4.22E-04	2.06E-05	C
BIPHENYL	92-52-4	V		3.70E+00	3.70E+00	NC
BIS(2-CHLOROETHYL)ETHER	111-44-4	V	1.57E-04		1.57E-04	C
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	V	4.94E-03	2.96E+00	4.94E-03	C
BIS(CHLOROMETHYL)ETHER	542-88-1	V	7.85E-07		7.85E-07	C
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	SV	1.23E-02	1.48E+00	1.23E-02	C
BORON	7440-42-8	M		4.22E-01	4.22E-01	NC
BROMOBENZENE	108-86-1	V		2.22E-01	2.22E-01	NC
BROMODICHLOROMETHANE	75-27-4	V	2.79E-03	1.48E+00	2.79E-03	C
BROMOETHENE	593-60-2	V	1.57E-03	6.37E-02	1.57E-03	C
BROMOFORM	75-25-2	SV	4.43E-02	1.48E+00	4.43E-02	C
BROMOMETHANE	74-83-9	V		1.04E-01	1.04E-01	NC
BROMOPHOS	2104-96-3	SV		3.70E-01	3.70E-01	NC
1,3-BUTADIENE	106-99-0	V	1.73E-03	4.22E-02	1.73E-03	C
1-BUTANOL	71-36-3	SV		7.41E+00	7.41E+00	NC
BUTYLBENZYLPHTHALATE	85-68-7	SV	9.09E-02	1.48E+01	9.09E-02	C
CADMIUM-FOOD	7440-43-9	M	2.74E-05	4.22E-03	2.74E-05	C
CAPROLACTAM	105-60-2	SV		3.70E+01	3.70E+01	NC
CARBARYL	63-25-2	SV		7.41E+00	7.41E+00	NC
CARBON DISULFIDE	75-15-0	V		1.48E+01	1.48E+01	NC
CARBON TETRACHLORIDE	56-23-5	V	3.26E-03	3.70E+00	3.26E-03	C
CARBOSULFAN	55285-14-8	SV		7.41E-01	7.41E-01	NC
CHLORAL HYDRATE	302-17-0	SV		7.41E+00	7.41E+00	NC
CHLORANIL	118-75-2	SV	4.32E-04		4.32E-04	C
CHLORDANE	57-74-9	SV	4.94E-04	1.48E-02	4.94E-04	C

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B- Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
CHLORINE	7782-50-5	V		4.22E-03	4.22E-03	NC
CHLORINE DIOXIDE	10049-04-4	V		4.22E-03	4.22E-03	NC
CHLOROACETIC ACID	79-11-8	SV		1.48E-01	1.48E-01	NC
4-CHLOROANILINE	106-47-8	SV	3.20E-03	2.96E-01	3.20E-03	C
CHLOROBENZENE	108-90-7	V		1.26E+00	1.26E+00	NC
2-CHLORO-1,3-BUTADIENE	126-99-8	V		1.48E-01	1.48E-01	NC
1-CHLORO-1,1-DIFLUOROETHANE	75-68-3	V		1.04E+03	1.04E+03	NC
CHLORODIFLUOROMETHANE	75-45-6	V		1.04E+03	1.04E+03	NC
CHLOROETHANE	75-00-3	V	5.96E-02	2.15E+02	5.96E-02	C
CHLOROFORM	67-66-3	V	2.13E-03	1.04E+00	2.13E-03	C
CHLOROMETHANE	74-87-3	V		1.93E+00	1.93E+00	NC
4-CHLORO-2-METHYLANILINE	95-69-2	SV	2.98E-04		2.98E-04	C
BETA-CHLORONAPHTHALENE	91-58-7	V		5.92E+00	5.92E+00	NC
O-CHLORONITROBENZENE	88-73-3	V	1.78E-02	1.48E-03	1.48E-03	NC
P-CHLORONITROBENZENE	100-00-5	V	2.58E-02	1.26E-02	1.26E-02	NC
2-CHLOROPHENOL	95-57-8	V		3.70E-01	3.70E-01	NC
2-CHLOROPROPANE	75-29-6	V		2.15E+00	2.15E+00	NC
O-CHLOROTOLUENE	95-49-8	V		1.48E+00	1.48E+00	NC
CHLORPYRIFOS	2921-88-2	SV		2.22E-01	2.22E-01	NC
CHLORPYRIFOS-METHYL	5598-13-0	SV		7.41E-01	7.41E-01	NC
CHROMIUM	7440-47-3	M		1.11E+02	1.11E+02	NC
CHROMIUM III	16065-83-1	M		1.11E+02	1.11E+02	NC
CHROMIUM VI	18540-29-9	M	4.21E-06	2.22E-03	4.21E-06	C
COBALT	7440-48-4	M	1.76E-05	4.22E-04	1.76E-05	C
COKE OVEN EMISSIONS (COAL TAR)	8007-45-2	SV	7.85E-05		7.85E-05	C
COPPER	7440-50-8	M		2.96E+00	2.96E+00	NC
CUMENE	98-82-8	V		8.15E+00	8.15E+00	NC
CYANIDE (FREE)	57-12-5	M		1.48E+00	1.48E+00	NC
CALCIUM CYANIDE	592-01-8	M		2.96E+00	2.96E+00	NC
COPPER CYANIDE	544-92-3	M		3.70E-01	3.70E-01	NC
CYANOGEN	460-19-5	V		2.96E+00	2.96E+00	NC
HYDROGEN CYANIDE	74-90-8	V		6.37E-02	6.37E-02	NC
POTASSIUM CYANIDE	151-50-8	M		3.70E+00	3.70E+00	NC
POTASSIUM SILVER CYANIDE	506-61-6	M		1.48E+01	1.48E+01	NC
SILVER CYANIDE	506-64-9	M		7.41E+00	7.41E+00	NC
SODIUM CYANIDE	143-33-9	M		2.96E+00	2.96E+00	NC
THIOCYANATE	NA	M		7.41E-03	7.41E-03	NC
ZINC CYANIDE	557-21-1	M		3.70E+00	3.70E+00	NC
CYCLOHEXANE	110-82-7	V		1.26E+02	1.26E+02	NC
CYCLOHEXANONE	108-94-1	SV		3.70E+02	3.70E+02	NC
CYHALOTHRIN/KARATE	68085-85-8	SV		3.70E-01	3.70E-01	NC
CYPERMETHRIN	52315-07-8	SV		7.41E-01	7.41E-01	NC
DACTHAL	1861-32-1	SV		7.41E-01	7.41E-01	NC
DALAPON	75-99-0	SV		2.22E+00	2.22E+00	NC
DDD	72-54-8	SV	7.20E-04	1.48E-01	7.20E-04	C
DDE	72-55-9	SV	5.08E-04		5.08E-04	C
DDT	50-29-3	SV	5.08E-04	3.70E-02	5.08E-04	C
DIAZINON	333-41-5	SV		6.67E-02	6.67E-02	NC
DIBENZOFURAN	132-64-9	V		1.48E-01	1.48E-01	NC
1,4-DIBROMOBENZENE	106-37-6	SV		7.41E-01	7.41E-01	NC
DIBROMOCHLOROMETHANE	124-48-1	V	2.06E-03	1.48E+00	2.06E-03	C
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	V	7.20E-02	4.22E-03	4.22E-03	NC
1,2-DIBROMOETHANE	106-93-4	V	8.64E-05	1.93E-01	8.64E-05	C
DIBUTYLPHTHALATE	84-74-2	SV		7.41E+00	7.41E+00	NC
DICAMBA	1918-00-9	SV		2.22E+00	2.22E+00	NC
1,2-DICHLOROBENZENE	95-50-1	V		2.96E+00	2.96E+00	NC
1,3-DICHLOROBENZENE	541-73-1	V		2.22E-01	2.22E-01	NC
1,4-DICHLOROBENZENE	106-46-7	V	7.85E-03	1.70E+01	7.85E-03	C
3,3'-DICHLOROBENZIDINE	91-94-1	SV	3.84E-04		3.84E-04	C
DICHLORODIFLUOROMETHANE	75-71-8	V		3.70E+00	3.70E+00	NC

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
1,1-DICHLOROETHANE	75-34-3	V		1.04E+01	1.04E+01	NC
1,2-DICHLOROETHANE	107-06-2	V	1.90E-03	5.18E+01	1.90E-03	C
1,1-DICHLOROETHENE	75-35-4	V		4.44E+00	4.44E+00	NC
CIS-1,2-DICHLOROETHENE	156-59-2	V		7.41E-01	7.41E-01	NC
TRANS-1,2-DICHLOROETHENE	156-60-5	V		1.26E+00	1.26E+00	NC
TOTAL 1,2-DICHLOROETHENE	540-59-0	V		6.67E-01	6.67E-01	NC
2,4-DICHLOROPHENOL	120-83-2	SV		2.22E-01	2.22E-01	NC
2,4-D	94-75-7	SV		7.41E-01	7.41E-01	NC
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94-82-6	SV		5.92E-01	5.92E-01	NC
1,2-DICHLOROPROPANE	78-87-5	V	2.54E-03	8.44E-02	2.54E-03	C
1,3-DICHLOROPROPANE	142-28-9	V		1.48E+00	1.48E+00	NC
2,3-DICHLOROPROPANOL	616-23-9	SV		2.22E-01	2.22E-01	NC
1,3-DICHLOROPROPENE	542-75-6	V	1.73E-02	4.23E-01	1.73E-02	C
DICHLORVOS	62-73-7	SV	5.96E-04	1.06E-02	5.96E-04	C
DIELDRIN	60-57-1	SV	1.08E-05	3.70E-03	1.08E-05	C
DIESEL EMISSIONS	NA	SV		1.04E-01	1.04E-01	NC
DIETHYLPHTHALATE	84-66-2	SV		5.92E+01	5.92E+01	NC
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112-34-5	SV		4.22E-01	4.22E-01	NC
DIETHYLENE GLYCOL, MONOETHYL ETHER	111-90-0	SV		6.37E-02	6.37E-02	NC
DI(2-ETHYLHEXYL)ADIPATE	103-23-1	SV	1.44E-01	4.44E+01	1.44E-01	C
DIETHYLSTILBESTROL	56-53-1	SV	3.68E-08		3.68E-08	C
DIFENZOQUAT (AVENGE)	43222-48-6	SV		5.92E+00	5.92E+00	NC
1,1-DIFLUOROETHANE	75-37-6	V		8.15E+02	8.15E+02	NC
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445-75-6	SV		5.92E+00	5.92E+00	NC
3,3'-DIMETHOXYBENZIDINE	119-90-4	SV	1.23E-02		1.23E-02	C
N,N-DIMETHYLANILINE	121-69-7	SV		1.48E-01	1.48E-01	NC
3,3'-DIMETHYLBENZIDINE	119-93-7	SV	7.51E-05		7.51E-05	C
2,4-DIMETHYLPHENOL	105-67-9	SV		1.48E+00	1.48E+00	NC
2,6-DIMETHYLPHENOL	576-26-1	SV		4.44E-02	4.44E-02	NC
3,4-DIMETHYLPHENOL	95-65-8	SV		7.41E-02	7.41E-02	NC
DIMETHYLPHTHALATE	131-11-3	SV		7.41E+02	7.41E+02	NC
1,2-DINITROBENZENE	528-29-0	SV		7.41E-03	7.41E-03	NC
1,3-DINITROBENZENE	99-65-0	SV		7.41E-03	7.41E-03	NC
1,4-DINITROBENZENE	100-25-4	SV		7.41E-03	7.41E-03	NC
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131-89-5	SV		1.48E-01	1.48E-01	NC
4,6-DINITRO-2-METHYLPHENOL	534-52-1	SV		7.41E-03	7.41E-03	NC
2,4-DINITROPHENOL	51-28-5	SV		1.48E-01	1.48E-01	NC
DINITROTOLUENE MIX	NA	SV	2.54E-04		2.54E-04	C
2,4-DINITROTOLUENE	121-14-2	SV		1.48E-01	1.48E-01	NC
2,6-DINITROTOLUENE	606-20-2	SV		7.41E-02	7.41E-02	NC
DINOSEB	88-85-7	SV		7.41E-02	7.41E-02	NC
DIOCTYLPHTHALATE	117-84-0	SV		2.96E+00	2.96E+00	NC
1,4-DIOXANE	123-91-1	SV	1.57E-02		1.57E-02	C
DIPHENYLAMINE	122-39-4	SV		1.85E+00	1.85E+00	NC
1,2-DIPHENYLHYDRAZINE	122-66-7	SV	2.16E-04		2.16E-04	C
DIQUAT	85-00-7	SV		1.63E-01	1.63E-01	NC
DISULFOTON	298-04-4	SV		2.96E-03	2.96E-03	NC
1,4-DITHIANE	505-29-3	SV		7.41E-01	7.41E-01	NC
DIURON	330-54-1	SV		1.48E-01	1.48E-01	NC
ENDOSULFAN	115-29-7	SV		4.44E-01	4.44E-01	NC
ENDRIN	72-20-8	SV		2.22E-02	2.22E-02	NC
EPICHLOROHYDRIN	106-89-8	V	4.11E-02	2.12E-02	2.12E-02	NC
ETHION	563-12-2	SV		3.70E-02	3.70E-02	NC
ETHYL ACETATE	141-78-6	V		6.67E+01	6.67E+01	NC
ETHYLBENZENE	100-41-4	V		2.15E+01	2.15E+01	NC
ETHYLENE DIAMINE	107-15-3	SV		6.67E+00	6.67E+00	NC
ETHYLENE GLYCOL	107-21-1	SV		1.48E+02	1.48E+02	NC
ETHYLENE GLYCOL, MONOBUTYL ETHER	111-76-2	SV		2.74E+02	2.74E+02	NC
ETHYLENE OXIDE	75-21-8	V	4.94E-04		4.94E-04	C
ETHYL ETHER	60-29-7	V		1.48E+01	1.48E+01	NC

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
FENAMIPHOS	22224-92-6	SV		1.85E-02	1.85E-02	NC
FLUOMETURON	2164-17-2	SV		9.63E-01	9.63E-01	NC
FLUORINE	7782-41-4	M		4.44E+00	4.44E+00	NC
FOMESAFEN	72178-02-0	SV	9.09E-04		9.09E-04	C
FONOFOS	944-22-9	SV		1.48E-01	1.48E-01	NC
FORMALDEHYDE	50-00-0	SV	3.84E-03	1.48E+01	3.84E-03	C
FURAN	110-00-9	V		7.41E-02	7.41E-02	NC
FURFURAL	98-01-1	SV		7.41E-01	7.41E-01	NC
GLYPHOSATE	1071-83-6	SV		7.41E+00	7.41E+00	NC
HEPTACHLOR	76-44-8	SV	3.84E-05	3.70E-02	3.84E-05	C
HEPTACHLOR EPOXIDE	1024-57-3	SV	1.90E-05	9.63E-04	1.90E-05	C
HEXABROMOBENZENE	87-82-1	SV		1.48E-01	1.48E-01	NC
HEXACHLOROBENZENE	118-74-1	SV	1.08E-04	5.92E-02	1.08E-04	C
HEXACHLOROBUTADIENE	87-68-3	SV	2.22E-03	1.48E-02	2.22E-03	C
ALPHA-HCH	319-84-6	SV	2.74E-05		2.74E-05	C
BETA-HCH	319-85-7	SV	9.60E-05		9.60E-05	C
GAMMA-HCH (LINDANE)	58-89-9	SV	1.33E-04	2.22E-02	1.33E-04	C
TECHNICAL HCH	608-73-1	SV	9.60E-05		9.60E-05	C
HEXACHLOROCYCLOPENTADIENE	77-47-4	SV		4.22E-03	4.22E-03	NC
HEXACHLORODIBENZODIOXIN MIX	19408-74-3	SV	3.80E-08		3.80E-08	C
HEXACHLOROETHANE	67-72-1	SV	1.23E-02	7.41E-02	1.23E-02	C
HEXACHLOROPHENE	70-30-4	SV		2.22E-02	2.22E-02	NC
1,6-HEXAMETHYLENE DIISOCYANATE	822-06-0	SV		2.15E-04	2.15E-04	NC
HEXANE	110-54-3	V		4.23E+00	4.23E+00	NC
HMX	2691-41-0	SV		3.70E+00	3.70E+00	NC
HYDRAZINE	302-01-2	V	1.02E-05		1.02E-05	C
HYDROGEN CHLORIDE	7647-01-0	V		4.22E-01	4.22E-01	NC
HYDROGEN SULFIDE	7783-06-4	V		4.22E-02	4.22E-02	NC
HYDROQUINONE	123-31-9	SV	3.09E-03	2.96E+00	3.09E-03	C
IRON	7439-89-6	M		2.22E+01	2.22E+01	NC
ISOBUTANOL	78-83-1	V		2.22E+01	2.22E+01	NC
ISOPHORONE	78-59-1	SV	1.82E-01	1.48E+01	1.82E-01	C
TETRAETHYLLEAD	78-00-2	V		7.41E-06	7.41E-06	NC
KEPONE	143-50-0	SV	2.16E-05	1.48E-02	2.16E-05	C
LITHIUM	7439-93-2	M		1.48E+00	1.48E+00	NC
MALATHION	121-75-5	SV		1.48E+00	1.48E+00	NC
MALEIC ANHYDRIDE	108-31-6	SV		7.41E+00	7.41E+00	NC
MANGANESE-FOOD	7439-96-5	M		1.06E-03	1.06E-03	NC
MEPHOSFOLAN	950-10-7	SV		6.67E-03	6.67E-03	NC
MEPIQUAT CHLORIDE	24307-26-4	SV		2.22E+00	2.22E+00	NC
MERCURIC CHLORIDE	7487-94-7	M		2.22E-02	2.22E-02	NC
MERCURY (elemental)	7439-97-6	M		6.37E-03	6.37E-03	NC
METHYLMERCURY	22967-92-6	V		7.41E-03	7.41E-03	NC
METHANOL	67-56-1	V		3.70E+01	3.70E+01	NC
METHIDATHION	950-37-8	SV		7.41E-02	7.41E-02	NC
METHOXYCHLOR	72-43-5	SV		3.70E-01	3.70E-01	NC
METHYL ACETATE	79-20-9	V		7.41E+01	7.41E+01	NC
METHYL ACRYLATE	96-33-3	V		2.22E+00	2.22E+00	NC
2-METHYLANILINE	95-53-4	SV	7.20E-04		7.20E-04	C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94-81-5	SV		7.41E-01	7.41E-01	NC
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94-74-6	SV		3.70E-02	3.70E-02	NC
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93-65-2	SV		7.41E-02	7.41E-02	NC
METHYLCYCLOHEXANE	108-87-2	V		6.37E+01	6.37E+01	NC
METHYLENE BROMIDE	74-95-3	V		7.41E-01	7.41E-01	NC
METHYLENE CHLORIDE	75-09-2	V	1.05E-01	2.22E+01	1.05E-01	C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101-14-4	SV	1.33E-03	5.18E-02	1.33E-03	C
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101-61-1	SV	3.76E-03		3.76E-03	C
4,4'-METHYLENEDIPHENYL ISOCYANATE	101-68-8	SV		1.26E-02	1.26E-02	NC
METHYL ETHYL KETONE (2-BUTANONE)	78-93-3	V		1.04E+02	1.04E+02	NC
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	108-10-1	V		6.37E+01	6.37E+01	NC

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
METHYL METHACRYLATE	80-62-6	V		1.48E+01	1.48E+01	NC
METHYL PARATHION	298-00-0	SV		1.85E-02	1.85E-02	NC
2-METHYLPHENOL	95-48-7	SV		3.70E+00	3.70E+00	NC
3-METHYLPHENOL	108-39-4	SV		3.70E+00	3.70E+00	NC
4-METHYLPHENOL	106-44-5	SV		3.70E-01	3.70E-01	NC
METHYLSTYRENE MIX	25013-15-4	V		7.41E-01	7.41E-01	NC
ALPHA-METHYLSTYRENE	98-83-9	V		5.18E+00	5.18E+00	NC
METHYL TERT-BUTYL ETHER	1634-04-4	V	4.32E-02	6.35E+01	4.32E-02	C
METOLACHLOR (DUAL)	51218-45-2	SV		1.11E+01	1.11E+01	NC
MIREX	2385-85-5	SV		1.48E-02	1.48E-02	NC
MOLYBDENUM	7439-98-7	M		3.70E-01	3.70E-01	NC
MONOCHLORAMINE	10599-90-3	SV		7.41E+00	7.41E+00	NC
NALED	300-76-5	SV		1.48E-01	1.48E-01	NC
NICKEL REFINERY DUST	NA	M	2.06E-04		2.06E-04	C
NICKEL	7440-02-0	M		1.48E+00	1.48E+00	NC
NITRATE	14797-55-8	M		1.18E+02	1.18E+02	NC
NITRITE	14797-65-0	M		7.41E+00	7.41E+00	NC
2-NITROANILINE	88-74-4	SV		2.22E-03	2.22E-03	NC
3-NITROANILINE	99-09-2	SV	8.64E-03	2.22E-02	8.64E-03	C
4-NITROANILINE	100-01-6	SV	8.64E-03	7.41E-02	8.64E-03	C
NITROBENZENE	98-95-3	V		4.44E-02	4.44E-02	NC
NITROGLYCERIN	55-63-0	SV	1.23E-02		1.23E-02	C
NITROGUANIDINE	556-88-7	SV		7.41E+00	7.41E+00	NC
2-NITROPROPANE	79-46-9	V	1.84E-05	4.22E-01	1.84E-05	C
N-NITROSO-DI-N-BUTYLAMINE	924-16-3	V	3.09E-05		3.09E-05	C
N-NITROSODIETHANOLAMINE	1116-54-7	SV	6.17E-05		6.17E-05	C
N-NITROSODIETHYLAMINE	55-18-5	SV	1.15E-06		1.15E-06	C
N-NITROSODIMETHYLAMINE	62-75-9	SV	3.39E-06	5.92E-04	3.39E-06	C
N-NITROSODIPHENYLAMINE	86-30-6	SV	3.53E-02	1.48E+00	3.53E-02	C
N-NITROSODIPROPYLAMINE	621-64-7	SV	2.47E-05		2.47E-05	C
N-NITROSO-N-METHYLETHYLAMINE	10595-95-6	SV	7.85E-06		7.85E-06	C
N-NITROSOPYRROLIDINE	930-55-2	SV	8.23E-05		8.23E-05	C
M-NITROTOLUENE	99-08-1	V		1.48E+00	1.48E+00	NC
O-NITROTOLUENE	88-72-2	V	7.51E-04	7.41E-01	7.51E-04	C
P-NITROTOLUENE	99-99-0	V	1.02E-02	7.41E-01	1.02E-02	C
NUSTAR	85509-19-9	SV		5.18E-02	5.18E-02	NC
ORYZALIN	19044-88-3	SV		3.70E+00	3.70E+00	NC
OXADIAZON	19666-30-9	SV		3.70E-01	3.70E-01	NC
OXAMYL	23135-22-0	SV		1.85E+00	1.85E+00	NC
OXYFLUORFEN	42874-03-3	SV		2.22E-01	2.22E-01	NC
PARAQUAT DICHLORIDE	1910-42-5	SV		3.33E-01	3.33E-01	NC
PARATHION	56-38-2	SV		4.44E-01	4.44E-01	NC
PENTACHLOROBENZENE	608-93-5	SV		5.92E-02	5.92E-02	NC
PENTACHLORONITROBENZENE	82-68-8	SV	6.65E-04	2.22E-01	6.65E-04	C
PENTACHLOROPHENOL	87-86-5	SV	1.44E-03	2.22E+00	1.44E-03	C
Pentaerythritoltetranitrate	78-11-5	SV	1.57E-03	2.22E-01	1.57E-03	C
PERCHLORATE	7601-90-3	M		5.18E-02	5.18E-02	NC
PERMETHRIN	52645-53-1	SV		3.70E+00	3.70E+00	NC
PHENOL	108-95-2	SV		2.22E+01	2.22E+01	NC
M-PHENYLENEDIAMINE	108-45-2	SV		4.44E-01	4.44E-01	NC
O-PHENYLENEDIAMINE	95-54-5	SV	3.68E-03		3.68E-03	C
P-PHENYLENEDIAMINE	106-50-3	SV		1.41E+01	1.41E+01	NC
PHOSPHINE	7803-51-2	SV		6.37E-03	6.37E-03	NC
PHOSPHORIC ACID	7664-38-2	M		2.15E-01	2.15E-01	NC
PHOSPHORUS (WHITE)	7723-14-0	M		1.48E-03	1.48E-03	NC
PHTHALIC ANHYDRIDE	85-44-9	SV		2.54E+00	2.54E+00	NC
POLYBROMINATED BIPHENYLS	NA	SV	1.94E-05	5.18E-04	1.94E-05	C
POLYCHLORINATED BIPHENYLS	1336-36-3	SV	8.64E-05		8.64E-05	C
AROCLOR-1016	12674-11-2	SV	2.47E-03	5.18E-03	2.47E-03	C
AROCLOR-1221	11104-28-2	SV	8.64E-05		8.64E-05	C

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
AROCLOR-1232	11141-16-5	SV	8.64E-05		8.64E-05	C
AROCLOR-1242	53469-21-9	SV	8.64E-05		8.64E-05	C
AROCLOR-1248	12672-29-6	SV	8.64E-05		8.64E-05	C
AROCLOR-1254	11097-69-1	SV	8.64E-05	1.48E-03	8.64E-05	C
AROCLOR-1260	11096-82-5	SV	8.64E-05		8.64E-05	C
POLYCHLORINATED TERPHENYLS	61788-33-8	SV	3.84E-05		3.84E-05	C
POLYNUCLEAR AROMATIC HYDROCARBONS:	NA	SV				
ACENAPHTHENE	83-32-9	V		4.44E+00	4.44E+00	NC
ANTHRACENE	120-12-7	V		2.22E+01	2.22E+01	NC
BENZ[A]ANTHRACENE	56-55-3	SV	2.37E-04		2.37E-04	C
BENZO[B]FLUORANTHENE	205-99-2	SV	2.37E-04		2.37E-04	C
BENZO[K]FLUORANTHENE	207-08-9	SV	2.37E-03		2.37E-03	C
BENZO[A]PYRENE	50-32-8	SV	5.57E-05		5.57E-05	C
CARBAZOLE	86-74-8	SV	8.64E-03		8.64E-03	C
CHRYSENE	218-01-9	SV	2.37E-02		2.37E-02	C
DIBENZ[A,H]ANTHRACENE	53-70-3	SV	2.37E-05		2.37E-05	C
FLUORANTHENE	206-44-0	SV		2.96E+00	2.96E+00	NC
FLUORENE	86-73-7	V		2.96E+00	2.96E+00	NC
INDENO[1,2,3-C,D]PYRENE	193-39-5	SV	2.37E-04		2.37E-04	C
2-METHYLNAPHTHALENE	91-57-6	V		2.96E-01	2.96E-01	NC
NAPHTHALENE	91-20-3	V		6.67E-02	6.67E-02	NC
PYRENE	129-00-0	V		2.22E+00	2.22E+00	NC
PROMETON	1610-18-0	SV		1.11E+00	1.11E+00	NC
PROMETRYN	7287-19-6	SV		2.96E-01	2.96E-01	NC
PROPACHLOR	1918-16-7	SV		9.63E-01	9.63E-01	NC
PROPARGITE	2312-35-8	SV		1.48E+00	1.48E+00	NC
PROPYLENE GLYCOL	57-55-6	SV		6.37E-02	6.37E-02	NC
PROPYLENE GLYCOL, MONOETHYL ETHER	52125-53-8	SV		5.18E+01	5.18E+01	NC
PROPYLENE GLYCOL, MONOMETHYL ETHER	107-98-2	SV		4.22E+01	4.22E+01	NC
PURSUIT	81335-77-5	SV		1.85E+01	1.85E+01	NC
PYRIDINE	110-86-1	SV		7.41E-02	7.41E-02	NC
QUINOLINE	91-22-5	SV	5.76E-05		5.76E-05	C
RDX	121-82-4	SV	1.57E-03	2.22E-01	1.57E-03	C
RESMETHRIN	10453-86-8	SV		2.22E+00	2.22E+00	NC
ROTENONE	83-79-4	SV		2.96E-01	2.96E-01	NC
SELENIUM	7782-49-2	M		3.70E-01	3.70E-01	NC
SILVER	7440-22-4	M		3.70E-01	3.70E-01	NC
SIMAZINE	122-34-9	SV	1.44E-03	3.70E-01	1.44E-03	C
SODIUM DIETHYLDITHIOCARBAMATE	148-18-5	SV	6.40E-04	2.22E+00	6.40E-04	C
STRONTIUM, STABLE	7440-24-6	M		4.44E+01	4.44E+01	NC
STRYCHNINE	57-24-9	SV		2.22E-02	2.22E-02	NC
STYRENE	100-42-5	V		2.12E+01	2.12E+01	NC
2,3,7,8-TETRACHLORODIBENZODIOXIN	1746-01-6	SV	1.15E-09		1.15E-09	C
1,2,4,5-TETRACHLOROBENZENE	95-94-3	SV		2.22E-02	2.22E-02	NC
1,1,1,2-TETRACHLOROETHANE	630-20-6	V	6.65E-03	2.22E+00	6.65E-03	C
1,1,2,2-TETRACHLOROETHANE	79-34-5	V	8.64E-04	4.44E+00	8.64E-04	C
TETRACHLOROETHENE	127-18-4	V	8.64E-03	1.04E+01	8.64E-03	C
2,3,4,6-TETRACHLOROPHENOL	58-90-2	SV		2.22E+00	2.22E+00	NC
P,A,A,A-TETRACHLOROTOLUENE	5216-25-1	SV	8.64E-06		8.64E-06	C
1,1,1,2-TETRAFLUOROETHANE	811-97-2	V		1.70E+03	1.70E+03	NC
TETRAHYDROFURAN	109-99-9	SV	2.54E-02	6.37E+00	2.54E-02	C
TETRYL	479-45-8	SV		2.96E-01	2.96E-01	NC
THALLIUM	7440-28-0	M		5.18E-03	5.18E-03	NC
THALLIUM ACETATE	563-68-8	M		6.67E-03	6.67E-03	NC
THALLIUM CARBONATE	6533-73-9	M		5.92E-03	5.92E-03	NC
THALLIUM CHLORIDE	7791-12-0	M		5.92E-03	5.92E-03	NC
THALLIUM NITRATE	10102-45-1	M		6.67E-03	6.67E-03	NC
THALLIUM SULFATE (2:1)	7446-18-6	M		5.92E-03	5.92E-03	NC
THIOBENCARB	28249-77-6	SV		7.41E-01	7.41E-01	NC
TIN	7440-31-5	M		4.44E+01	4.44E+01	NC

Appendix F

Risk-Based Air Concentrations for the Oasis Resident

Attachment 10B - Thermal Treatment Unit Human Health Risk Assessment

Chemical	CAS No.	Group	Carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Non-carcinogenic Risk-based Concentration (mg/M^3) Inhalation	Final Risk-based Concentration (mg/M^3) Final	Final Risk-based Concentration (mg/M^3) Basis
TITANIUM	7440-32-6	M		6.37E-01	6.37E-01	NC
TITANIUM DIOXIDE	13463-67-7	M		6.37E-01	6.37E-01	NC
TOLUENE	108-88-3	V		8.44E+00	8.44E+00	NC
TOLUENE-2,4-DIAMINE	95-80-7	SV	5.40E-05		5.40E-05	C
TOLUENE-2,5-DIAMINE	95-70-5	SV		4.44E+01	4.44E+01	NC
TOLUENE-2,6-DIAMINE	823-40-5	SV		1.48E+01	1.48E+01	NC
P-TOLUIDINE	106-49-0	SV	9.09E-04		9.09E-04	C
TOXAPHENE	8001-35-2	SV	1.57E-04		1.57E-04	C
1,2,4-TRIBROMOBENZENE	615-54-3	SV		3.70E-01	3.70E-01	NC
TRIBUTYLTIN OXIDE	56-35-9	SV		2.22E-02	2.22E-02	NC
2,4,6-TRICHLOROANILINE	634-93-5	SV	5.08E-03		5.08E-03	C
1,2,4-TRICHLOROBENZENE	120-82-1	V		7.41E-02	7.41E-02	NC
1,1,1-TRICHLOROETHANE	71-55-6	V		4.67E+01	4.67E+01	NC
1,1,2-TRICHLOROETHANE	79-00-5	V	3.09E-03	2.96E-01	3.09E-03	C
TRICHLOROETHENE	79-01-6	V	4.32E-04	7.41E-01	4.32E-04	C
TRICHLOROFLUOROMETHANE	75-69-4	V		1.48E+01	1.48E+01	NC
2,4,5-TRICHLOROPHENOL	95-95-4	SV		7.41E+00	7.41E+00	NC
2,4,6-TRICHLOROPHENOL	88-06-2	SV	1.73E-02		1.73E-02	C
2,4,5-T	93-76-5	SV		7.41E-01	7.41E-01	NC
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93-72-1	SV		5.92E-01	5.92E-01	NC
1,1,2-TRICHLOROPROPANE	598-77-6	V		3.70E-01	3.70E-01	NC
1,2,3-TRICHLOROPROPANE	96-18-4	V	8.64E-05	1.04E-01	8.64E-05	C
1,2,3-TRICHLOROPROPENE	96-19-5	V		2.22E-02	2.22E-02	NC
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	V		6.37E+02	6.37E+02	NC
1,2,4-TRIMETHYLBENZENE	95-63-6	V		1.26E-01	1.26E-01	NC
1,3,5-TRIMETHYLBENZENE	108-67-8	V		1.26E-01	1.26E-01	NC
1,3,5-TRINITROBENZENE	99-35-4	SV		2.22E+00	2.22E+00	NC
2,4,6-TRINITROTOLUENE	118-96-7	SV	5.76E-03	3.70E-02	5.76E-03	C
URANIUM (SOLUBLE SALTS; from IRIS)	7440-61-1	M		2.22E-01	2.22E-01	NC
URANIUM (SOLUBLE SALTS; provisional)	7440-61-1	M		1.48E-02	1.48E-02	NC
VANADIUM	7440-62-2	M		7.41E-02	7.41E-02	NC
VINCLOZOLIN	50471-44-8	SV		1.85E+00	1.85E+00	NC
VINYL ACETATE	108-05-4	V		4.23E+00	4.23E+00	NC
VINYL CHLORIDE: adult (see cover memos)	75-01-4	V	1.15E-02	2.07E+00	1.15E-02	C
WARFARIN	81-81-2	SV		2.22E-02	2.22E-02	NC
O-XYLENE	95-47-6	V		2.22E+00	2.22E+00	NC
M,P-XYLENES	1330-20-7	V		2.22E+00	2.22E+00	NC
XYLENES	1330-20-7	V		2.22E+00	2.22E+00	NC
ZINC	7440-66-6	M		2.22E+01	2.22E+01	NC
ZINEB	12122-67-7	SV		3.70E+00	3.70E+00	NC

APPENDIX G

2022 Human Health Risk Screen Evaluation

Hill Air Force Base, Utah

75 CEG/CEIE

Final
Utah Test and Training Range
Thermal Treatment Unit
2022 Human Health Risk Screen
Evaluation

Contract No.: W9123822C0011

January 2023

F I N A L

Utah Test and Training Range
Thermal Treatment Unit
2022 Human Health Risk Screen Evaluation
Contract No.: W9123822C0011

Prepared for:

Hill Air Force Base
75 CEG/CEIE
Environmental Branch
Civil Engineer Group

January 2023

Jacobs

6440 S. Millrock Dr
Suite 300
Holladay, UT 84121

Executive Summary

ES.0.0.1 This five-year review human health risk screening evaluation (HHRSE) was conducted for the Thermal Treatment Unit (TTU) as required by the current Utah Test and Training Range Resource Conservation and Recovery Act Part B Hazardous Waste Operating Permit**.** This HHRSE does not show unacceptable risks for site worker exposures to TTU soil or offsite air exposure for any of the three exposure scenarios (Explosive Ordnance Disposal [EOD] worker, Salt Lake boater, and Oasis resident).

ES.0.0.2 For surface soil exposure by industrial worker, the cumulative excess lifetime cancer risk (ELCR) and cumulative noncancer and hazard index (HI) remained essentially unchanged compared with the 2018 HHRSE. The cumulative ELCR was 3×10^{-6}, which is slightly above the lower end of the 1×10^{-6} to 1×10^{-4} target risk range and unchanged from the 2018 value. The noncancer HI remained below the target HI of 1. Practically all the carcinogenic risk associated with soil arises from arsenic. Arsenic is not known to be a major component of the open burn/open denotation items. Furthermore, arsenic concentrations in TTU soil are consistent with site-specific background concentrations (CH2M HILL, 2011a), indicating that it is naturally occurring. Excluding the naturally occurring arsenic, the cumulative ELCR for the site worker was below 1×10^{-6}.

ES.0.0.3 For the offsite air exposures (EOD worker, Salt Lake boater, and Oasis resident), the calculated cumulative ELCRs were within the target ELCR range of 1×10^{-6} to 1×10^{-4}. The calculated HIs did not exceed acceptable levels for any exposure scenario. As a result, modifications to Attachment 10B of the permit are not warranted at this time.

This page intentionally left blank.

Contents

Tables

Appendix

Acronyms and Abbreviations

- -	not analyzed
µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
AFB	Air Force Base
ATSDR	Agency for Toxic Substances and Disease Registry
B	The analyte was detected in the associated method and/or calibration blank.
bgs	below the ground surface
Cal EPA	California Environmental Protection Agency
CAS	Chemical Abstracts Service
CFR	*Code of Federal Regulations*
ELCR	excess lifetime cancer risk
EOD	explosive ordnance disposal
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ft	foot (feet)
HEAST	Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HHRSE	Human Health Risk Screening Evaluation
HI	hazard index
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HQ	hazard quotient
ID	identification
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
J	The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
kg	kilogram(s)
mg/kg	milligram(s) per kilogram
mg/kg-day	milligram(s) per kilogram per day
mg/L	milligram(s) per liter
mg/m^3	milligram(s) per cubic meter
MIDAS	Munitions Items Disposition Action System
N/A	not applicable or available
OB	open burn
OD	open detonation
PPRTV	Provisional Peer-reviewed Toxicity Values

RBC	risked-based concentration
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RfC	inhalation reference concentration
RfD	oral reference dose
RSL	regional screening level
SF	oral cancer slope factor
TTU	thermal treatment unit
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UB	The analyte is not detected at or above the indicated concentration due to blank contamination.
UCL	upper confidence limit (on the mean)
UDEQ	Utah Department of Environmental Quality
UJ	The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
UTTR	Utah Test and Training Range

SECTION 1

General

1.0.0.1 Hill Air Force Base (AFB) has been carrying out open burn (OB)/open detonation (OD) operations at the Utah Test and Training Range (UTTR)-North (U.S. Environmental Protection Agency [EPA] ID Number UT 0570090001) Thermal Treatment Unit (TTU) under a Resource Conservation and Recovery Act (RCRA) Part B permit issued by the Utah Department of Environmental Quality (UDEQ). The 1997 human health risk assessment (HHRA) submitted in support of the original permit request indicated that the OB/OD operations would not cause undue harm to the potential onsite and offsite receptors. The risk evaluation was updated in April 2005 with the inclusion of additional soil sampling data from the 2002 and 2004 sampling events. The human health risk screening evaluations (HHRSEs) were performed in 2007, 2009, 2011, 2013, and 2018 with updated soil sampling data. These evaluations also indicated that there was no unacceptable risk from the OB/OD operations to the potential onsite and offsite receptors. The 2005 risk assessment forms the baseline against which the future soil sampling data must be evaluated, in terms of changes in the human health risk from the ongoing OB/OD operations.

1.0.0.2 The risk assessment must be evaluated every 5 years with the biennial soil sampling data. This HHRSE assesses the human health risks using 2019 and 2021 soil data. The scope pertaining to this risk assessment update includes:

1. A review of the chemicals in Attachments 10A and 10B to add additional emissions as a result of updates in the Munitions Items Disposition Action System (MIDAS) database or other relevant emission data.
2. A review of the toxicity information (reference doses, cancer slope factors), in Attachments 10A and 10B, to include any new or updated toxicity data.
3. A review of environmental sampling data acquired since the last evaluation and discussion of how these data affect the risk assessments in Attachments 10A and 10B.

1.1 Evaluation of the Risk Assessments

1.1.0.1 This evaluation of the completeness and accuracy of the HHRA (Attachment 10B of the permit) has been prepared and is being submitted to UDEQ as required by Condition II.F of the RCRA permit. This HHRSE includes a review of the chemicals in Attachment 10B (human health) with respect to updates in the MIDAS database or other relevant emission data; a review of the toxicity information (reference doses, cancer slope factors) in Attachment 10B; and any new or updated toxicity data. This 2018 HHRSE includes a review of the environmental sampling data acquired since the last HHRSE conducted in 2018 and discusses how the new data affect the risk assessments in Attachment 10B.

1.1.0.2 The treatment of a single MOAB by OD on the TTU was reported as a new waste stream in the 2020 Waste Characterization Technical Memo. The MOAB weapon system can use either tritonal or H-6 explosive fill. While the MOAB weapon system is identified as a new waste stream since 2018, the ingredients of both tritonal and H-6 explosives are included in the historic and current waste streams treated at the TTU.

1.1.0.3 The 1997, 2005, 2007, 2009, 2011, 2013, and 2018 HHRSEs addressed risks for four distinct exposure scenarios or pathways. These are the groundwater exposure pathway (Section 2.0), the surface water exposure pathway (Section 3.0), the surface soil exposure pathway (Section 4.0), and the air exposure pathway (Section 5.0). All previous HHRSEs established a lack of exposure to groundwater and surface water. New groundwater analytical results collected since 2018 show that no explosives or

explosive breakdown products were detected in the groundwater in 2018, 2019, 2020, or 2021. Consequently, the discussion about groundwater (Section 2.0) and surface water (Section 3.0) does not substantially differ from that presented in the 2005, 2007, 2009, 2011, 2013, and 2018 HHRSEs.

1.1.0.4 Section 4.0 discusses the potential risks for soil ingestion, inhalation, and dermal adsorption to an industrial worker. The industrial worker exposure assumptions represent a full-time career person working at the TTU. The industrial worker was not evaluated in the original permit. Rather, a resident and a construction worker involved in a hypothetical residential development onsite were evaluated. Given the unlikelihood that the site will ever be developed, the residential development scenario is not realistic; therefore, the assessment of risks to these hypothetical receptors is not appropriate at this time and has not been included. On the other hand, maintenance of the OB/OD area by an industrial worker is a current activity. Therefore, potential exposure to soil by the industrial TTU worker is considered complete and an assessment of this exposure scenario is required by Section III.G.1 of the Part B permit.

1.1.0.5 Section 5.0 discusses the air exposure pathway and analyzes inhalation risks to (1) explosive ordnance disposal (EOD) personnel monitoring the OB/OD operations onsite, (2) a recreational boater on the Great Salt Lake, and (3) a resident at the nearby community of Oasis (limited access, onsite, operational headquarters and lodging for the UTTR). These receptors remain the same as in the original permit, but toxicity information has been updated and chemical-specific risks have been recalculated.

SECTION 2

Groundwater Pathway (40 CFR 264.601[a] and R315-264-601)

2.1 Performance Standards

2.1.0.1 The environmental performance standard for protection of groundwater calls for the prevention of any releases that may adversely affect human health or the environment due to migration of waste constituents in the groundwater or subsurface environments. Specific items to be considered include the following:

- The volume and chemical characteristics of the waste in the unit
- The hydrogeologic and geologic characteristics of the unit and surrounding area
- The existing quality of groundwater
- The quantity and direction of groundwater flow
- The proximity to and withdrawal rates of current and potential groundwater users
- The patterns of land use in the region
- The potential for deposition or migration of waste constituents into the subsurface, physical structures, and the root zone of food chain crops and other vegetation
- The potential for health risks caused by human exposure to waste constituents
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents

2.2 Required Programs

2.2.0.1 Utah regulations require groundwater monitoring and reporting at all hazardous waste management facilities unless a waiver is granted. The groundwater monitoring program consists of detection monitoring, compliance monitoring, and monitoring during and after corrective actions. Groundwater monitoring at the TTU is conducted on an annual basis.

2.3 Site-specific Conditions

2.3.0.1 Groundwater and geologic conditions beneath the TTU facility were investigated, starting in 1991, through installing and sampling Monitoring Wells TTU-l and TTU-2. Boreholes for the wells revealed extensive thicknesses of unsaturated, low permeability soils. Groundwater in an unnamed aquifer occurs at depths ranging from 450 feet (ft) near the southwest corner of the facility to 650 ft beneath the ridge at Sedal Pass above the TTU. Based on groundwater levels in the upgradient and downgradient monitoring wells, depth to groundwater beneath the three OB/OD units is estimated to be greater than 585 ft.

2.3.0.2 Groundwater samples collected from the wells at TTU-l and TTU-2 since 2018 were analyzed for energetics and metals. Table 2-1 shows the detected analytes. Each is commonly found in area soils.

2.3.0.3 Analytical results show various metals were present in groundwater samples taken from both monitoring wells in 2018, 2019, 2020, and 2021 (Table 2-1). New groundwater analytical results collected since 2018 show that, although there is variability in the concentrations of naturally occurring metals in the groundwater, there is no indication of metals associated with TTU waste streams affecting groundwater. No explosives or explosive breakdown products were detected in the groundwater. Perchlorate, which is both naturally occurring and used as an oxidizer in propellants, was detected at concentrations consistent with those previously observed (approximately 1 microgram per liter (ug/L), with the exception of the 2018 sample in TTU-2 (2.01 ug/L).

2.3.0.4 Samples collected since 2018 and presented in the previous HHRSEs show the presence of perchlorate levels around 1 ug/L in groundwater, with the exception of the 2018 sample in TTU-2 (2.01 ug/L). Those findings do not appear to be the result of laboratory or field contamination. A previous groundwater dating study using carbon-14, tritium/helium, and chlorofluorocarbon methods has demonstrated that groundwater in this area is Pleistocene in age (14,000 years before present), is essentially stagnant, and receives little or no current recharge (CH2M HILL, 2006). That study supports the conclusion that some perchlorate in groundwater beneath the TTU is naturally occurring.

The observed increases in metal and perchlorate concentrations along with a lack of explosives or their decomposition products is believed to indicate that well TTU-2 data may be affected due to its proximity to the large detonation events on the TTU and dust contamination from TTU activities. Although perchlorate was detected at a concentration (2.01 ug/L) at TTU-2 higher than previously observed in 2018, this observation was expected to be attributable to dust contamination from outside the well. The detected concentration of perchlorate in the subsequent sampling events in 2019, 2020, and 2021 are consistent with levels observed in the past (less than 1 ug/L). Ground movement at well TTU-2 is believed to be in excess of 1 inch during the largest detonations on the TTU; this provides potential for damage to the well and the well seals. The top of the well is also subjected to significant overpressure from these detonations. For this reason, a seal is maintained on the well head cap to prevent outside contamination. The metals detected in the well with increasing concentrations are not associated with TTU activities but many of the metals are associated with well construction materials. The TTU-2 well pump was replaced in 2021. The low flow pump was replaced with a high flow Grundfos pump, as had been previously utilized, to allow for purging of stagnant water containing corrosion byproducts from the well.

2.3.0.5 Groundwater contamination from TTU OB/OD activity has been considered unlikely because of the following:

- Groundwater occurs at greater than 400 to 600 ft below the ground surface (bgs).
- The average annual precipitation is generally low (i.e., approximately 6 inches per year).
- The potential for evapotranspiration is high.
- The soil deposits exhibit low permeability characteristics.

Given the groundwater increases in metals not associated with OB/OD on the TTU and increases in perchlorate in well TTU-2, further investigation of well TTU-2 indicated well pump TTU-2 needed replacement.

2.3.0.6 A subsurface investigation performed in 2007 indicated that contamination was relatively shallow.

2.3.0.7 As discussed in Attachment 1 of the hazardous waste operating permit, the amount of groundwater recharged due to infiltration is slight. Groundwater recharge near the TTU enters the groundwater system only along the margins of the adjacent mountains where coarser-grained sediments are present.

2.4 Assessment of Potential Health Risks

2.4.0.1 Analytical results indicate that groundwater beneath the TTU has likely not been contaminated by OB/OD activities. In addition to the lack of groundwater contamination, the groundwater under the TTU is not potable, so it is extremely unlikely that anyone would drink from the same groundwater source that lies beneath the TTU and be at risk for groundwater exposure because of TTU activities.

- Migration of contaminants from surface soil to the water table is limited. The area receives less than 6 inches of precipitation per year, on average; the soil and rock beneath the TTU have low vertical permeabilities; and groundwater is more than 400 ft bgs.
- There is no current or projected future use of groundwater resources near the TTU.
- Based on this assessment, the groundwater exposure pathway is considered incomplete. The groundwater protection performance standard has been met, and no revision to the permit is needed to address groundwater exposures.

This page intentionally left blank.

Table 2-1. TTU Groundwater Monitoring Well Sampling Results

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Analyte	Location / Sample Date	Units	TTU-1 11/14/2018	TTU-2 11/14/2018	TTU-1 11/13/2019	TTU-2 11/13/2019	TTU-1 11/18/2020	TTU-2 11/17/2020	TTU-1 11/16/2021	TTU-2 11/17/2021
VOCs										
Energetics										
1,3,5-Trinitrobenzene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dinitrobenzene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4,6-Trinitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,4-Dinitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2,6-Dinitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Amino-4,6-Dinitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Nitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
3-Nitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Amino-2,6-Dinitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
4-Nitrotoluene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
HMX		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nitrobenzene		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
RDX		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetryl		µg/L	1.0 U	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Metallic Species										
Aluminum		µg/L	100 U	500 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic		µg/L	**13.8**	5 U	**12.4**	**0.232 J**	**13**	**0.252 J**	**12.8**	**0.163**
Barium		µg/L	**33.1**	**181**	**29.6**	**70**	**28.1**	**91.2**	**29.3**	**99.5**
Beryllium		µg/L	1 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium		µg/L	1 U	5 U	0.2 U	**0.66 J**	0.2 U	**0.632 J**	0.2 U	**1.36**
Chromium		µg/L	1 U	5 U	**0.105 J**	0.2 U	**0.398 J**	**0.142 J**	**0.136 J**	0.2 U
Iron		µg/L	100 U	**566000**	**10 U**	**737**	**5.22 J**	**48.7**	10 U	**7530**
Lead		µg/L	1 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Mercury		µg/L	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel		µg/L	**1.32**	**799**	**0.42**	**33.5**	**0.339 J**	**318**	**0.463**	**399**
Selenium		µg/L	**3.93**	5 U	**3.64**	**3.35**	**4.09**	**2.06**	**3.98**	**3.29**
Silver		µg/L	1 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.118 J**
Vanadium		µg/L	**15.5**	5 U	**14.7**	**0.929 J**	**17.2**	**0.641 J**	0.5 U	0.5 U
Zinc		µg/L	20 U	**186000**	**10.4 J**	**57100**	10.0 U	**98500**	10 U	**252000**
General Chemical Assays										
Total Alkalinity		mg/L	**70.6**	**73**	**126**	**228**	**68.8**	**191**	**62**	**122**

Table 2-1. TTU Groundwater Monitoring Well Sampling Results

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Analyte	Location / Sample Date	Units	TTU-1 11/14/2018	TTU-2 11/14/2018	TTU-1 11/13/2019	TTU-2 11/13/2019	TTU-1 11/18/2020	TTU-2 11/17/2020	TTU-1 11/16/2021	TTU-2 11/17/2021
Bicarbonate Alkalinity		mg/L	**64**	**73**	**94.4**	**228**	**52**	**191**	**49.6**	**122**
Carbonate Alkalinity		mg/L	**6.58**	5 U	**31.3**	5 U	**16.8**	5 U	**12.4**	5 U
Chloride		mg/L	**512**	**2890**	**483**	**910**	**484**	**1150**	**460**	**1360**
Fluoride		mg/L	**0.358**	0.4 U	**0.372**	**0.3**	**0.391**	**0.282**	**0.284**	**0.214**
Nitrate-Nitrite		mg/L	**0.331**	0.25 U	**0.345 J**	**1.43**	**0.6**	**0.764**	**0.493**	**0.731**
Sulfate		mg/L	**134**	**125**	**129**	**107**	**131**	**112**	**124**	**103**
Total Dissolved Solids		mg/L	**972**	**5390**	**1100**	**2190**	**1060**	**1940**	**1120**	**2760**
Total Phosphorus		mg/L	0.1 U	0.1 U	**0.0188 J**	0.03 U	**0.0263 J**	**0.038 J**	0.03 U	0.03 U
Perchlorate		µg/L	0.5 U	**2.01**	**0.249**	**0.353**	**0.379**	**0.481**	**0.424**	**1.0**

Notes:

ID = identification

mg/L = milligram(s) per liter

µg/L = microgram(s) per liter

B = The analyte was detected in the associated method and/or calibration blank.

J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

Bold indicates the analyte was detected.

SECTION 3

Surface Water (40 CFR 264.601[b] and R315-264-601)

3.1 Performance Standards

3.1.0.1 The environmental performance standard for surface water calls for the prevention of any releases that may have adverse effects on human health or the environment due to migration of waste constituents in surface water or in wetlands. Considerations include the following:

- The volume and physical and chemical characteristics of the waste in the unit
- The effectiveness and reliability of containing, confining, and collecting systems and structures and preventing migration
- The hydrologic characteristics of the unit and surrounding area, including the topography and land around the unit
- The patterns of precipitation in the region
- The quantity, quality, and direction of groundwater flow
- The proximity of the unit to surface waters
- The current and potential uses of nearby surface waters and any other water quality standards established for those surface waters
- The existing quality of surface waters and surface soils, including other sources of contamination
- Patterns of land use in the region
- The potential for health risks caused by human exposure to waste constituents
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents

3.2 Required Programs

3.2.0.1
The requirement for surface water monitoring is found in Section III.G.4.a of the TTU permit:

> Surface water accumulation will be monitored during the monthly environmental compliance inspection of the TTU required by Condition II.H. and described in Attachment 5. Sampling of observed surface water will take place within 24 hours if, in the judgement of the Facility inspector, significant surface water accumulation is observed that is likely to facilitate contaminant transport or serve as a water source for wildlife. The area of inspection for surface water will be limited to the TTU boundary.

3.3 Site-specific Conditions

3.3.0.1 There are no permanent surface water bodies within the confines of the TTU or in the surrounding area. However, there is an erosional dry wash located topographically below the TTU subunits. Surface water may also collect in detonation craters or other depressions within the TTU

operational area, although the area is actively managed to facilitate storm water runoff. Surface water is present in the dry wash and detonation craters infrequently during major storm events. Annual precipitation in and around the TTU is generally less than 6 inches per year. The only additional water input to the site is from localized dust control operations. Because the TTU sub-units are located near the top of the precipitation catchment basin, there is little potential for surface water runoff collecting in the subunits. The natural topography directs the flow away from active portions of the TTU. The closest surface water body to the TTU is the Great Salt Lake, which lies approximately 3 miles eastward. Because the TTU is located on the west side of the Lakeside Mountain Range, surface water runoff from the TTU facility is directed to the west, away from the Great Salt Lake, into the Sink Valley, which is a closed, internally drained basin.

3.3.0.2 For these reasons, surface water resources in the vicinity will not be affected by OB/OD operations at the TTU. In addition, there are no significant surface water exposure pathways from the TTU subunits to potential human receptors.

3.3.0.3 The only surface water present at the TTU is the infrequent accumulation of storm water in a detonation crater and dry wash. A heavy rain event in August 2012 resulted in the accumulation of surface water runoff in one of the detonation craters. Surface water was collected from the crater in 2012 and evaluated for potential risks in the 2013 HHRSE. No accumulations of surface water have been observed at the site since 2013; therefore, surface water is not evaluated in this 2022 HHRSE. Human health risks and hazards via surface water exposure pathway are considered insignificant because the limited duration of standing water and limited access renders potential exposures de minimis. Therefore, there is no potential for significant human health risks from this pathway.

SECTION 4

Surface Soil (40 CFR 264.601[b] and R315-264-601)

4.1 Performance Standards

4.1.0.1 The environmental performance standard for soil calls for the prevention of any releases that may have adverse effects on human health.

4.2 Required Programs

4.2.0.1 Soil sampling at the TTU is required on a biennial basis as described in Section III.G.1 of the UTTR RCRA Permit.

4.3 Surface Soil Data

4.3.0.1 This report addresses soil data from the 2019 and 2021 sampling events (CH2M HILL, 2020; CH2M HILL, 2022). The analytical data for these sampling events were verified and validated according to the Air Force Center for Engineering and the Environment data quality assessment and validation guidelines. The discussion in this section pertains to data collected in 2019 and 2021 and constitutes the 2022 risk assessment review required by the current RCRA permit.

4.3.1 Chemicals of Concern

4.3.1.1 Table 4-1 presents the descriptive statistics for the soil samples collected in 2019 and 2021, including the total number of samples, number of detects, and maximum detected concentrations by analyte.

4.3.1.2 EPA Region 8 does not require a toxicity assessment for chemicals with less than a 5% detection frequency. However, Hill AFB evaluated all the detected analytes in the HHRSE regardless of the detection frequency. The surface soil analytes are presented in Table 4-1.

4.3.2 Exposure Point Concentrations

4.3.2.1 Maximum detected concentrations were used conservatively as exposure point concentrations (EPCs) in the HHRSE. The tiered approach was applied in this HHRSE: risk was evaluated first with observed maximum detected concentrations. If a risk estimated based on the maximum detected concentration indicates potential unacceptable risk, then statistically derived 95% upper confidence level (UCL) on mean concentrations would be calculated and used as EPCs in a subsequent risk estimation.[1]

4.3.3 Background Evaluation

4.3.3.1 Most of the metals detected in the TTU samples also occur naturally. In risk characterization, it is important to distinguish metals that may be attributable to the OB/OD operations from those not originating from the operations. If the site sample concentration for a metal is not statistically distinguishable from the natural concentration, it could be concluded that TTU operations have not

[1] Because the risks estimated based on the maximum detected concentrations did not indicate unacceptable risks, a subsequent evaluation of risks based on 95% UCLs of mean was not warranted in this HHRSE.

affected the area soils with respect to that metal; therefore, that metal can be excluded from risk characterization.

4.3.3.2 Soil characterization studies surrounding the TTU have adequately characterized the background soil composition (CH2M HILL, 2011b; Appendix A). This updated HHRA report addresses background versus site comparisons only for analytes that exceed risk based screening levels.

4.4 Assessment of Potential Health Risks

4.4.0.1 The HHRSE was conducted to determine whether existing concentrations of the analytes in soil indicate potential unacceptable health risk for the industrial worker. The EPA's regional screening levels (RSLs) for the industrial worker soil exposure were the basis of this HHRSE (EPA, 2022a). The RSLs are risk-based concentrations (RBCs) derived from standardized equations combining exposure information assumptions with EPA toxicity data. The RSLs are considered by the EPA to be protective for humans (including sensitive groups) over a lifetime. The excess lifetime cancer risk (ELCR) and hazard quotient (HQ) used to calculate the RSLs are 10^{-6} and 1, respectively.

4.4.1 Exposure and Intake Parameters

4.4.1.1 The RSLs account for exposure to soil via incidental ingestion, dermal contact, and inhalation of volatiles and particulate inhalation. These are the same exposure pathways considered in the 2018 HHRSE (CH2M HILL, 2013).

4.4.1.2 The RSL table and User's Guide (EPA, 2022a) presenting the updated EPA default exposure factors and resulting RSLs are presented in Appendix A and the EPA's Regional Screening Level User's Guide (EPA, 2022b).

4.4.2 Toxicity Factors

4.4.2.1 The RSLs use toxicity factors derived from the three-tier hierarchy established by EPA (2003). These sources include the following:

- Tier 1—The EPA's Integrated Risk Information System.
- Tier 2—The EPA's Provisional Peer reviewed Toxicity Values (PPRTVs).
- Tier 3—Other Toxicity Values. Tier 3 includes additional EPA and non-EPA sources of toxicity information.
  - The Agency for Toxic Substances and Disease Registry minimal risk levels
  - The California Environmental Protection Agency Office of Environmental Health Hazard Assessment Toxicity Criteria Database
  - The EPA's PPRTV Screening Toxicity Values
  - The EPA's Health Effects Assessment Summary Table.

4.4.2.2 Table 4-2 contains the toxicity factors for analytes detected in TTU soils. Table 4-3 summarizes changes in toxicity factors that would result in a potential increase of the risks previously estimated in the 2018 HHRSE based on the current toxicity factors.

4.4.3 Risk Characterization

4.4.3.1 The ELCR and noncancer HI for detected analytes were calculated using the chemical-specific EPCs and RSL as follows:

- ELCR = EPC/Cancer RSL×10^{-6}
- HI = EPC/Noncancer RSL

4.4.3.2 Table 4-1 presents the RSLs, ELCRs, and HQs for individual analytes. The cumulative ELCR was calculated by adding the ELCRs for the individual analytes. The noncancer hazard index (HI) was calculated by adding the HQs for the individual analytes. These cumulative estimates are also presented in Table 4-1.

4.4.3.3 For surface soil exposure, the cumulative ELCR and cumulative noncancer HI remained essentially unchanged compared with the 2018 HHRSE. The noncancer HI (0.3) was well below the target level of 1. The cumulative ELCR was 3×10^{-6}, which is slightly above the lower end of the 1×10^{6} to 1×10^{4} target risk range. Practically all the carcinogenic risk (91%) associated with soil arises from arsenic. Arsenic is not known to be a major component of the OB/OD items. Furthermore, arsenic concentrations in TTU soil are consistent with site-specific background concentrations (CH2M HILL, 2011a), indicating that it is naturally occurring. Excluding the naturally occurring arsenic, the calculated cumulative ELCR for the site worker ($2x10^{7}$) is below 1×10^{-6}. These results indicate that no modification to the permit Attachment 10B is warranted with respect to soil exposure at the TTU.

This page intentionally left blank.

Table 4-1. Summary Statistics for Surface Soil Samples Collected between 2019 and 2021 and Estimation of Screening Excess Lifetime Cancer Risk and Hazard Index for an Industrial Worker

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

			Summary Statistics					Risk Screening					
Analyte Group	**Chemical Name**	**CAS Number**	**Sample Count**	**Detection Count**	**Detection Frequency**	**2019-21 Maximum Result (mg/kg)**	**EPC Basis[a]**	**Cancer RSL[b] (mg/kg)**	**Screening ELCR[c]**	**ELCR Percent Total[d]**	**Noncancer RSL[b] (mg/kg)**	**Screening HQ[c]**	**HI Percent Total[d]**
GenChem	Chloride	16887-00-6	12	8	67%	3100	Max	--	--		--	--	
	Nitrate as Nitrogen	7697-37-2	12	12	100%	24	Max	--	--		--	--	
	Perchlorate	14797-73-0	12	12	100%	9.6	Max	--	--		820	1.2E-02	4%
	Sulfate	14808-79-8	12	9	75%	3400	Max	--	--		--	--	
Explosives	Nitroglycerin	55-63-0	12	3	25%	15	Max	140	1.1E-07	4%	82	1.8E-01	59%
	Nitroguanidine	556-88-7	12	0	0%	<0.02	--	--	--		82000	--	
	PETN	78-11-5	12	0	0%	<0.49	--	530	--		7400	--	
	Picric Acid	88-89-1	12	0	0%	<0.056	--	--	--		1600	--	
Metal	Aluminum	7429-90-5	12	12	100%	18000	Max	--	--		1100000	1.6E-02	5%
	Antimony	7440-36-0	12	12	100%	0.66	Max	--	--		470	1.4E-03	
	Arsenic	7440-38-2	12	12	100%	7	Max	3	2.3E-06	91%	480	1.5E-02	5%
	Barium	7440-39-3	12	12	100%	270	Max	--	--		220000	1.2E-03	
	Beryllium	7440-41-7	12	12	100%	0.73	Max	6900	1.1E-10		2300	3.2E-04	
	Cadmium	7440-43-9	12	12	100%	0.67	Max	9300	7.2E-11		100	6.7E-03	2%
	Calcium	7440-70-2	12	12	100%	170000	Max	--	--		--	--	
	Chromium[e]	7440-47-3	12	12	100%	15	Max	--	--		1800000	8.3E-06	
	Cobalt	7440-48-4	12	12	100%	4.2	Max	1900	2.2E-09		350	1.2E-02	4%
	Copper	7440-50-8	12	12	100%	18	Max	--	--		47000	3.8E-04	
	Iron	7439-89-6	12	12	100%	13000	Max	--	--		820000	1.6E-02	5%
	Lead	7439-92-1	12	12	100%	17	Max	--	--		800	[f]	
	Magnesium	7439-95-4	12	12	100%	22000	Max	--	--		--	--	
	Manganese	7439-96-5	12	12	100%	500	Max	--	--		26000	1.9E-02	6%
	Mercury	7439-97-6	12	9	75%	0.015	Max	--	--		46	3.3E-04	
	Molybdenum	7439-98-7	12	12	100%	2.8	Max	--	--		5800	4.8E-04	
	Nickel	7440-02-0	12	12	100%	12	Max	64000	1.9E-10		22000	5.5E-04	
	Potassium	7440-09-7	12	12	100%	6200	Max	--	--		--	--	
	Selenium	7782-49-2	12	12	100%	0.23	Max	--	--		5800	4.0E-05	
	Silver	7440-22-4	12	12	100%	0.23	Max	--	--		5800	4.0E-05	
	Sodium	7440-23-5	12	12	100%	3800	Max	--	--		--	--	

Table 4-1. Summary Statistics for Surface Soil Samples Collected between 2019 and 2021 and Estimation of Screening Excess Lifetime Cancer Risk and Hazard Index for an Industrial Worker

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Analyte Group	Chemical Name	CAS Number	Summary Statistics					Risk Screening					
			Sample Count	Detection Count	Detection Frequency	2019-21 Maximum Result (mg/kg)	EPC Basis[a]	Cancer RSL[b] (mg/kg)	Screening ELCR[c]	ELCR Percent Total[d]	Noncancer RSL[b] (mg/kg)	Screening HQ[c]	HI Percent Total[d]
	Strontium	7440-24-6	12	12	100%	420	Max	--	--		700000	6.0E-04	
	Thallium	7440-28-0	12	12	100%	0.22	Max	--	--		12	1.8E-02	6%
	Vanadium	7440-62-2	12	12	100%	24	Max	--	--		5800	4.1E-03	1%
	Zinc	7440-66-6	12	12	100%	48	Max	--	--		350000	1.4E-04	
SVOC	1,3,5-Trinitrobenzene	99-35-4	12	0	0%	<0.014	--	--	--		32000	--	
	2,4,6-Trinitrotoluene (TNT)	118-96-7	12	0	0%	<0.031	--	96	--		510	--	
	2,4-Dinitrotoluene	121-14-2	12	3	25%	0.76	Max	7.4	1.0E-07	4%	1600	4.8E-04	
	2,6-Dinitrotoluene	606-20-2	12	1	8%	0.019	Max	1.5	1.3E-08		250	7.6E-05	
	2-Amino-4,6-dinitrotoluene	35572-78-2	12	0	0%	<0.033	--	--	--		110	--	
	2-Nitrotoluene	88-72-2	12	0	0%	<0.047	--	15	--		1100	--	
	3-Nitrotoluene	99-08-1	12	0	0%	<0.064	--	--	--		82	--	
	4-Amino-2,6-dinitrotoluene	19406-51-0	6	0	0%	<0.03	--	--	--		110	--	
	4-Nitrotoluene - SS	99-99-0	12	0	0%	<0.037	--	140	--		3300	--	
	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	12	1	8%	0.052	Max	38	1.4E-09		4400	1.2E-05	
	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	12	0	0%	<0.044	--	--	--		2300	--	
	Nitrobenzene	98-95-3	12	0	0%	<0.085	--	22	--		1300	--	
	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	12	3	25%	1.1	Max	--	--		57000	1.9E-05	
VOC	1,3-Dinitrobenzene	99-65-0	12	0	0%	<0.017	--	--	--		82	--	
							Total		**3E-06**			**3E-01**	

Notes:

[a] Maximum detected concentrations were used conservatively as EPC.

[b] Industrial Soil RSLs (May 2022) based on a target ELCR of 10^{-6} (1e-06) and HQ of 1.

[c] Screening ELCR and HQ were calculated conservatively based on the ratio of maximum detected concentration (as EPC) to RSL for respective health end point.

d Percent contribution to receptor total ELCR and HI greater than or equal to 1% is presented.

e Chromium III RSL was used as a surrogate for total chromium

f EPA considers lead to be a special case because of the difficulty in identifying the classic “threshold” needed to develop a RfD; therefore, HI was not calculated for lead.

The industrial soil RSL of 800 mg/kg was used as the screening level for soil. The maximum detected concentration of lead was more than an order of magnitude lower than the industrial soil RSL.

CAS = Chemical Abstracts Service

Max = maximum

mg/kg = milligram(s) per kilogram

RfD = reference dose

Table 4-2. Toxicity Factors

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Chemical Name	Standard Name	CAS Number	SF $(mg/kg\text{-}day)^{-1}$	SF Ref	RfD (mg/kg-day)	RfD Ref	IUR $(\mu g/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref
1,3,5-Trinitrobenzene	Trinitrobenzene, 1,3,5-	99-35-4	--	--	0.03	I	--	--	--	--
1,3-Dinitrobenzene	Dinitrobenzene, 1,3-	99-65-0	--	--	0.0001	I	--	--	--	--
2,4,6-Trinitrotoluene (TNT)	Trinitrotoluene, 2,4,6-	118-96-7	0.03	I	0.0005	I	--	--	--	--
2,4-Dinitrotoluene	Dinitrotoluene, 2,4-	121-14-2	0.31	C	0.002	I	0.000089	C	--	--
2,6-Dinitrotoluene	Dinitrotoluene, 2,6-	606-20-2	1.5	P	0.0003	X	--	--	--	--
2-Amino-4,6-dinitrotoluene	Dinitrotoluene, 2-Amino-4,6-	35572-78-2	--	--	0.0001	X	--	--	--	--
2-Nitrotoluene	Nitrotoluene, o-	88-72-2	0.22	P	0.0009	P	--	--	--	--
3-Nitrotoluene	Nitrotoluene, m-	99-08-1	--	--	0.0001	X	--	--	--	--
4-Amino-2,6-dinitrotoluene	Dinitrotoluene, 4-Amino-2,6-	19406-51-0	--	--	0.0001	X	--	--	--	--
4-Nitrotoluene - SS	Nitrotoluene, p-	99-99-0	0.016	P	0.004	P	--	--	--	--
Aluminum	Aluminum	7429-90-5	--	--	1	P	--	--	0.005	P
Antimony	Antimony (metallic)	7440-36-0	--	--	0.0004	I	--	--	0.0003	A
Arsenic	Arsenic, Inorganic	7440-38-2	1.5	I	0.0003	I	0.0043	I	0.000015	C
Barium	Barium	7440-39-3	--	--	0.2	I	--	--	0.0005	H
Beryllium	Beryllium and compounds	7440-41-7	--	--	0.002	I	0.0024	I	0.00002	I
Cadmium	Cadmium (Diet)	7440-43-9	--	--	0.0001	A	0.0018	I	0.00001	A
Calcium	Calcium	7440-70-2	--	--	--	--	--	--	--	--
Chloride	Chloride	16887-00-6	--	--	--	--	--	--	--	--
Chromium[a]	Chromium	7440-47-3	--	--	1.5	I	--	--	--	--
Cobalt	Cobalt	7440-48-4	--	--	0.0003	P	0.009	P	0.000006	P
Copper	Copper	7440-50-8	--	--	0.04	H	--	--	--	--
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	0.08	I	0.004	I	--	--	--	--
Iron	Iron	7439-89-6	--	--	0.7	P	--	--	--	--
Lead	Lead and Compounds	7439-92-1	--	--	--	--	--	--	--	--
Magnesium	Magnesium	7439-95-4	--	--	--	--	--	--	--	--
Manganese	Manganese (Non-diet)	7439-96-5	--	--	0.024	G	--	--	0.00005	I
Mercury	Mercury (elemental)	7439-97-6	--	--	--	--	--	--	0.0003	I
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	Tetryl (Trinitrophenylmethylnitramine)	479-45-8	--	--	0.002	P	--	--	--	--
Molybdenum	Molybdenum	7439-98-7	--	--	0.005	I	--	--	0.002	A
Nickel	Nickel Soluble Salts	7440-02-0	--	--	0.02	I	0.00026	C	0.00009	A
Nitrate as Nitrogen	Nitrate as Nitrogen	7697-37-2	--	--	--	--	--	--	--	--

Table 4-2. Toxicity Factors

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Chemical Name	Standard Name	CAS Number	SF $(mg/kg\text{-}day)^{-1}$	SF Ref	RfD (mg/kg-day)	RfD Ref	IUR $(\mu g/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref
Nitrobenzene	Nitrobenzene	98-95-3	--	--	0.002	I	0.00004	I	0.009	I
Nitroglycerin	Nitroglycerin	55-63-0	0.017	P	0.0001	P	--	--	--	--
Nitroguanidine	Nitroguanidine	556-88-7	--	--	0.1	I	--	--	--	--
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	--	--	0.05	I	--	--	--	--
Perchlorate	Perchlorate and Perchlorate Salts	14797-73-0	--	--	0.0007	I	--	--	--	--
PETN	Pentaerythritol tetranitrate (PETN)	78-11-5	0.0043	X	0.009	P	--	--	--	--
Picric Acid	Picric Acid (2,4,6-Trinitrophenol)	88-89-1	--	--	0.002	X	--	--	--	--
Potassium	Potassium	7440-09-7	--	--	--	--	--	--	--	--
Selenium	Selenium	7782-49-2	--	--	0.005	I	--	--	0.02	C
Silver	Silver	7440-22-4	--	--	0.005	I	--	--	--	--
Sodium	Sodium	7440-23-5	--	--	--	--	--	--	--	--
Strontium	Strontium, Stable	7440-24-6	--	--	0.6	I	--	--	--	--
Sulfate	Sulfate	14808-79-8	--	--	--	--	--	--	--	--
Thallium	Thallium (Soluble Salts)	7440-28-0	--	--	0.00001	X	--	--	--	--
Vanadium	Vanadium and Compounds	7440-62-2	--	--	0.005	G	--	--	0.0001	A
Zinc	Zinc and Compounds	7440-66-6	--	--	0.3	I	--	--	--	--

Notes:

[a] Chromium III toxicity value is used as a surrogate for total chromium

$\mu g/m^3$ = microgram(s) per cubic meter

IUR = inhalation unit risk

mg/kg-day = milligram(s) per kilogram per day

mg/m^3 = milligram(s) per cubic meter

RfC = inhalation reference concentration

RfD = oral reference dose

SF = oral cancer slope factor

References:

A = ATSDR (Agency for Toxic Substances and Disease Registry)

C = California Environmental Protection Agency

H = HEAST (Health Effects Assessment Summary Tables)

I = IRIS (Integrated Risk Information System)

P = PPRTV (Provisional Peer-reviewed Toxicity Values)

G = See RSL User's Guide

X = PPRTV Appendix Screening Value

Table 4-3. Changes in Toxicity Factors from 2018 to 2022
Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

Chemical Name[a]	Standard Name	CAS Number	Carcinogenic toxicity changes[b]					Non-carcinogenic toxicity changes									
			SF (mg/kg-day)$^{-1}$					RfD (mg/kg-day)					RfC (mg/m^3)				
			2018 HHRSE		2022 HHRSE		Change	2018 HHRSE		2022 HHRSE		Change	2018 HHRSE		2022 HHRSE		Change
			Value	Ref	Value	Ref	in Value	Value	Ref	Value	Ref	in Value	Value	Ref	Value	Ref	in Value
2-Amino-4,6-dinitrotoluene	Dinitrotoluene, 2-Amino-4,6-	35572-78-2						2.0E-03	[c]	1.0E-04	PPRTV Appendix	more stringent					
4-Amino-2,6-dinitrotoluene	Dinitrotoluene, 4-Amino-2,6-	19406-51-0						2.0E-03	[c]	1.0E-04	PPRTV Appendix	more stringent					
Antimony	Antimony (metallic)	7440-36-0											--	--	3.0E-04	ATSDR	more stringent
Cadmium	Cadmium (Diet)	7440-43-9						1.0E-03	IRIS	1.0E-04	ATSDR	more stringent					
Molybdenum	Molybdenum	7439-98-7											--	--	2.0E-03	ATSDR	more stringent
PETN	Pentaerythritol tetranitrate (PETN)	78-11-5	4.0E-03	PPRTV Appendix	4.3E-03	PPRTV Appendix	more stringent										

Notes:

[a] Chemicals with changes in toxicity factors that result in a potential increase of the previously estimated risks in the 2018 HHRSE are presented in this table.

[b] No changes in IUR that result in a potential increase of the previously estimated risks in the 2018 HHRSE were identified.

[c] 2,4-Dinitrotoluene RfD was used as surrogate toxicity value (See RSL User's Guide)

References:

ATSDR = Agency for Toxic Substances and Disease Registry

IRIS = Integrated Risk Information System

PPRTV = Provisional Peer-reviewed Toxicity Values

This page intentionally left blank.

Air (40 CFR 264.601[c] and R315-264-601)

5.1 Performance Standards

5.1.0.1 The environmental performance standard for the protection of the air pathway requires the prevention of any release that may have adverse effects on human health or the environment due to migration of waste constituents in the air. Specific items to be considered include the following:

- The volume and physical and chemical characteristics of the waste in the unit, including its potential for the emission and dispersal of gases, aerosols, and particulates
- The effectiveness and reliability of systems and structures to reduce or prevent emissions of hazardous constituents to the air
- The operating characteristics of the unit
- The atmospheric, meteorological, and topographic characteristics of the unit and surrounding area
- The existing quality of the air, including other sources of contamination and their cumulative impact on the air
- The potential for health risks caused by human exposure to waste constituents
- The potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents

5.2 Receptors

5.2.0.1 The air pathway entails potential inhalation risks to (1) EOD personnel monitoring the OB/OD operations onsite, (2) a recreational boater on the Great Salt Lake, and (3) a resident at the nearby community of Oasis (limited access, onsite, operational headquarters and lodging for the UTTR). These receptors remain the same as in the original permit. Water levels in the Great Salt Lake have dropped substantially over the last 10 years with the net result of significantly limiting access to, and use of, the Great Salt Lake for recreation.

5.3 Emission Characterization

5.3.0.1 As a source of air pollutants, OB/OD units must operate in accordance with specifications provided in the State-issued hazardous waste permit. All OB/OD units must comply with National Ambient Air Quality Standards and the Utah Division of Air Quality standards, as demonstrated by the use of State-approved air dispersion modeling protocol. In addition, OB/OD facilities must evaluate whether air emissions pose a risk to human health or the environment.

5.3.0.2 The air modeling exercise was completed as part of the 1997 permit application. The EPA's INPUFF model was used to estimate the air concentrations (hence, risks for three specific receptors). The air modeling does not need to be updated unless significant changes have been made to the usage patterns at the TTU or to the emission factor inputs to the air dispersion model. The OB/OD is carried out as an on-demand batch operation, depending on the needs of the time. However, an analysis of the materials destroyed over a period of 10 years indicated that regardless of the items being destroyed (i.e., a rocket motor or missile engine), the explosive and propellant types and quantities have remained relatively unchanged (Hill AFB, 2005). From year to year, the detonation of C-4 missile motors has comprised from 50 to 85% of the net amount of explosives and propellants destroyed. As the inventory

of C-4 motors awaiting disposal is almost depleted, disposal of D-5 missile motors (the successor to the C-4 missiles) is commencing. The propellant in the C-4 and D-5 missiles is nearly identical with no discernible upward change to projected emissions. Further, there is no new information in the MIDAS database to warrant a revision of the modeling or a change in the emissions. It should be noted that waste streams using the burn pan (e.g., small munitions and dunnage) were last treated at the TTU in 1997 and the burn pan was decommissioned and removed in 2018. This does not add or increase emissions.

5.3.0.3 Based on the TTU usage pattern previously described, it is not necessary to modify the EPCs presented Tables 8, 9, and 10 of the 1997 permit application at this time. These EPCs used in the HHRSE for offsite air exposures are presented in Table 5-2.

5.3.1 Dioxin and Furan Emissions

5.3.1.1 As part of the 2005 risk assessment revision and as a requirement of permit Section II.F.2.c, Hill AFB investigated the potential for formation of dioxins and furans from the OB/OD operations, including the burning of dunnage and diesel fuel. A thorough discussion of the previous dioxins/furans investigation and data evaluation results is presented in the 2009 risk screening evaluation (CH2M HILL, 2009). The burn pan for small munitions and dunnage (with diesel fuel as an accelerant) was removed in 2018. There are no plans to resume treating this waste stream at the TTU.

5.4 Assessment of Potential Health Risks

5.4.0.1 The results of the 1997 INPUFF air dispersion modeling were used in the inhalation risk characterization. The most recent toxicity factors obtained from the RSL table (EPA, 2022a), which compiles toxicity values from EPA recommended sources based on the three-tier hierarchy discussed in Section 4.4.2, were used in the HHRSE.

5.4.1 Exposure and Intake Parameters

5.4.1.1 The exposure and intake parameters for the air receptors are included in Table 5-1. These parameters are the same as in the 1997, 2003, 2005, 2007, 2009, 2011, 2013, and 2018 assessments, except for the update on the exposure duration for the Oasis resident in the 2018 HHRSE. The exposure duration for the Oasis resident was changed from 30 years to 26 years according to the EPA's update to standard default exposure factors in 2014 (EPA, 2014). It was assumed that the EOD worker was exposed to emissions only while conducting OB/OD operations. The recreational boater was assumed to spend 2 days on the lake every week. Access to the Oasis compound is limited to working employees only and no family members are allowed to reside in the area. The Oasis resident (adult workers) was assumed to spend at least 5 days per week at the Oasis compound. The daily exposure times include a factor to account for the fraction of the time the wind blows in the direction of a given receptor as presented in the 2003 Permit Attachment 10B. These factors are shown in Table 5-1.

5.4.1.2 Averaged inhalation exposure concentrations were calculated as follows:

$$C_{AIR} \times \frac{\frac{ET}{24\ h/d} \times WF \times EF \times ED}{AT} = Conc_{Avg}$$

where:

C_{AIR} = EPC (mg/m^3) presented Tables 8, 9, and 10 of the 1997 permit application.

$Conc_{Avg}$ = Averaged exposure concentration (mg/m^3).

ED = Exposure duration (years), or the number of years that a receptor is potentially exposed to contamination.

EF = Exposure frequency (days per year), or the number of days per year a receptor spends in the exposure location.

ET = Exposure time (hours per day [h/d]), or the amount of time a receptor spends in an exposure setting on a daily basis.

WF = Wind factor (percent), or fraction of time (day) wind blowing toward receptor.

AT = Averaging time (days). For cancer effects, the concentration is averaged over an assumed lifetime of 70 years (25,500 days). For noncancer effects, the concentration is averaged over the duration of exposure.

5.4.2 Toxicity Factors

5.4.2.1 The three-tiered sources for inhalation toxicity factors were the same as described for soil exposures (Section 4.0). These factors include the inhalation unit risk (IUR) for cancer risk and the inhalation reference concentration (RfC) for noncancer effects (Table 5-2).

5.4.3 Risk Characterization

5.4.3.1 The risks for each chemical were calculated using the chemical-specific averaged exposure concentration and inhalation toxicity factors (IUR for cancer effects and RfC for noncancer effects as follows:

$$Conc_{Avg} \times IUR \times \frac{1{,}000}{(\mu g/m^3)} = ELCR$$

where:

IUR = Inhalation unit risk $(\mu g/m^3)^{-1}$, chemical-specific

ELCR = Excess lifetime cancer risk (unitless)

$$\frac{Conc_{Avg}}{RfC} = HQ$$

where:

RfC = Inhalation reference concentration for chronic exposure (mg/m^3), chemical specific

HQ = Noncancer hazard quotient (unitless)

5.4.3.2 The individual chemical ELCR and HQ were then added for each receptor. The cumulative ELCR and HI are provided in Table 5-2 for the EOD worker, Salt Lake boater, and Oasis resident.

5.4.3.3 For the offsite air exposures (EOD worker, Salt Lake boater, and Oasis resident), the calculated cumulative ELCRs were within the target ELCR range of 1×10^{-6} to 1×10^{-4} and the HIs did not exceed the

target HI of 1. The HI for EOD worker exposure was 1 due primarily to cadmium (the cadmium HQ was also 1, contributing more than 90% of the cumulative HI of 1). However, cadmium in the original TTU air emissions modeling of waste streams is believed to be from items previously (1997 and earlier) processed in the burn pan. Cadmium is a relatively significant emission for medium cartridges and small rockets (typical burn pan waste streams) with emission factors as high as 3×10^{-3} lb/lb net explosive weight. Cadmium is not known to be a component of the large missile motors processed on the TTU. These large missile motors are by far the largest waste stream processed on the TTU; over 20 million pounds of large missile propellant have been processed on the TTU since 2000 and cadmium concentrations in surface soil have remained essentially constant at ~ 1 mg/kg over that time. The burn pan has been removed and has not been used since 1997, although contributions from burn pan waste streams have not been removed from the predicted air emissions from the TTU. Removal of the contribution of cadmium lowers the total HI for the EOD worker exposure by an order of magnitude to 0.1.

5.4.3.4 Based on evaluations of the air emissions, the results of the 2022 HHRSE show that cumulative ELCRs and HIs from potential offsite air exposures resulting from continued OB/OD operations do not indicate potential unacceptable human health risks; no modifications to Attachment 10B of the permit are warranted at this time.

Table 5-1. Intake and Exposure Parameters

Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

		Air Emissions		
Intake and Exposure Parameter	**Units**	**Current EOD Worker**	**Current Salt Lake Boater**	**Current Oasis Resident**
Averaging Time, Cancer	days	25,500	25,500	25,500
Averaging Time, Noncancer	years	7,300	7,300	9,490
Exposure Frequency	days per year	250	104	350
Exposure Time —No Wind Factor	hours per day	1	24	24
Wind Factor—Fraction of Time Blowing Toward Receptor	percent	3%	7%	10%
Final Exposure Time—Wind Factor Incorporated	hours per day	0.027	1.6	2.3
Exposure Duration	years	20	20	26

This page intentionally left blank.

Table 5-2. Risk Summary for Hypothetical Offsite Air Exposures (Permit Tables 8, 9, and 10)
Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

			EPC (mg/m³)			Toxicity Factors				Exposure Scenario											
										Current EOD Worker				Current Salt Lake Boater				Current Oasis Resident			
Standard Name	Chemical	CAS No.	Permit Table 8 (Air_EOD)	Permit Table 9 (Air_Rec)	Permit Table 10 (Air_Res)	IUR (µg/m³)⁻¹	IUR Ref.	RfC (mg/m³)	RfC Ref.	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]
1,1,1-Trichloroethane	Methyl chloroform	71-55-6	1.32E-04	1.74E-06	5.52E-07	--	--	5	I	--		2.E-08		--		7.E-09		--		1.E-08	
1,1,2,2-Tetrachloroethane	1,1,2,2-Tetrachoroethae	79-34-5	1.38E-04	1.82E-06	5.78E-07	0.000058	C	--	--	2.E-09		--		6.E-10		--		1.E-09		--	
1,1,2-Trichloro-1,2,2-trifluoroethane	Freon113	76-13-1	5.43E-06	7.13E-08	2.27E-08	--	--	5	P	--		8.E-10		--		3.E-10		--		4.E-10	
1,1-Dichloroethene	Vinylidene chloride	75-35-4	3.40E-05	4.47E-07	1.42E-07	--	--	0.2	I	--		1.E-07		--		4.E-08		--		7.E-08	
1,2,4-Trimethylbenzene	1,2,4-Trimethylbenzene	95-63-6	3.04E-04	3.99E-06	1.27E-06	--	--	0.06	I	--		4.E-06		--		1.E-06		--		2.E-06	
1,3,5-Trimethylbenzene	1,3,5-Trimethylbenzene	108-67-8	3.87E-06	5.09E-08	1.62E-08	--	--	0.06	I	--		5.E-08		--		2.E-08		--		2.E-08	
1,3-Butadiene	1,3-Butadiene	106-99-0	2.38E-04	3.12E-06	9.92E-07	0.00003	I	0.002	I	2.E-09		9.E-05		5.E-10		3.E-05		1.E-09		5.E-05	
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	3.89E-05	5.11E-07	1.63E-07	--	--	--	--	--		--		--		--		--		--	
2,6-Dinitrotoluene	2,4-DNT	606-20-2	1.17E-05	1.54E-07	4.90E-08	--	--	--	--	--		--		--		--		--		--	
2-Nitrodiphenylamine	2-Nitrodiphenylamine	119-75-5	1.82E-06	2.39E-08	7.61E-09	--	--	--	--	--		--		--		--		--		--	
Allyl chloride	Allyl chloride	107-05-1	2.30E-04	3.02E-06	9.61E-07	0.000006	C	0.001	I	3.E-10		2.E-04		1.E-10		6.E-05		2.E-10		9.E-05	
Aluminum	Aluminum	7429-90-5	2.38E-01	3.12E-03	9.92E-04	--	--	0.005	P	--		4.E-02	3%	--		1.E-02	3%	--		2.E-02	3%
Antimony	Antimony	7440-36-0	1.49E-03	1.96E-05	6.23E-06	--	--	0.0003	A	--		4.E-03		--		1.E-03		--		2.E-03	
Barium	Barium	7440-39-3	4.11E-03	5.40E-05	1.72E-05	--	--	0.0005	H	--		6.E-03		--		2.E-03		--		3.E-03	
Benzene	Benzene	71-43-2	7.90E-04	1.04E-05	3.30E-06	0.0000078	I	0.03	I	1.E-09		2.E-05		4.E-10		7.E-06		9.E-10		1.E-05	
Benzo(a)anthracene	Benzo(a)anthracene	56-55-3	5.98E-07	7.85E-09	2.50E-09	0.00006	E	--	--	8.E-12		--		3.E-12		--		5.E-12		--	
Benzo(a)pyrene	Benzo(a)pyrene	50-32-8	7.76E-06	1.02E-07	3.24E-08	0.0006	I	0.000002	I	1.E-09		3.E-03		3.E-10		1.E-03		7.E-10		1.E-03	

Table 5-2. Risk Summary for Hypothetical Offsite Air Exposures (Permit Tables 8, 9, and 10)
Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

			EPC (mg/m³)			Toxicity Factors				Exposure Scenario											
										Current EOD Worker				Current Salt Lake Boater				Current Oasis Resident			
Standard Name	Chemical	CAS No.	Permit Table 8 (Air_EOD)	Permit Table 9 (Air_Rec)	Permit Table 10 (Air_Res)	IUR (µg/m³)⁻¹	IUR Ref.	RfC (mg/m³)	RfC Ref.	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]
bis(2-ethylhexyl)phthalate	bis(2-ethylhexyl)phthalate	117-81-7	6.24E-05	8.20E-07	5.22E-11	0.0000024	C	--	--	3.E-11		--		1.E-11		--		4.E-15		--	
Bromomethane	Methyl Bromide	74-83-9	6.54E-05	8.59E-07	2.73E-07	--	--	0.005	I	--		1.E-05		--		3.E-06		--		5.E-06	
Butylbenzylphthalate	Butylbenzylphthalate	85-68-7	4.26E-06	5.59E-08	1.78E-08	--	--	--	--	--		--		--		--		--		--	
Cadmium	Cadmium	7440-43-9	1.52E-02	1.99E-04	6.34E-05	0.0018	I	0.00001	A	**6.E-06**	94%	1.E+00	92%	**2.E-06**	94%	4.E-01	92%	**4.E-06**	94%	6.E-01	92%
Calcium	Calcium	7440-70-2	2.58E-02	3.39E-04	1.08E-04	--	--	--	--	--		--		--		--		--		--	
Carbon tetrachloride	Carbon tetrachloride	56-23-5	8.30E-06	1.09E-07	3.47E-08	0.000006	I	0.1	I	1.E-11		6.E-08		4.E-12		2.E-08		7.E-12		3.E-08	
Chloroethane	Ethyl chloride	75-00-3	2.46E-05	3.23E-07	1.03E-07	--	--	4	P	--		5.E-09		--		2.E-09		--		2.E-09	
Chloromethane	Methyl chloride	74-87-3	3.44E-05	4.51E-07	1.43E-07	--	--	0.09	I	--		3.E-07		--		1.E-07		--		1.E-07	
Chromium	Chromium	7440-47-3	1.06E-03	1.39E-05	4.42E-06	--	--	--	--	--		--		--		--		--		--	
Chrysene	Chrysene	218-01-9	5.73E-07	7.52E-09	2.39E-09	0.0000006	E	--	--	8.E-14		--		2.E-14		--		5.E-14		--	
Copper	Copper	7440-50-8	4.88E-02	6.41E-04	2.04E-04	--	--	--	--	--		--		--		--		--		--	
Dichlorodifluoromethane	Freon12	75-71-8	1.24E-05	1.63E-07	5.19E-08	--	--	0.1	X	--		1.E-07		--		3.E-08		--		5.E-08	
Diethylphthalate	Diethylphthalate	84-66-2	1.03E-02	1.35E-04	4.28E-05	--	--	--	--	--		--		--		--		--		--	
Dimethylphthalate	Dimethylphthalate	131-11-3	1.29E-07	1.69E-09	5.38E-10	--	--	--	--	--		--		--		--		--		--	
Di-n-butylphthalate	Di-n-butylphthalate	84-74-2	2.73E-04	3.58E-06	1.14E-06	--	--	--	--	--		--		--		--		--		--	
Di-n-octylphthalate	Di-n-octylphthalate	117-84-0	1.48E-05	1.95E-07	6.20E-08	--	--	--	--	--		--		--		--		--		--	
Ethylbenzene	Ethylbenzene	100-41-4	2.52E-05	3.31E-07	1.05E-07	0.0000025	C	1	I	1.E-11		2.E-08		4.E-12		6.E-09		9.E-12		1.E-08	
Fluoranthene	Fluoranthene	206-44-0	2.05E-06	2.69E-08	8.57E-09	--	--	--	--	--		--		--		--		--		--	
Fluorene	Fluorene	86-73-7	2.58E-07	3.39E-09	1.08E-09	--	--	--	--	--		--		--		--		--		--	
Hexachlorobenzene	Hexachlorobenzene	118-74-1	2.13E-05	2.80E-07	8.90E-08	0.00046	I	--	--	2.E-09		--		7.E-10		--		1.E-09		--	

Table 5-2. Risk Summary for Hypothetical Offsite Air Exposures (Permit Tables 8, 9, and 10)
Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

			EPC (mg/m³)			Toxicity Factors				Exposure Scenario											
										Current EOD Worker				Current Salt Lake Boater				Current Oasis Resident			
Standard Name	Chemical	CAS No.	Permit Table 8 (Air_EOD)	Permit Table 9 (Air_Rec)	Permit Table 10 (Air_Res)	IUR (µg/m³)$^{-1}$	IUR Ref.	RfC (mg/m³)	RfC Ref.	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]
Hexahydro-1,3,5-trinitro-1,3,5-triazine	Hexahydro-1,3,5…(RDX)	121-82-4	7.63E-02	1.00E-03	3.18E-04	--	--	--	--	--		--		--		--		--		--	
Lead	Lead	7439-92-1	2.13E-02	2.80E-04	8.90E-05	--	--	--	--	--		--		--		--		--		--	
m,p-Xylenes	m,p-Xylene	1330-20-7	1.90E-05	2.49E-07	7.92E-08	--	--	0.1	I	--		1.E-07		--		5.E-08		--		7.E-08	
Mercury	Mercury	7439-97-6	1.94E-06	2.55E-08	8.12E-09	--	--	0.0003	I	--		5.E-06		--		2.E-06		--		2.E-06	
Methane	Methane	74-82-8	3.17E-03	4.17E-05	1.32E-05	--	--	--	--	--		--		--		--		--		--	
Methylene chloride	Dichloromethane	75-09-2	3.39E-03	4.46E-05	1.42E-05	1E-08	I	0.6	I	7.E-12		4.E-06		2.E-12		1.E-06		5.E-12		2.E-06	
Naphthalene	Naphthalene	91-20-3	8.98E-06	1.18E-07	3.75E-08	0.000034	C	0.003	I	7.E-11		2.E-06		2.E-11		7.E-07		4.E-11		1.E-06	
Nickel	Nickel	7440-02-0	6.82E-03	8.95E-05	2.85E-05	0.00026	C	0.00009	A	4.E-07	6%	6.E-02	5%	1.E-07	6%	2.E-02	5%	3.E-07	6%	3.E-02	5%
Nitroglycerin	Nitroglycerine	55-63-0	1.71E-05	2.24E-07	7.13E-08	--	--	--	--	--		--		--		--		--		--	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	Octahydro-1,3,5,7…(HMX)	2691-41-0	5.81E-03	7.63E-05	2.43E-05	--	--	--	--	--		--		--		--		--		--	
o-Xylene	o-Xylene	95-47-6	9.18E-06	1.21E-07	3.83E-08	--	--	0.1	G	--		7.E-08		--		2.E-08		--		4.E-08	
Pentaerythritoltetranitrate	Pentaerythritol tetranitrate (PETN)	78-11-5	5.81E-03	7.63E-05	2.43E-05	--	--	--	--	--		--		--		--		--		--	
p-Ethyltoluene	p-Ethyltoluene	622-96-8	9.99E-06	1.31E-07	4.17E-08	--	--	--	--	--		--		--		--		--		--	
Phenanthrene	Phenanthrene	85-01-8	1.59E-06	2.08E-08	6.62E-09	--	--	--	--	--		--		--		--		--		--	
Phenol	Phenol	108-95-2	1.08E-05	1.42E-07	4.51E-08	--	--	0.2	C	--		4.E-08		--		1.E-08		--		2.E-08	
Potassium	Potassium	7440-09-7	2.89E-01	3.79E-03	1.21E-03	--	--	--	--	--		--		--		--		--		--	
Pyrene	Pyrene	129-00-0	8.17E-06	1.07E-07	3.41E-08	--	--	--	--	--		--		--		--		--		--	
Sodium	Sodium	7440-23-5	1.26E-02	1.65E-04	5.24E-05	--	--	--	--	--		--		--		--		--		--	
Styrene	Styrene	100-42-5	1.98E-04	2.61E-06	8.28E-07	--	--	1	I	--		2.E-07		--		5.E-08		--		8.E-08	
Titanium	Titanium	7440-32-6	6.17E-04	8.10E-06	2.58E-06	--	--	--	--	--		--		--		--		--		--	

Table 5-2. Risk Summary for Hypothetical Offsite Air Exposures (Permit Tables 8, 9, and 10)
Thermal Treatment Unit 2022 Human Health Risk Screen Evaluation

			EPC (mg/m³)			Toxicity Factors				Exposure Scenario											
										Current EOD Worker				Current Salt Lake Boater				Current Oasis Resident			
Standard Name	Chemical	CAS No.	Permit Table 8 (Air_EOD)	Permit Table 9 (Air_Rec)	Permit Table 10 (Air_Res)	IUR (µg/m³)$^{-1}$	IUR Ref.	RfC (mg/m³)	RfC Ref.	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]	ELCR	ELCR Percent Total[a]	HQ	HQ Percent Total[a]
Toluene	Toluene	108-88-3	1.99E-04	2.62E-06	8.34E-07	--	--	5	I	--		3.E-08		--		1.E-08		--		2.E-08	
Trichlorofluoromethane	Freon11	75-69-4	1.95E-05	2.56E-07	8.14E-08	--	--	--	--	--		--		--		--		--		--	
Vinyl Chloride	Vinyl chloride	75-01-4	1.67E-05	2.20E-07	6.99E-08	0.0000044	I	0.08	A	2.E-11		2.E-07		5.E-12		5.E-08		1.E-11		8.E-08	
Zinc	Zinc	7440-66-6	4.43E-02	5.82E-04	1.85E-04	--	--	--	--	--		--		--		--		--		--	
							Receptor Total			**6.E-06**		1.E+00		**2.E-06**		4.E-01		**4.E-06**		6.E-01	

Notes:

Bolded values indicate an ELCR > 10-6 or an HQ > 1.

[a] Percent contribution to receptor total ELCR and HI greater than or equal to 1% is presented.

References:

A = ATSDR (Agency for Toxic Substances and Disease Registry)
C = California Environmental Protection Agency
E = Values were derived based on relative potency factors to benzo(a)pyrene.
H = HEAST (Health Effects Assessment Summary Tables)
I = IRIS (Integrated Risk Information System)
P = PPRTV (Provisional Peer-reviewed Toxicity Values)
G = See RSL User's Guide
X = PPRTV Appendix Screening Value

SECTION 6

References

CH2M HILL, Inc. 2006. *Colloidal Borescope, Aquifer Age Dating, and Environmental Tracer Results, Landfill 5 and Thermal Treatment Unit.* Utah Test and Training Range, Utah. February.

CH2M HILL, Inc. 2009. *Utah Test and Training Range Thermal Treatment Unit, 2009 Ecological Risk Screen Evaluation*. Hill Air Force Base, Utah. Final. September.

CH2M HILL, Inc. 2011a. *Utah Test and Training Range Thermal Treatment Unit, 2011 Ecological Risk Screen Evaluation*. Hill Air Force Base, Utah. Final. October.

CH2M HILL, Inc. 2011b. *Hill Air Force Base Analytical Data Validation and Field Summary Report for the 2010 Annual Thermal Treatment Unit Soil Sampling Event*. Hill Air Force Base, Utah. Final. March.

CH2M HILL, Inc. 2013. *Utah Test and Training Range Thermal Treatment Unit 2013 Human Health Risk Screen Evaluation*. Hill Air Force Base, Utah. July.

CH2M HILL, Inc. 2020. *Analytical Data Validation and Field Summary Report for the 2019 Annual Thermal Treatment Unit Soil Sampling Event*. Hill Air Force Base, Utah. Final. May.

CH2M HILL, Inc. 2022. *Analytical Data Validation and Field Summary Report for the 2021 Annual Thermal Treatment Unit Soil Sampling Event*. Hill Air Force Base, Utah. Final. January.

Hill Air Force Base (Hill AFB). 2005. *Utah Test and Training Range—Waste Characterization Evaluation for the Thermal Treatment Unit*.

U.S. Environmental Protection Agency (EPA). 2003. *Human Health Toxicity Values in Superfund Risk Assessments*. OSWER Directive 9285.7-53. Office of Solid Waste and Emergency Response. December 5.

U.S. Environmental Protection Agency (EPA). 2014. *Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors.* OSWER Directive 9200.1-120. February.

U.S. Environmental Protection Agency (EPA). 2022a. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* https://www.epa.gov/risk/regional-screening-levels-rsls.

U.S. Environmental Protection Agency (EPA). 2022b. Regional Screening Levels (RSLs) - User's Guide. May. https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide.

This page intentionally left blank.

Appendix A
Regional Screening Level Table

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				3.0E-04	O					1	0.1		Acephate	30560-19-1	1.9E+01	n	2.5E+02	n					6.0E+00	n		1.3E-03	n	
		2.2E-06	I			9.0E-03	I	V		1		1.1E+05	Acetaldehyde	75-07-0	1.1E+01	c**	4.9E+01	c**	1.3E+00	c**	5.6E+00	c**	2.6E+00	c**		5.2E-04	c**	
				2.0E-02	I					1	0.1		Acetochlor	34256-82-1	1.3E+03	n	1.6E+04	n					3.5E+02	n		2.8E-01	n	
				9.0E-01	I			V		1		1.1E+05	Acetone	67-64-1	7.0E+04	n	1.1E+06	nms					1.8E+04	n		3.7E+00	n	
						2.0E-03	X			1	0.1		Acetone Cyanohydrin	75-86-5	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n						
						6.0E-02	I	V		1		1.3E+05	Acetonitrile	75-05-8	8.1E+02	n	3.4E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	n	
				1.0E-01	I			V		1		2.5E+03	Acetophenone	98-86-2	7.8E+03	ns	1.2E+05	nms					1.9E+03	n		5.8E-01	n	
3.8E+00	C	1.3E-03	C							1	0.1		Acetylaminofluorene, 2-	53-96-3	1.4E-01	c	6.0E-01	c	2.2E-03	c	9.4E-03	c	1.6E-02	c		7.5E-05	c	
				5.0E-04	I	2.0E-05	I	V		1		2.3E+04	Acrolein	107-02-8	1.4E-01	n	6.0E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.4E-06	n	
5.0E-01	I	1.0E-04	I	2.0E-03	I	6.0E-03	I		M	1	0.1		Acrylamide	79-06-1	2.4E-01	c	4.6E+00	c	1.0E-02	c	1.2E-01	c	5.0E-02	c		1.1E-05	c	
				5.0E-01	I	2.0E-04	P	V		1		1.1E+05	Acrylic Acid	79-10-7	2.0E+01	n	8.3E+01	n	2.1E-01	n	8.8E-01	n	4.2E-01	n		8.5E-05	n	
5.4E-01	I	6.8E-05	I	1.0E-02	A	2.0E-03	I	V		1		1.1E+04	Acrylonitrile	107-13-1	2.5E-01	c*	1.1E+00	c*	4.1E-02	c*	1.8E-01	c*	5.2E-02	c*		1.1E-05	c*	
						6.0E-03	P			1	0.1		Adiponitrile	111-69-3	8.5E+06	nm	3.6E+07	nm	6.3E+00	n	2.6E+01	n						
5.6E-02	C			1.0E-02	I					1	0.1		Alachlor	15972-60-8	9.7E+00	c*	4.1E+01	c					1.1E+00	c	2.0E+00	8.7E-04	c	1.6E-03
				1.0E-03	I					1	0.1		Aldicarb	116-06-3	6.3E+01	n	8.2E+02	n					2.0E+01	n	3.0E+00	4.9E-03	n	7.5E-04
				1.0E-03	I					1	0.1		Aldicarb Sulfone	1646-88-4	6.3E+01	n	8.2E+02	n					2.0E+01	n	2.0E+00	4.4E-03	n	4.4E-04
										1	0.1		Aldicarb sulfoxide	1646-87-3											4.0E+00			8.8E-04
1.7E+01	I	4.9E-03	I	3.0E-05	I			V		1			Aldrin	309-00-2	3.9E-02	c*	1.8E-01	c	5.7E-04	c	2.5E-03	c	9.2E-04	c		1.5E-04	c	
				4.0E-03	P	1.0E-04	X	V		1		1.1E+05	Allyl Alcohol	107-18-6	3.5E+00	n	1.5E+01	n	1.0E-01	n	4.4E-01	n	2.1E-01	n		4.2E-05	n	
2.1E-02	C	6.0E-06	C			1.0E-03	I	V		1		1.4E+03	Allyl Chloride	107-05-1	7.2E-01	c**	3.2E+00	c**	4.7E-01	c**	2.0E+00	c**	7.3E-01	c**		2.3E-04	c**	
				1.0E+00	P	5.0E-03	P			1			Aluminum	7429-90-5	7.7E+04	n	1.1E+06	nm	5.2E+00	n	2.2E+01	n	2.0E+04	n		3.0E+04	n	
				4.0E-04	I					1			Aluminum Phosphide	20859-73-8	3.1E+01	n	4.7E+02	n					8.0E+00	n				
				9.0E-03	I					1	0.1		Ametryn	834-12-8	5.7E+02	n	7.4E+03	n					1.5E+02	n		1.6E-01	n	
2.1E+01	C	6.0E-03	C							1	0.1		Aminobiphenyl, 4-	92-67-1	2.6E-02	c	1.1E-01	c	4.7E-04	c	2.0E-03	c	3.0E-03	c		1.5E-05	c	
				8.0E-02	P					1	0.1		Aminophenol, m-	591-27-5	5.1E+03	n	6.6E+04	n					1.6E+03	n		6.1E-01	n	
				4.0E-03	X					1	0.1		Aminophenol, o-	95-55-6	2.5E+02	n	3.3E+03	n					7.9E+01	n		3.0E-02	n	
				2.0E-02	P					1	0.1		Aminophenol, p-	123-30-8	1.3E+03	n	1.6E+04	n					4.0E+02	n		1.5E-01	n	
				2.5E-03	I					1	0.1		Amitraz	33089-61-1	1.6E+02	n	2.1E+03	n					8.2E+00	n		4.2E+00	n	
						5.0E-01	I	V		1			Ammonia	7664-41-7					5.2E+02	n	2.2E+03	n						
				2.0E-03	X					1	0.1		Ammonium Picrate	131-74-8	1.3E+02	n	1.6E+03	n					4.0E+01	n		1.9E-01	n	
				2.0E-01	I					1			Ammonium Sulfamate	7773-06-0	1.6E+04	n	2.3E+05	nm					4.0E+03	n				
						3.0E-03	X	V		1		1.4E+04	Amyl Alcohol, tert-	75-85-4	8.2E+01	n	3.4E+02	n	3.1E+00	n	1.3E+01	n	6.3E+00	n		1.3E-03	n	
5.7E-03	I	1.6E-06	C	7.0E-03	P	1.0E-03	I			1	0.1		Aniline	62-53-3	9.5E+01	c**	4.0E+02	c*	1.0E+00	n	4.4E+00	n	1.3E+01	c*		4.6E-03	c*	
4.0E-02	P			2.0E-03	X					1	0.1		Anthraquinone, 9,10-	84-65-1	1.4E+01	c**	5.7E+01	c*					1.4E+00	c*		1.4E-02	c*	
				4.0E-04	I	3.0E-04	A			0.15			Antimony (metallic)	7440-36-0	3.1E+01	n	4.7E+02	n	3.1E-01	n	1.3E+00	n	7.8E+00	n	6.0E+00	3.5E-01	n	2.7E-01
				5.0E-04	H					0.15			Antimony Pentoxide	1314-60-9	3.9E+01	n	5.8E+02	n					9.7E+00	n				
				4.0E-04	H					0.15			Antimony Tetroxide	1332-81-6	3.1E+01	n	4.7E+02	n					7.8E+00	n				
						2.0E-04	I			0.15			Antimony Trioxide	1309-64-4	2.8E+05	nm	1.2E+06	nm	2.1E-01	n	8.8E-01	n						
1.5E+00	I	4.3E-03	I	3.0E-04	I	1.5E-05	C			1	0.03		Arsenic, Inorganic	7440-38-2	6.8E-01	c*R	3.0E+00	cR	6.5E-04	c*	2.9E-03	c*	5.2E-02	c	1.0E+01	1.5E-03	c	2.9E-01
				3.5E-06	C	5.0E-05	I			1			Arsine	7784-42-1	2.7E-01	n	4.1E+00	n	5.2E-02	n	2.2E-01	n	7.0E-02	n				
										1			Asbestos (units in fibers)	1332-21-4											7.0E+06(G)			
				3.6E-02	O					1	0.1		Asulam	3337-71-1	2.3E+03	n	3.0E+04	n					7.2E+02	n		1.8E-01	n	
2.3E-01	C			3.0E-03	A					1	0.1		Atrazine	1912-24-9	2.4E+00	c*	1.0E+01	c					3.0E-01	c	3.0E+00	2.0E-04	c	1.9E-03
8.8E-01	C	2.5E-04	C							1	0.1		Auramine	492-80-8	6.2E-01	c	2.6E+00	c	1.1E-02	c	4.9E-02	c	7.8E-02	c		7.1E-04	c	
				4.0E-04	I					1	0.1		Avermectin B1	65195-55-3	2.5E+01	n	3.3E+02	n					8.0E+00	n		1.4E+01	n	
				3.0E-03	A	1.0E-02	A			1	0.1		Azinphos-methyl	86-50-0	1.9E+02	n	2.5E+03	n	1.0E+01	n	4.4E+01	n	5.6E+01	n		1.7E-02	n	
1.1E-01	I	3.1E-05	I					V		1			Azobenzene	103-33-3	5.6E+00	c	2.6E+01	c	9.1E-02	c	4.0E-01	c	1.2E-01	c		9.3E-04	c	
				1.0E+00	P	7.0E-06	P			1	0.1		Azodicarbonamide	123-77-3	8.6E+03	n	4.0E+04	n	7.3E-03	n	3.1E-02	n	2.0E+04	n		6.8E+00	n	
				2.0E-01	I	5.0E-04	H			0.07			Barium	7440-39-3	1.5E+04	n	2.2E+05	nm	5.2E-01	n	2.2E+00	n	3.8E+03	n	2.0E+03	1.6E+02	n	8.2E+01
				5.0E-03	O			V		1			Benfluralin	1861-40-1	3.9E+02	n	5.8E+03	n					2.8E+01	n		9.4E-01	n	
				5.0E-02	I					1	0.1		Benomyl	17804-35-2	3.2E+03	n	4.1E+04	n					9.7E+02	n		8.5E-01	n	
				2.0E-01	I					1	0.1		Bensulfuron-methyl	83055-99-6	1.3E+04	n	1.6E+05	nm					3.9E+03	n		1.0E+00	n	
				3.0E-02	I					1	0.1		Bentazon	25057-89-0	1.9E+03	n	2.5E+04	n					5.7E+02	n		1.2E-01	n	
4.0E-03	P			1.0E-01	I			V		1		1.2E+03	Benzaldehyde	100-52-7	1.7E+02	c*	8.2E+02	c					1.9E+01	c		4.1E-03	c	
5.5E-02	I	7.8E-06	I	4.0E-03	I	3.0E-02	I	V		1		1.8E+03	Benzene	71-43-2	1.2E+00	c*	5.1E+00	c*	3.6E-01	c*	1.6E+00	c*	4.6E-01	c*	5.0E+00	2.3E-04	c*	2.6E-03
1.0E-01	X			3.0E-04	X					1	0.1		Benzenediamine-2-methyl sulfate, 1,4-	6369-59-1	5.4E+00	c**	2.3E+01	c*					7.8E-01	c**		2.2E-04	c**	
				1.0E-03	P			V		1		1.3E+03	Benzenethiol	108-98-5	7.8E+01	n	1.2E+03	n					1.7E+01	n		1.1E-02	n	
2.3E+02	I	6.7E-02	I	3.0E-03	I				M	1	0.1		Benzidine	92-87-5	5.3E-04	c	1.0E-02	c	1.5E-05	c	1.8E-04	c	1.1E-04	c		2.8E-07	c	
				4.0E+00	I					1	0.1		Benzoic Acid	65-85-0	2.5E+05	nm	3.3E+06	nm					7.5E+04	n		1.5E+01	n	
1.3E+01	I							V		1		3.2E+02	Benzotrichloride	98-07-7	5.3E-02	c	2.5E-01	c					3.0E-03	c		6.6E-06	c	
				1.0E-01	P					1	0.1		Benzyl Alcohol	100-51-6	6.3E+03	n	8.2E+04	n					2.0E+03	n		4.8E-01	n	
1.7E-01	I	4.9E-05	C	2.0E-03	P	1.0E-03	P	V		1		1.5E+03	Benzyl Chloride	100-44-7	1.1E+00	c*	4.8E+00	c*	5.7E-02	c*	2.5E-01	c*	8.9E-02	c*		9.8E-05	c*	
		2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			Beryllium and compounds	7440-41-7	1.6E+02	n	2.3E+03	n	1.2E-03	c*	5.1E-03	c*	2.5E+01	n	4.0E+00	1.9E+01	n	3.2E+00
				9.0E-03	P					1	0.1		Bifenox	42576-02-3	5.7E+02	n	7.4E+03	n					1.0E+02	n		7.6E-01	n	
				1.5E-02	I					1	0.1		Biphenthrin	82657-04-3	9.5E+02	n	1.2E+04	n					3.0E+02	n		1.4E+03	n	
8.0E-03	I			5.0E-01	I	4.0E-04	X	V		1			Biphenyl, 1,1'-	92-52-4	4.7E+01	n	2.0E+02	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		8.7E-03	n	
				4.0E-02	I			V		1		1.0E+03	Bis(2-chloro-1-methylethyl) ether	108-60-1	3.1E+03	ns	4.7E+04	ns					7.1E+02	n		2.6E-01	n	
				3.0E-03	P					1	0.1		Bis(2-chloroethoxy)methane	111-91-1	1.9E+02	n	2.5E+03	n					5.9E+01	n		1.3E-02	n	
1.1E+00	I	3.3E-04	I					V		1		5.1E+03	Bis(2-chloroethyl)ether	111-44-4	2.3E-01	c	1.0E+00	c	8.5E-03	c	3.7E-02	c	1.4E-02	c		3.6E-06	c	
2.2E+02	I	6.2E-02	I					V		1		4.2E+03	Bis(chloromethyl)ether	542-88-1	8.3E-05	c	3.6E-04	c	4.5E-05	c	2.0E-04	c	7.2E-05	c		1.7E-08	c	
				5.0E-02	I					1	0.1		Bisphenol A	80-05-7	3.2E+03	n	4.1E+04	n					7.7E+02	n		5.8E+01	n	
				2.0E-01	I	2.0E-02	H			1			Boron And Borates Only	7440-42-8	1.6E+04	n	2.3E+05	nm	2.1E+01	n	8.8E+01	n	4.0E+03	n		1.3E+01	n	
				2.0E+00	P	2.0E-02	P	V		1			Boron Trichloride	10294-34-5	1.6E+05	nm	2.3E+06	nm	2.1E+01	n	8.8E+01	n	4.2E+01	n				
				4.0E-02	C	1.3E-02	C	V		1			Boron Trifluoride	7637-07-2	3.1E+03	n	4.7E+04	n	1.4E+01	n	5.7E+01	n	2.6E+01	n				
7.0E-01	I			4.0E-03	I					1			Bromate	15541-45-4	9.9E-01	c	4.7E+00	c					1.1E-01	c	1.0E+01	8.5E-04	c	7.7E-02
				1.0E-04	X	6.0E-05	X	V		1		2.4E+03	Bromo-2-chloroethane, 1-	107-04-0	3.5E-01	n	1.5E+00	n	6.3E-02	n	2.6E-01	n	1.2E-01	n		3.3E-05	n	
				3.0E-04	X			V		1		9.0E+02	Bromo-3-fluorobenzene, 1-	1073-06-9	2.3E+01	n	3.5E+02	n					4.9E+00	n		4.7E-03	n	
				3.0E-04	X			V		1		3.2E+02	Bromo-4-fluorobenzene, 1-	460-00-4	2.3E+01	n	3.5E+02	ns					4.6E+00	n		4.4E-03	n	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information														Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
										1	0.1		Bromoacetic acid	79-08-3										6.0E+01(G)			1.2E-02
				8.0E-03	I	6.0E-02	I	V		1		6.8E+02	Bromobenzene	108-86-1	2.9E+02	n	1.8E+03	ns	6.3E+01	n	2.6E+02	n	6.2E+01	n		4.2E-02	n		
						4.0E-02	X	V		1		4.0E+03	Bromochloromethane	74-97-5	1.5E+02	n	6.3E+02	n	4.2E+01	n	1.8E+02	n	8.3E+01	n		2.1E-02	n		
6.2E-02	I	3.7E-05	C	8.0E-03	P			V		1		9.3E+02	Bromodichloromethane	75-27-4	2.9E-01	c	1.3E+00	c	7.6E-02	c	3.3E-01	c	1.3E-01	c	8.0E+01(G)	3.6E-05	c	2.2E-02
7.9E-03	I	1.1E-06	I	2.0E-02	I			V		1		9.2E+02	Bromoform	75-25-2	1.9E+01	c*	8.6E+01	c	2.6E+00	c	1.1E+01	c	3.3E+00	c	8.0E+01(G)	8.7E-04	c	2.1E-02
				1.4E-03	I	5.0E-03	I	V		1		3.6E+03	Bromomethane	74-83-9	6.8E+00	n	3.0E+01	n	5.2E+00	n	2.2E+01	n	7.5E+00	n		1.9E-03	n		
				5.0E-03	H			V		1			Bromophos	2104-96-3	3.9E+02	n	5.8E+03	n					3.5E+01	n		1.5E-01	n		
						1.0E-01	A	V		1		9.7E+02	Bromopropane, 1-	106-94-5	2.2E+02	n	9.4E+02	n	1.0E+02	n	4.4E+02	n	2.1E+02	n		6.4E-02	n		
1.0E-01	O			1.5E-02	O					1	0.1		Bromoxynil	1689-84-5	5.3E+00	c	2.2E+01	c					6.1E-01	c		5.2E-04	c		
1.0E-01	O			1.5E-02	O			V		1			Bromoxynil Octanoate	1689-99-2	6.7E+00	c	3.2E+01	c					2.4E-01	c		2.1E-03	c		
6.0E-01	C	3.0E-05	I			2.0E-03	I	V		1		6.7E+02	Butadiene, 1,3-	106-99-0	7.6E-02	c*	3.3E-01	c*	9.4E-02	c*	4.1E-01	c*	7.1E-02	c*		3.9E-05	c*		
				1.0E-01	I			V		1		7.6E+03	Butanol, N-	71-36-3	7.8E+03	ns	1.2E+05	nms					2.0E+03	n		4.1E-01	n		
5.0E-04	I			4.0E-01	I	5.0E+00	I	V		1			Butyl Alcohol, t-	75-65-0	1.4E+03	c*	6.5E+03	c*	5.2E+03	n	2.2E+04	n	1.5E+02	c*		3.2E-02	c*		
				2.0E+00	P	3.0E+01	P	V		1		2.1E+04	Butyl alcohol, sec-	78-92-2	1.3E+05	nms	1.5E+06	nms	3.1E+04	n	1.3E+05	n	2.4E+04	n		5.0E+00	n		
				5.0E-02	I			V		1			Butylate	2008-41-5	3.9E+03	n	5.8E+04	n					4.6E+02	n		4.5E-01	n		
2.0E-04	C	5.7E-08	C							1	0.1		Butylated hydroxyanisole	25013-16-5	2.7E+03	c	1.1E+04	c	4.9E+01	c	2.2E+02	c	1.5E+02	c		2.9E-01	c		
3.6E-03	P			3.0E-01	P					1	0.1		Butylated hydroxytoluene	128-37-0	1.5E+02	c	6.4E+02	c					3.4E+00	c		1.0E-01	c		
				5.0E-02	P			V		1		1.1E+02	Butylbenzene, n-	104-51-8	3.9E+03	ns	5.8E+04	ns					1.0E+03	n		3.2E+00	n		
				1.0E-01	X			V		1		1.5E+02	Butylbenzene, sec-	135-98-8	7.8E+03	ns	1.2E+05	nms					2.0E+03	n		5.9E+00	n		
				1.0E-01	X			V		1		1.8E+02	Butylbenzene, tert-	98-06-6	7.8E+03	ns	1.2E+05	nms					6.9E+02	n		1.6E+00	n		
				2.0E-02	A					1	0.1		Cacodylic Acid	75-60-5	1.3E+03	n	1.6E+04	n					4.0E+02	n		1.1E-01	n		
		1.8E-03	I	1.0E-04	A	1.0E-05	A			0.025	0.001		Cadmium (Diet)	7440-43-9	7.1E+00	n	1.0E+02	n	1.6E-03	c**	6.8E-03	c**							
		1.8E-03	I	1.0E-04	A	1.0E-05	A			0.05	0.001		Cadmium (Water)	7440-43-9					1.6E-03	c**	6.8E-03	c**	1.8E+00	n	5.0E+00	1.4E-01	n	3.8E-01	
				5.0E-01	I	2.2E-03	C			1	0.1		Caprolactam	105-60-2	3.1E+04	n	4.0E+05	nm	2.3E+00	n	9.6E+00	n	9.9E+03	n		2.5E+00	n		
1.5E-01	C	4.3E-05	C	2.0E-03	I					1	0.1		Captafol	2425-06-1	3.6E+00	c*	1.5E+01	c	6.5E-02	c	2.9E-01	c	4.0E-01	c*		7.1E-04	c*		
2.3E-03	C	6.6E-07	C	1.3E-01	I					1	0.1		Captan	133-06-2	2.4E+02	c*	1.0E+03	c	4.3E+00	c	1.9E+01	c	3.1E+01	c*		2.2E-02	c*		
				1.0E-01	I					1	0.1		Carbaryl	63-25-2	6.3E+03	n	8.2E+04	n					1.8E+03	n		1.7E+00	n		
				5.0E-03	I					1	0.1		Carbofuran	1563-66-2	3.2E+02	n	4.1E+03	n					9.4E+01	n	4.0E+01	3.7E-02	n	1.6E-02	
				1.0E-01	I	7.0E-01	I	V		1		7.4E+02	Carbon Disulfide	75-15-0	7.7E+02	ns	3.5E+03	ns	7.3E+02	n	3.1E+03	n	8.1E+02	n		2.4E-01	n		
7.0E-02	I	6.0E-06	I	4.0E-03	I	1.0E-01	I	V		1		4.6E+02	Carbon Tetrachloride	56-23-5	6.5E-01	c	2.9E+00	c	4.7E-01	c	2.0E+00	c	4.6E-01	c	5.0E+00	1.8E-04	c	1.9E-03	
						1.0E-01	P	V		1		5.9E+03	Carbonyl Sulfide	463-58-1	6.7E+01	n	2.8E+02	n	1.0E+02	n	4.4E+02	n	2.1E+02	n		5.1E-01	n		
				1.0E-02	I					1	0.1		Carbosulfan	55285-14-8	6.3E+02	n	8.2E+03	n					5.1E+01	n		1.2E+00	n		
				1.0E-01	I					1	0.1		Carboxin	5234-68-4	6.3E+03	n	8.2E+04	n					1.9E+03	n		1.0E+00	n		
						9.0E-04	I			1			Ceric oxide	1306-38-3	1.3E+06	nm	5.4E+06	nm	9.4E-01	n	3.9E+00	n							
				1.0E-01	I			V		1			Chloral Hydrate	302-17-0	7.8E+03	n	1.2E+05	nm					2.0E+03	n		4.0E-01	n		
				1.5E-02	I					1	0.1		Chloramben	133-90-4	9.5E+02	n	1.2E+04	n					2.9E+02	n		7.0E-02	n		
										1	0.1		Chloramines, Organic	E701235											4.0E+03(G)				
4.0E-01	H									1	0.1		Chloranil	118-75-2	1.3E+00	c	5.7E+00	c					1.8E-01	c		1.5E-04	c		
				5.0E-04	G			V		1	0.04		Chlordane (alpha)	5103-71-9	3.6E+01	n	5.0E+02	n					3.6E+00	n		4.9E-01	n		
				5.0E-04	G			V		1	0.04		Chlordane (gamma)	5103-74-2	3.6E+01	n	5.0E+02	n					1.0E+01	n		1.4E+00	n		
3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I	V		1	0.04		Chlordane (technical mixture)	12789-03-6	1.7E+00	c*	7.7E+00	c*	2.8E-02	c*	1.2E-01	c*	2.0E-02	c*	2.0E+00	2.7E-03	c*	2.7E-01	
1.0E+01	I	4.6E-03	C	3.0E-04	I					1	0.1		Chlordecone (Kepone)	143-50-0	5.4E-02	c	2.3E-01	c	6.1E-04	c	2.7E-03	c	3.5E-03	c		1.2E-04	c		
				7.0E-04	A					1	0.1		Chlorfenvinphos	470-90-6	4.4E+01	n	5.7E+02	n					1.1E+01	n		3.1E-02	n		
				9.0E-02	O					1	0.1		Chlorimuron, Ethyl-	90982-32-4	5.7E+03	n	7.4E+04	n					1.8E+03	n		6.0E-01	n		
				1.0E-01	I	1.5E-04	A	V		1		2.8E+03	Chlorine	7782-50-5	1.8E-01	n	7.8E-01	n	1.5E-01	n	6.4E-01	n	3.0E-01	n	4.0E+03(G)	1.5E-04	n	2.0E+00	
				3.0E-02	I	2.0E-04	I	V		1			Chlorine Dioxide	10049-04-4	2.3E+03	n	3.4E+04	n	2.1E-01	n	8.8E-01	n	4.2E-01	n	8.0E+02(G)				
				3.0E-02	I					1			Chlorite (Sodium Salt)	7758-19-2	2.3E+03	n	3.5E+04	n					6.0E+02	n	1.0E+03				
						5.0E+01	I	V		1		1.2E+03	Chloro-1,1-difluoroethane, 1-	75-68-3	5.4E+04	ns	2.3E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		5.2E+01	n		
		3.0E-04	I	2.0E-02	H	2.0E-02	I	V		1		7.9E+02	Chloro-1,3-butadiene, 2-	126-99-8	1.0E-02	c	4.4E-02	c	9.4E-03	c	4.1E-02	c	1.9E-02	c		9.8E-06	c		
4.6E-01	H									1	0.1		Chloro-2-methylaniline HCl, 4-	3165-93-3	1.2E+00	c	5.0E+00	c					1.7E-01	c		1.5E-04	c		
1.0E-01	P	7.7E-05	C	3.0E-03	X					1	0.1		Chloro-2-methylaniline, 4-	95-69-2	5.4E+00	c*	2.3E+01	c	3.6E-02	c	1.6E-01	c	7.0E-01	c*		4.0E-04	c*		
2.7E-01	X							V		1		1.2E+04	Chloroacetaldehyde, 2-	107-20-0	2.6E+00	c	1.2E+01	c					2.9E-01	c		5.8E-05	c		
										1	0.1		Chloroacetic Acid	79-11-8											6.0E+01(G)			1.2E-02	
						3.0E-05	I			1	0.1		Chloroacetophenone, 2-	532-27-4	4.3E+04	n	1.8E+05	nm	3.1E-02	n	1.3E-01	n							
2.0E-01	P			5.0E-04	P					1	0.1		Chloroaniline, p-	106-47-8	2.7E+00	c*	1.1E+01	c*					3.7E-01	c*		1.6E-04	c*		
				2.0E-02	I	5.0E-02	P	V		1		7.6E+02	Chlorobenzene	108-90-7	2.8E+02	n	1.3E+03	ns	5.2E+01	n	2.2E+02	n	7.8E+01	n	1.0E+02	5.3E-02	n	6.8E-02	
				1.0E-01	X					1	0.1		Chlorobenzene sulfonic acid, p-	98-66-8	6.3E+03	n	8.2E+04	n					2.0E+03	n		4.7E-01	n		
1.1E-01	C	3.1E-05	C	2.0E-02	I					1	0.1		Chlorobenzilate	510-15-6	4.9E+00	c	2.1E+01	c	9.1E-02	c	4.0E-01	c	3.1E-01	c		1.0E-03	c		
				3.0E-02	X					1	0.1		Chlorobenzoic Acid, p-	74-11-3	1.9E+03	n	2.5E+04	n					5.1E+02	n		1.3E-01	n		
		8.6E-06	C	3.0E-03	P	3.0E-01	P	V		1		2.9E+02	Chlorobenzotrifluoride, 4-	98-56-6	2.2E+00	c*	9.6E+00	c	3.3E-01	c	1.4E+00	c	6.5E-01	c*		2.3E-03	c*		
				4.0E-02	P			V		1		7.3E+02	Chlorobutane, 1-	109-69-3	3.1E+03	ns	4.7E+04	ns					6.4E+02	n		2.6E-01	n		
						5.0E+01	I	V		1		1.7E+03	Chlorodifluoromethane	75-45-6	4.9E+04	ns	2.1E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		4.3E+01	n		
				2.0E-02	P			V		1		1.1E+05	Chloroethanol, 2-	107-07-3	1.6E+03	n	2.3E+04	n					4.0E+02	n		8.1E-02	n		
3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		1		2.5E+03	Chloroform	67-66-3	3.2E-01	c	1.4E+00	c	1.2E-01	c	5.3E-01	c	2.2E-01	c	8.0E+01(G)	6.1E-05	c	2.2E-02	
						9.0E-02	I	V		1		1.3E+03	Chloromethane	74-87-3	1.1E+02	n	4.6E+02	n	9.4E+01	n	3.9E+02	n	1.9E+02	n		4.9E-02	n		
2.4E+00	C	6.9E-04	C					V		1		9.3E+03	Chloromethyl Methyl Ether	107-30-2	2.0E-02	c	8.9E-02	c	4.1E-03	c	1.8E-02	c	6.5E-03	c		1.4E-06	c		
3.0E-01	P			3.0E-03	P	1.0E-05	X			1	0.1		Chloronitrobenzene, o-	88-73-3	1.8E+00	c	7.7E+00	c	1.0E-02	n	4.4E-02	n	2.4E-01	c		2.2E-04	c		
6.0E-02	P			7.0E-04	P	2.0E-03	P			1	0.1		Chloronitrobenzene, p-	100-00-5	9.0E+00	c**	3.8E+01	c*	2.1E+00	n	8.8E+00	n	1.2E+00	c*		1.1E-03	c*		
				5.0E-03	I			V		1		2.7E+04	Chlorophenol, 2-	95-57-8	3.9E+02	n	5.8E+03	n					9.1E+01	n		8.9E-02	n		
						4.0E-04	C	V		1		6.2E+02	Chloropicrin	76-06-2	2.0E+00	n	8.2E+00	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		2.5E-04	n		
1.7E-02	C			1.5E-02	I					1	0.1		Chlorothalonil	1897-45-6	3.2E+01	c*	1.4E+02	c*					4.0E+00	c*		9.0E-03	c*		
				2.0E-02	I			V		1		9.1E+02	Chlorotoluene, o-	95-49-8	1.6E+03	ns	2.3E+04	ns					2.4E+02	n		2.3E-01	n		
				2.0E-02	X			V		1		2.5E+02	Chlorotoluene, p-	106-43-4	1.6E+03	ns	2.3E+04	ns					2.5E+02	n		2.4E-01	n		
2.4E+02	C	6.9E-02	C							1	0.1		Chlorozotocin	54749-90-5	2.3E-03	c	9.6E-03	c	4.1E-05	c	1.8E-04	c	3.2E-04	c		7.1E-08	c		
				5.0E-03	O					1	0.1		Chlorpropham	101-21-3	3.2E+02	n	4.1E+03	n					7.1E+01	n		6.4E-02	n		
				1.0E-03	A					1	0.1		Chlorpyrifos	2921-88-2	6.3E+01	n	8.2E+02	n					8.4E+00	n		1.2E-01	n		
				1.0E-02	H					1	0.1		Chlorpyrifos Methyl	5598-13-0	6.3E+02	n	8.2E+03	n					1.2E+02	n		5.4E-01	n		
				5.0E-02	O					1	0.1		Chlorsulfuron	64902-72-3	3.2E+03	n	4.1E+04	n					9.9E+02	n		8.3E-01	n		

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				1.0E-02	I					1	0.1		Chlorthal-dimethyl	1861-32-1	6.3E+02	n	8.2E+03	n					1.2E+02	n		1.5E-01	n	
				8.0E-04	H					1	0.1		Chlorthiophos	60238-56-4	5.1E+01	n	6.6E+02	n					2.8E+00	n		7.3E-02	n	
				1.5E+00	I					0.013			Chromium(III), Insoluble Salts	16065-83-1	1.2E+05	nm	1.8E+06	nm					2.2E+04	n		4.0E+07	n	
5.0E-01	C	8.4E-02	G	3.0E-03	I	1.0E-04	I		M	0.025			Chromium(VI)	18540-29-9	3.0E-01	c	6.3E+00	c	1.2E-05	c	1.5E-04	c	3.5E-02	c		6.7E-04	c	
										0.013			Chromium, Total	7440-47-3											1.0E+02			1.8E+05
				1.3E-02	I					1	0.1		Clofentezine	74115-24-5	8.2E+02	n	1.1E+04	n					2.3E+02	n		1.4E+01	n	
		9.0E-03	P	3.0E-04	P	6.0E-06	P			1			Cobalt	7440-48-4	2.3E+01	n	3.5E+02	n	3.1E-04	c*	1.4E-03	c*	6.0E+00	n		2.7E-01	n	
		6.2E-04	I					V	M	1			Coke Oven Emissions	E649830					1.6E-03	c	2.0E-02	c						
				4.0E-02	H					1			Copper	7440-50-8	3.1E+03	n	4.7E+04	n					8.0E+02	n	1.3E+03	2.8E+01	n	4.6E+01
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, m-	108-39-4	3.2E+03	n	4.1E+04	n	6.3E+02	n	2.6E+03	n	9.3E+02	n		7.4E-01	n	
				5.0E-02	I	6.0E-01	C			1	0.1		Cresol, o-	95-48-7	3.2E+03	n	4.1E+04	n	6.3E+02	n	2.6E+03	n	9.3E+02	n		7.5E-01	n	
				2.0E-02	P	6.0E-01	C			1	0.1		Cresol, p-	106-44-5	1.3E+03	n	1.6E+04	n	6.3E+02	n	2.6E+03	n	3.7E+02	n		3.0E-01	n	
				1.0E-01	A					1	0.1		Cresol, p-chloro-m-	59-50-7	6.3E+03	n	8.2E+04	n					1.4E+03	n		1.7E+00	n	
				1.0E-01	A	6.0E-01	C			1	0.1		Cresols	1319-77-3	6.3E+03	n	8.2E+04	n	6.3E+02	n	2.6E+03	n	1.5E+03	n		1.3E+00	n	
1.9E+00	H			1.0E-03	P			V		1		1.7E+04	Crotonaldehyde, trans-	123-73-9	3.7E-01	c	1.7E+00	c					4.0E-02	c		8.2E-06	c	
				1.0E-01	I	4.0E-01	I	V		1		2.7E+02	Cumene	98-82-8	1.9E+03	ns	9.9E+03	ns	4.2E+02	n	1.8E+03	n	4.5E+02	n		7.4E-01	n	
2.2E-01	C	6.3E-05	C							1	0.1		Cupferron	135-20-6	2.5E+00	c	1.0E+01	c	4.5E-02	c	1.9E-01	c	3.5E-01	c		6.1E-04	c	
8.4E-01	H			2.0E-03	H					1	0.1		Cyanazine	21725-46-2	6.5E-01	c	2.7E+00	c					8.8E-02	c		4.1E-05	c	
													Cyanides															
				1.0E-03	I					1			~Calcium Cyanide	592-01-8	7.8E+01	n	1.2E+03	n					2.0E+01	n				
				5.0E-03	I					1			~Copper Cyanide	544-92-3	3.9E+02	n	5.8E+03	n					1.0E+02	n				
				6.0E-04	I	8.0E-04	G	V		1		9.5E+05	~Cyanide (CN-)	57-12-5	2.3E+01	n	1.5E+02	n	8.3E-01	n	3.5E+00	n	1.5E+00	n	2.0E+02	1.5E-02	n	2.0E+00
				1.0E-03	I			V		1			~Cyanogen	460-19-5	7.8E+01	n	1.2E+03	n					2.0E+01	n				
				9.0E-02	I			V		1			~Cyanogen Bromide	506-68-3	7.0E+03	n	1.1E+05	nm					1.8E+03	n				
				5.0E-02	I			V		1			~Cyanogen Chloride	506-77-4	3.9E+03	n	5.8E+04	n					1.0E+03	n				
				6.0E-04	I	8.0E-04	I	V		1		1.0E+07	~Hydrogen Cyanide	74-90-8	2.3E+01	n	1.5E+02	n	8.3E-01	n	3.5E+00	n	1.5E+00	n		1.5E-02	n	
				2.0E-03	I					1			~Potassium Cyanide	151-50-8	1.6E+02	n	2.3E+03	n					4.0E+01	n				
				5.0E-03	I					0.04			~Potassium Silver Cyanide	506-61-6	3.9E+02	n	5.8E+03	n					8.2E+01	n				
				1.0E-01	I					0.04			~Silver Cyanide	506-64-9	7.8E+03	n	1.2E+05	nm					1.8E+03	n				
				1.0E-03	I					1			~Sodium Cyanide	143-33-9	7.8E+01	n	1.2E+03	n					2.0E+01	n	2.0E+02			
				2.0E-04	P					1			~Thiocyanates	E1790665	1.6E+01	n	2.3E+02	n					4.0E+00	n				
				2.0E-04	X			V		1			~Thiocyanic Acid	463-56-9	1.6E+01	n	2.3E+02	n					4.0E+00	n				
				5.0E-02	I					1			~Zinc Cyanide	557-21-1	3.9E+03	n	5.8E+04	n					1.0E+03	n				
						6.0E+00	I	V		1		1.2E+02	Cyclohexane	110-82-7	6.5E+03	ns	2.7E+04	ns	6.3E+03	n	2.6E+04	n	1.3E+04	n		1.3E+01	n	
2.0E-02	X			2.0E-02	X					1	0.1		Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	2.7E+01	c*	1.1E+02	c					2.8E+00	c		1.6E-02	c	
				5.0E+00	I	7.0E-01	P	V		1		5.1E+03	Cyclohexanone	108-94-1	2.8E+04	ns	1.3E+05	nms	7.3E+02	n	3.1E+03	n	1.4E+03	n		3.4E-01	n	
				5.0E-03	P	1.0E+00	X	V		1		2.8E+02	Cyclohexene	110-83-8	3.1E+02	ns	3.1E+03	ns	1.0E+03	n	4.4E+03	n	7.0E+01	n		4.6E-02	n	
				2.0E-01	I			V		1		2.9E+05	Cyclohexylamine	108-91-8	1.6E+04	n	2.3E+05	nm					3.8E+03	n		1.0E+00	n	
				2.5E-02	I					1	0.1		Cyfluthrin	68359-37-5	1.6E+03	n	2.1E+04	n					1.2E+02	n		3.1E+01	n	
				7.2E-02	O					1	0.1		Cypermethrin	52315-07-8	4.5E+03	n	5.9E+04	n					1.4E+03	n		2.3E+02	n	
				5.0E-01	O					1	0.1		Cyromazine	66215-27-8	3.2E+04	n	4.1E+05	nm					9.9E+03	n		2.5E+00	n	
2.4E-01	I	6.9E-05	C	3.0E-05	X					1	0.1		DDD, p,p`- (DDD)	72-54-8	1.9E+00	n	9.6E+00	c**	4.1E-02	c	1.8E-01	c	3.2E-02	c**		7.5E-03	c**	
3.4E-01	I	9.7E-05	C	3.0E-04	X			V		1			DDE, p,p'-	72-55-9	2.0E+00	c*	9.3E+00	c*	2.9E-02	c	1.3E-01	c	4.6E-02	c		1.1E-02	c	
3.4E-01	I	9.7E-05	I	5.0E-04	I					1	0.03		DDT	50-29-3	1.9E+00	c*	8.5E+00	c*	2.9E-02	c	1.3E-01	c	2.3E-01	c*		7.7E-02	c*	
				3.0E-02	I					1	0.1		Dalapon	75-99-0	1.9E+03	n	2.5E+04	n					6.0E+02	n	2.0E+02	1.2E-01	n	4.1E-02
1.8E-02	C	5.1E-06	C	1.5E-01	I					1	0.1		Daminozide	1596-84-5	3.0E+01	c	1.3E+02	c	5.5E-01	c	2.4E+00	c	4.3E+00	c		9.5E-04	c	
7.0E-04	I			7.0E-03	I					1	0.1		Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	4.4E+02	n	3.3E+03	c**					1.1E+02	c**		6.2E+01	c**	
				4.0E-05	I					1	0.1		Demeton	8065-48-3	2.5E+00	n	3.3E+01	n					4.2E-01	n				
1.2E-03	I			6.0E-01	I					1	0.1		Di(2-ethylhexyl)adipate	103-23-1	4.5E+02	c*	1.9E+03	c					6.5E+01	c	4.0E+02	4.7E+00	c	2.9E+01
6.1E-02	H									1	0.1		Diallate	2303-16-4	8.9E+00	c	3.8E+01	c					5.4E-01	c		8.0E-04	c	
				7.0E-04	A					1	0.1		Diazinon	333-41-5	4.4E+01	n	5.7E+02	n					1.0E+01	n		6.5E-02	n	
				1.0E-02	X			V		1			Dibenzothiophene	132-65-0	7.8E+02	n	1.2E+04	n					6.5E+01	n		1.2E+00	n	
8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1		9.8E+02	Dibromo-3-chloropropane, 1,2-	96-12-8	5.3E-03	c	6.4E-02	c	1.7E-04	c	2.0E-03	c	3.3E-04	c	2.0E-01	1.4E-07	c	8.6E-05
										1	0.1		Dibromoacetic acid	631-64-1											6.0E+01(G)			1.2E-02
				4.0E-04	X			V		1		1.6E+02	Dibromobenzene, 1,3-	108-36-1	3.1E+01	n	4.7E+02	ns					5.3E+00	n		5.1E-03	n	
				1.0E-02	I			V		1			Dibromobenzene, 1,4-	106-37-6	7.8E+02	n	1.2E+04	n					1.3E+02	n		1.2E-01	n	
8.4E-02	I			2.0E-02	I			V		1		8.0E+02	Dibromochloromethane	124-48-1	8.3E+00	c	3.9E+01	c					8.7E-01	c	8.0E+01(G)	2.3E-04	c	2.1E-02
2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V		1		1.3E+03	Dibromoethane, 1,2-	106-93-4	3.6E-02	c	1.6E-01	c	4.7E-03	c	2.0E-02	c	7.5E-03	c	5.0E-02	2.1E-06	c	1.4E-05
						4.0E-03	X	V		1		2.8E+03	Dibromomethane (Methylene Bromide)	74-95-3	2.4E+01	n	9.9E+01	n	4.2E+00	n	1.8E+01	n	8.3E+00	n		2.1E-03	n	
				3.0E-04	P					1	0.1		Dibutyltin Compounds	E1790661	1.9E+01	n	2.5E+02	n					6.0E+00	n				
				3.0E-02	I					1	0.1		Dicamba	1918-00-9	1.9E+03	n	2.5E+04	n					5.7E+02	n		1.5E-01	n	
										1	0.1		Dichloramine	3400-09-7											4.0E+03(G)			
		4.2E-03	P					V		1		5.5E+02	Dichloro-2-butene, 1,4-	764-41-0	2.1E-03	c	9.4E-03	c	6.7E-04	c	2.9E-03	c	1.3E-03	c		6.6E-07	c	
		4.2E-03	P					V		1		5.2E+02	Dichloro-2-butene, cis-1,4-	1476-11-5	7.4E-03	c	3.2E-02	c	6.7E-04	c	2.9E-03	c	1.3E-03	c		6.2E-07	c	
		4.2E-03	P					V		1		7.6E+02	Dichloro-2-butene, trans-1,4-	110-57-6	7.4E-03	c	3.2E-02	c	6.7E-04	c	2.9E-03	c	1.3E-03	c		6.2E-07	c	
5.0E-02	I			4.0E-03	I					1	0.1		Dichloroacetic Acid	79-43-6	1.1E+01	c*	4.6E+01	c*					1.5E+00	c*	6.0E+01(G)	3.1E-04	c*	1.2E-02
				9.0E-02	I	2.0E-01	H	V		1		3.8E+02	Dichlorobenzene, 1,2-	95-50-1	1.8E+03	ns	9.3E+03	ns	2.1E+02	n	8.8E+02	n	3.0E+02	n	6.0E+02	3.0E-01	n	5.8E-01
5.4E-03	C	1.1E-05	C	7.0E-02	A	8.0E-01	I	V		1			Dichlorobenzene, 1,4-	106-46-7	2.6E+00	c	1.1E+01	c	2.6E-01	c	1.1E+00	c	4.8E-01	c	7.5E+01	4.6E-04	c	7.2E-02
4.5E-01	I	3.4E-04	C							1	0.1		Dichlorobenzidine, 3,3'-	91-94-1	1.2E+00	c	5.1E+00	c	8.3E-03	c	3.6E-02	c	1.3E-01	c		8.2E-04	c	
				9.0E-03	X					1	0.1		Dichlorobenzophenone, 4,4'-	90-98-2	5.7E+02	n	7.4E+03	n					7.8E+01	n		4.7E-01	n	
				2.0E-01	I	1.0E-01	X	V		1		8.5E+02	Dichlorodifluoromethane	75-71-8	8.7E+01	n	3.7E+02	n	1.0E+02	n	4.4E+02	n	2.0E+02	n		3.0E-01	n	
5.7E-03	C	1.6E-06	C	2.0E-01	P			V		1		1.7E+03	Dichloroethane, 1,1-	75-34-3	3.6E+00	c	1.6E+01	c	1.8E+00	c	7.7E+00	c	2.8E+00	c		7.8E-04	c	
9.1E-02	I	2.6E-05	I	6.0E-03	X	7.0E-03	P	V		1		3.0E+03	Dichloroethane, 1,2-	107-06-2	4.6E-01	c*	2.0E+00	c*	1.1E-01	c*	4.7E-01	c*	1.7E-01	c*	5.0E+00	4.8E-05	c*	1.4E-03
				5.0E-02	I	2.0E-01	I	V		1		1.2E+03	Dichloroethylene, 1,1-	75-35-4	2.3E+02	n	1.0E+03	n	2.1E+02	n	8.8E+02	n	2.8E+02	n	7.0E+00	1.0E-01	n	2.5E-03
				2.0E-03	I			V		1		2.4E+03	Dichloroethylene, cis-1,2-	156-59-2	1.6E+02	n	2.3E+03	n					3.6E+01	n	7.0E+01	1.1E-02	n	2.1E-02
				2.0E-02	I	4.0E-02	X	V		1		1.9E+03	Dichloroethylene, trans-1,2-	156-60-5	7.0E+01	n	3.0E+02	n	4.2E+01	n	1.8E+02	n	6.8E+01	n	1.0E+02	2.1E-02	n	3.1E-02
				3.0E-03	I					1	0.1		Dichlorophenol, 2,4-	120-83-2	1.9E+02	n	2.5E+03	n					4.6E+01	n		2.3E-02	n	
				1.0E-02	I					1	0.05		Dichlorophenoxy Acetic Acid, 2,4-	94-75-7	7.0E+02	n	9.6E+03	n					1.7E+02	n	7.0E+01	4.5E-02	n	1.8E-02

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
3.7E-02	P	3.7E-06	P	4.0E-02	P	4.0E-03	I	V		1		1.4E+03	Dichloropropane, 1,2-	78-87-5	2.5E+00	c**	1.1E+01	c**	7.6E-01	c**	3.3E+00	c**	8.5E-01	c**	5.0E+00	2.8E-04	c**	1.7E-03
				2.0E-02	P			V		1		1.5E+03	Dichloropropane, 1,3-	142-28-9	1.6E+03	ns	2.3E+04	ns					3.7E+02	n		1.3E-01	n	
				3.0E-03	I					1	0.1		Dichloropropanol, 2,3-	616-23-9	1.9E+02	n	2.5E+03	n					5.9E+01	n		1.3E-02	n	
1.0E-01	I	4.0E-06	I	3.0E-02	I	2.0E-02	I	V		1		1.6E+03	Dichloropropene, 1,3-	542-75-6	1.8E+00	c*	8.2E+00	c*	7.0E-01	c*	3.1E+00	c*	4.7E-01	c*		1.7E-04	c*	
2.9E-01	I	8.3E-05	C	5.0E-04	I	5.0E-04	I			1	0.1		Dichlorvos	62-73-7	1.9E+00	c*	7.9E+00	c*	3.4E-02	c*	1.5E-01	c*	2.6E-01	c*		8.1E-05	c*	
				3.0E-05	O					1	0.1		Dicrotophos	141-66-2	1.9E+00	n	2.5E+01	n					6.0E-01	n		1.4E-04	n	
				8.0E-02	P	3.0E-04	X	V		1		2.6E+02	Dicyclopentadiene	77-73-6	1.3E+00	n	5.4E+00	n	3.1E-01	n	1.3E+00	n	6.3E-01	n		2.2E-03	n	
1.6E+01	I	4.6E-03	I	5.0E-05	I					1	0.1		Dieldrin	60-57-1	3.4E-02	c*	1.4E-01	c	6.1E-04	c	2.7E-03	c	1.8E-03	c		7.1E-05	c	
		3.0E-04	C			5.0E-03	I			1	0.1		Diesel Engine Exhaust	E17136615					9.4E-03	c	4.1E-02	c						
				2.0E-03	P	2.0E-04	P			1	0.1		Diethanolamine	111-42-2	1.3E+02	n	1.6E+03	n	2.1E-01	n	8.8E-01	n	4.0E+01	n		8.1E-03	n	
				3.0E-02	P	1.0E-04	P			1	0.1		Diethylene Glycol Monobutyl Ether	112-34-5	1.9E+03	n	2.4E+04	n	1.0E-01	n	4.4E-01	n	6.0E+02	n		1.3E-01	n	
				6.0E-02	P	3.0E-04	P			1	0.1		Diethylene Glycol Monoethyl Ether	111-90-0	3.8E+03	n	4.8E+04	n	3.1E-01	n	1.3E+00	n	1.2E+03	n		2.4E-01	n	
				1.0E-03	P			V		1		1.1E+05	Diethylformamide	617-84-5	7.8E+01	n	1.2E+03	n					2.0E+01	n		4.1E-03	n	
3.5E+02	C	1.0E-01	C							1	0.1		Diethylstilbestrol	56-53-1	1.6E-03	c	6.6E-03	c	2.8E-05	c	1.2E-04	c	5.1E-05	c		2.8E-05	c	
				8.3E-02	O					1	0.1		Difenzoquat	43222-48-6	5.2E+03	n	6.8E+04	n					1.7E+03	n		2.6E+02	n	
				2.0E-02	I					1	0.1		Diflubenzuron	35367-38-5	1.3E+03	n	1.6E+04	n					2.9E+02	n		3.3E-01	n	
						4.0E+01	I	V		1		1.4E+03	Difluoroethane, 1,1-	75-37-6	4.8E+04	ns	2.0E+05	nms	4.2E+04	n	1.8E+05	n	8.3E+04	n		2.8E+01	n	
						3.0E+01	X	V		1		6.9E+02	Difluoropropane, 2,2-	420-45-1	2.4E+04	ns	1.0E+05	ns	3.1E+04	n	1.3E+05	n	6.3E+04	n		1.4E+02	n	
4.4E-02	C	1.3E-05	C					V		1			Dihydrosafrole	94-58-6	9.9E+00	c	4.5E+01	c	2.2E-01	c	9.4E-01	c	3.0E-01	c		1.9E-04	c	
						7.0E-01	P	V		1		2.3E+03	Diisopropyl Ether	108-20-3	2.2E+03	n	9.4E+03	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n		3.7E-01	n	
				8.0E-02	I			V		1		5.3E+02	Diisopropyl Methylphosphonate	1445-75-6	6.3E+03	ns	9.3E+04	ns					1.6E+03	n		4.5E-01	n	
				2.2E-02	O					1	0.1		Dimethipin	55290-64-7	1.4E+03	n	1.8E+04	n					4.4E+02	n		9.6E-02	n	
				2.2E-03	O					1	0.1		Dimethoate	60-51-5	1.4E+02	n	1.8E+03	n					4.4E+01	n		9.9E-03	n	
1.6E+00	P									1	0.1		Dimethoxybenzidine, 3,3'-	119-90-4	3.4E-01	c	1.4E+00	c					4.7E-02	c		5.8E-05	c	
1.7E-03	P			6.0E-02	P					1	0.1		Dimethyl methylphosphonate	756-79-6	3.2E+02	c*	1.4E+03	c*					4.6E+01	c*		9.6E-03	c*	
4.6E+00	C	1.3E-03	C							1	0.1		Dimethylamino azobenzene [p-]	60-11-7	1.2E-01	c	5.0E-01	c	2.2E-03	c	9.4E-03	c	5.0E-03	c		2.1E-05	c	
5.8E-01	H									1	0.1		Dimethylaniline HCl, 2,4-	21436-96-4	9.4E-01	c	4.0E+00	c					1.3E-01	c		1.2E-04	c	
2.0E-01	P			2.0E-03	X					1	0.1		Dimethylaniline, 2,4-	95-68-1	2.7E+00	c*	1.1E+01	c					3.7E-01	c		2.1E-04	c	
2.7E-02	P			2.0E-03	I			V		1		8.3E+02	Dimethylaniline, N,N-	121-69-7	2.6E+01	c**	1.2E+02	c*					2.5E+00	c*		9.0E-04	c*	
1.1E+01	P									1	0.1		Dimethylbenzidine, 3,3'-	119-93-7	4.9E-02	c	2.1E-01	c					6.5E-03	c		4.3E-05	c	
				1.0E-01	P	3.0E-02	I	V		1		1.1E+05	Dimethylformamide	68-12-2	2.6E+03	n	1.5E+04	n	3.1E+01	n	1.3E+02	n	6.1E+01	n		1.2E-02	n	
				1.0E-04	X	2.0E-06	X	V		1		1.7E+05	Dimethylhydrazine, 1,1-	57-14-7	5.7E-02	n	2.4E-01	n	2.1E-03	n	8.8E-03	n	4.2E-03	n		9.3E-07	n	
5.5E+02	C	1.6E-01	C					V		1		1.9E+05	Dimethylhydrazine, 1,2-	540-73-8	8.8E-04	c	4.1E-03	c	1.8E-05	c	7.7E-05	c	2.8E-05	c		6.5E-09	c	
				2.0E-02	I					1	0.1		Dimethylphenol, 2,4-	105-67-9	1.3E+03	n	1.6E+04	n					3.6E+02	n		4.2E-01	n	
				6.0E-04	I					1	0.1		Dimethylphenol, 2,6-	576-26-1	3.8E+01	n	4.9E+02	n					1.1E+01	n		1.3E-02	n	
				1.0E-03	I					1	0.1		Dimethylphenol, 3,4-	95-65-8	6.3E+01	n	8.2E+02	n					1.8E+01	n		2.1E-02	n	
4.5E-02	C	1.3E-05	C					V		1		4.7E+02	Dimethylvinylchloride	513-37-1	1.1E+00	c	4.8E+00	c	2.2E-01	c	9.4E-01	c	3.3E-01	c		1.1E-04	c	
				8.0E-05	X					1	0.1		Dinitro-o-cresol, 4,6-	534-52-1	5.1E+00	n	6.6E+01	n					1.5E+00	n		2.6E-03	n	
				2.0E-03	I					1	0.1		Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5	1.3E+02	n	1.6E+03	n					2.3E+01	n		7.7E-01	n	
				4.0E-04	X	2.0E-03	X			1	0.1		Dinitroaniline, 3,5-	618-87-1	2.5E+01	n	3.3E+02	n	2.1E+00	n	8.8E+00	n	7.7E+00	n		4.1E-03	n	
				1.0E-04	P					1	0.1		Dinitrobenzene, 1,2-	528-29-0	6.3E+00	n	8.2E+01	n					1.9E+00	n		1.8E-03	n	
				1.0E-04	I					1	0.1		Dinitrobenzene, 1,3-	99-65-0	6.3E+00	n	8.2E+01	n					2.0E+00	n		1.8E-03	n	
				1.0E-04	P					1	0.1		Dinitrobenzene, 1,4-	100-25-4	6.3E+00	n	8.2E+01	n					2.0E+00	n		1.8E-03	n	
				2.0E-03	I					1	0.1		Dinitrophenol, 2,4-	51-28-5	1.3E+02	n	1.6E+03	n					3.9E+01	n		4.4E-02	n	
6.8E-01	I									1	0.1		Dinitrotoluene Mixture, 2,4/2,6-	E1615210	8.0E-01	c	3.4E+00	c					1.1E-01	c		1.5E-04	c	
3.1E-01	C	8.9E-05	C	2.0E-03	I					1	0.102		Dinitrotoluene, 2,4-	121-14-2	1.7E+00	c*	7.4E+00	c	3.2E-02	c	1.4E-01	c	2.4E-01	c		3.2E-04	c	
1.5E+00	P			3.0E-04	X					1	0.099		Dinitrotoluene, 2,6-	606-20-2	3.6E-01	c*	1.5E+00	c					4.9E-02	c		6.7E-05	c	
				1.0E-04	X					1	0.006		Dinitrotoluene, 2-Amino-4,6-	35572-78-2	7.7E+00	n	1.1E+02	n					1.9E+00	n		1.5E-03	n	
				1.0E-04	X					1	0.009		Dinitrotoluene, 4-Amino-2,6-	19406-51-0	7.7E+00	n	1.1E+02	n					1.9E+00	n		1.5E-03	n	
4.5E-01	X			9.0E-04	X					1	0.1		Dinitrotoluene, Technical grade	25321-14-6	1.2E+00	c*	5.1E+00	c					1.0E-01	c		1.4E-04	c	
				1.0E-03	I					1	0.1		Dinoseb	88-85-7	6.3E+01	n	8.2E+02	n					1.5E+01	n	7.0E+00	1.3E-01	n	6.2E-02
1.0E-01	I	5.0E-06	I	3.0E-02	I	3.0E-02	I	V		1		1.2E+05	Dioxane, 1,4-	123-91-1	5.3E+00	c	2.4E+01	c	5.6E-01	c*	2.5E+00	c*	4.6E-01	c		9.4E-05	c	
													Dioxins																
6.2E+03	I	1.3E+00	I							1	0.03		~Hexachlorodibenzo-p-dioxin, Mixture	34465-46-8	1.0E-04	c	4.7E-04	c	2.2E-06	c	9.4E-06	c	1.3E-05	c		1.7E-05	c	
1.3E+05	C	3.8E+01	C	7.0E-10	I	4.0E-08	C	V		1	0.03		~TCDD, 2,3,7,8-	1746-01-6	4.8E-06	c*	2.2E-05	c*	7.4E-08	c	3.2E-07	c	1.2E-07	c	3.0E-05	5.9E-08	c	1.5E-05
				3.0E-02	I					1	0.1		Diphenamid	957-51-7	1.9E+03	n	2.5E+04	n					5.3E+02	n		5.2E+00	n	
						4.0E-04	X	V		1			Diphenyl Ether	101-84-8	3.4E+01	n	1.4E+02	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		3.4E-03	n	
				8.0E-04	X					1	0.1		Diphenyl Sulfone	127-63-9	5.1E+01	n	6.6E+02	n					1.5E+01	n		3.6E-02	n	
				1.0E-01	O					1	0.1		Diphenylamine	122-39-4	6.3E+03	n	8.2E+04	n					1.3E+03	n		2.3E+00	n	
8.0E-01	I	2.2E-04	I							1	0.1		Diphenylhydrazine, 1,2-	122-66-7	6.8E-01	c	2.9E+00	c	1.3E-02	c	5.6E-02	c	7.8E-02	c		2.5E-04	c	
				2.2E-03	I					1	0.1		Diquat	2764-72-9	1.4E+02	n	1.8E+03	n					4.0E+01	n	2.0E+01	3.3E-01	n	1.7E-01
7.4E+00	C	2.1E-03	C							1	0.1		Direct Black 38	1937-37-7	7.3E-02	c	3.1E-01	c	1.3E-03	c	5.8E-03	c	1.1E-02	c		5.1E+00	c	
7.4E+00	C	2.1E-03	C							1	0.1		Direct Blue 6	2602-46-2	7.3E-02	c	3.1E-01	c	1.3E-03	c	5.8E-03	c	1.1E-02	c		1.7E+01	c	
6.7E+00	C	1.9E-03	C							1	0.1		Direct Brown 95	16071-86-6	8.1E-02	c	3.4E-01	c	1.5E-03	c	6.5E-03	c	1.2E-02	c		1.6E-01	c	
				4.0E-05	I					1	0.1		Disulfoton	298-04-4	2.5E+00	n	3.3E+01	n					5.0E-01	n		9.4E-04	n	
				1.0E-02	I			V		1			Dithiane, 1,4-	505-29-3	7.8E+02	n	1.2E+04	n					2.0E+02	n		9.7E-02	n	
				2.0E-03	I					1	0.1		Diuron	330-54-1	1.3E+02	n	1.6E+03	n					3.6E+01	n		1.5E-02	n	
				2.0E-02	O					1	0.1		Dodine	2439-10-3	1.3E+03	n	1.6E+04	n					4.0E+02	n		2.1E+00	n	
				5.0E-02	O			V		1			EPTC	759-94-4	3.9E+03	n	5.8E+04	n					7.5E+02	n		4.0E-01	n	
				6.0E-03	I			V		1			Endosulfan	115-29-7	4.7E+02	n	7.0E+03	n					1.0E+02	n		1.4E+00	n	
				6.0E-03	P					1	0.1		Endosulfan Sulfate	1031-07-8	3.8E+02	n	4.9E+03	n					1.1E+02	n		2.1E+00	n	
				2.0E-02	I					1	0.1		Endothall	145-73-3	1.3E+03	n	1.6E+04	n					3.8E+02	n	1.0E+02	9.1E-02	n	2.4E-02
				3.0E-04	I					1	0.1		Endrin	72-20-8	1.9E+01	n	2.5E+02	n					2.3E+00	n	2.0E+00	9.2E-02	n	8.1E-02
9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V		1		1.1E+04	Epichlorohydrin	106-89-8	1.9E+01	n	8.2E+01	n	1.0E+00	n	4.4E+00	n	2.0E+00	n		4.5E-04	n	
						2.0E-02	I	V		1		1.5E+04	Epoxybutane, 1,2-	106-88-7	1.6E+02	n	6.7E+02	n	2.1E+01	n	8.8E+01	n	4.2E+01	n		9.2E-03	n	
				4.0E-02	P					1	0.1		Ethanol, 2-(2-methoxyethoxy)-	111-77-3	2.5E+03	n	3.3E+04	n					8.0E+02	n		1.6E-01	n	
				5.0E-03	I					1	0.1		Ethephon	16672-87-0	3.2E+02	n	4.1E+03	n					1.0E+02	n		2.1E-02	n	
				5.0E-04	I					1	0.1		Ethion	563-12-2	3.2E+01	n	4.1E+02	n					4.3E+00	n		8.5E-03	n	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				1.0E-01	P	6.0E-02	P	V		1		2.4E+04	Ethoxyethanol Acetate, 2-	111-15-9	2.6E+03	n	1.4E+04	n	6.3E+01	n	2.6E+02	n	1.2E+02	n		2.5E-02	n	
				9.0E-02	P	4.0E-02	P	V		1		1.1E+05	Ethoxyethanol, 2-	110-80-5	2.6E+03	n	1.5E+04	n	4.2E+01	n	1.8E+02	n	8.0E+01	n		1.6E-02	n	
				7.0E-01	P	7.0E-02	P	V		1		1.1E+04	Ethyl Acetate	141-78-6	6.2E+02	n	2.6E+03	n	7.3E+01	n	3.1E+02	n	1.4E+02	n		3.1E-02	n	
				5.0E-03	P	8.0E-03	P	V		1		2.5E+03	Ethyl Acrylate	140-88-5	4.7E+01	n	2.1E+02	n	8.3E+00	n	3.5E+01	n	1.4E+01	n		3.2E-03	n	
						4.0E+00	P	V		1		2.1E+03	Ethyl Chloride (Chloroethane)	75-00-3	5.4E+03	ns	2.3E+04	ns	4.2E+03	n	1.8E+04	n	8.3E+03	n		2.4E+00	n	
				2.0E-01	I			V		1		1.0E+04	Ethyl Ether	60-29-7	1.6E+04	ns	2.3E+05	nms					3.9E+03	n		8.8E-01	n	
						3.0E-01	P	V		1		1.1E+03	Ethyl Methacrylate	97-63-2	1.8E+03	ns	7.6E+03	ns	3.1E+02	n	1.3E+03	n	6.3E+02	n		1.5E-01	n	
		8.0E-08	I	1.0E+00	I	4.0E+01	I	V		1		2.9E+03	Ethyl Tertiary Butyl Ether (ETBE)	637-92-3	1.3E+02	c	5.6E+02	c	3.5E+01	c	1.5E+02	c	7.0E+01	c		1.7E-02	c	
				1.0E-05	I					1	0.1		Ethyl-p-nitrophenyl Phosphonate	2104-64-5	6.3E-01	n	8.2E+00	n					8.9E-02	n		2.8E-03	n	
1.1E-02	C	2.5E-06	C	5.0E-02	P	1.0E+00	I	V		1		4.8E+02	Ethylbenzene	100-41-4	5.8E+00	c	2.5E+01	c	1.1E+00	c	4.9E+00	c	1.5E+00	c	7.0E+02	1.7E-03	c	7.8E-01
				7.0E-02	P					1	0.1		Ethylene Cyanohydrin	109-78-4	4.4E+03	n	5.7E+04	n					1.4E+03	n		2.8E-01	n	
				9.0E-02	P			V		1		1.9E+05	Ethylene Diamine	107-15-3	7.0E+03	n	1.1E+05	nm					1.8E+03	n		4.1E-01	n	
				8.0E-01	A	4.0E-01	C			1	0.1		Ethylene Glycol	107-21-1	5.1E+04	n	6.6E+05	nm	4.2E+02	n	1.8E+03	n	1.6E+04	n		3.2E+00	n	
				1.0E-01	I	1.6E+00	I			1	0.1		Ethylene Glycol Monobutyl Ether	111-76-2	6.3E+03	n	8.2E+04	n	1.7E+03	n	7.0E+03	n	2.0E+03	n		4.1E-01	n	
3.1E-01	C	3.0E-03	I			3.0E-02	C	V	M	1		1.2E+05	Ethylene Oxide	75-21-8	2.0E-03	c	2.5E-02	c	3.4E-04	c	4.1E-03	c	6.7E-04	c		1.4E-07	c	
4.5E-02	C	1.3E-05	C	8.0E-05	I					1	0.1		Ethylene Thiourea	96-45-7	5.1E+00	n	5.1E+01	c**	2.2E-01	c	9.4E-01	c	1.6E+00	n		3.6E-04	n	
6.5E+01	C	1.9E-02	C					V		1		1.5E+05	Ethyleneimine	151-56-4	2.7E-03	c	1.2E-02	c	1.5E-04	c	6.5E-04	c	2.4E-04	c		5.2E-08	c	
				3.0E+00	I					1	0.1		Ethylphthalyl Ethyl Glycolate	84-72-0	1.9E+05	nm	2.5E+06	nm					5.8E+04	n		1.3E+02	n	
				2.5E-04	I					1	0.1		Fenamiphos	22224-92-6	1.6E+01	n	2.1E+02	n					4.4E+00	n		4.3E-03	n	
				2.5E-02	I					1	0.1		Fenpropathrin	39515-41-8	1.6E+03	n	2.1E+04	n					6.4E+01	n		2.9E+00	n	
				2.5E-02	I					1	0.1		Fenvalerate	51630-58-1	1.6E+03	n	2.1E+04	n					5.0E+02	n		3.2E+02	n	
				1.3E-02	I					1	0.1		Fluometuron	2164-17-2	8.2E+02	n	1.1E+04	n					2.4E+02	n		1.9E-01	n	
				4.0E-02	C	1.3E-02	C			1			Fluoride	16984-48-8	3.1E+03	n	4.7E+04	n	1.4E+01	n	5.7E+01	n	8.0E+02	n	4.0E+03	1.2E+02	n	6.0E+02
				6.0E-02	I	1.3E-02	C			1			Fluorine (Soluble Fluoride)	7782-41-4	4.7E+03	n	7.0E+04	n	1.4E+01	n	5.7E+01	n	1.2E+03	n	4.0E+03	1.8E+02	n	6.0E+02
				8.0E-02	I					1	0.1		Fluridone	59756-60-4	5.1E+03	n	6.6E+04	n					1.4E+03	n		1.6E+02	n	
				4.0E-02	O					1	0.1		Flurprimidol	56425-91-3	2.5E+03	n	3.3E+04	n					6.9E+02	n		3.1E+00	n	
				2.0E-03	O					1	0.1		Flusilazole	85509-19-9	1.3E+02	n	1.6E+03	n					3.1E+01	n		5.1E+00	n	
				5.0E-01	O					1	0.1		Flutolanil	66332-96-5	3.2E+04	n	4.1E+05	nm					7.9E+03	n		4.2E+01	n	
				1.0E-02	I					1	0.1		Fluvalinate	69409-94-5	6.3E+02	n	8.2E+03	n					2.0E+02	n		2.9E+02	n	
				9.0E-02	O					1	0.1		Folpet	133-07-3	5.7E+03	n	7.4E+04	n					1.6E+03	n		3.9E-01	n	
				1.0E-02	O					1	0.1		Fomesafen	72178-02-0	6.3E+02	n	8.2E+03	n					1.9E+02	n		6.3E-01	n	
				2.0E-03	I					1	0.1		Fonofos	944-22-9	1.3E+02	n	1.6E+03	n					2.4E+01	n		4.7E-02	n	
2.1E-02	C	1.3E-05	I	2.0E-01	I	9.8E-03	A	V		1		4.2E+04	Formaldehyde	50-00-0	1.1E+01	c*	5.0E+01	c*	2.2E-01	c*	9.4E-01	c*	3.9E-01	c*		7.8E-05	c*	
				9.0E-01	P	3.0E-04	X	V		1		1.1E+05	Formic Acid	64-18-6	2.9E+01	n	1.2E+02	n	3.1E-01	n	1.3E+00	n	6.3E-01	n		1.3E-04	n	
				2.5E+00	O					1	0.1		Fosetyl-AL	39148-24-8	1.6E+05	nm	2.1E+06	nm					5.0E+04	n		6.6E+02	n	
													Furans															
				1.0E-03	X			V		1			~Dibenzofuran	132-64-9	7.8E+01	n	1.2E+03	n					7.9E+00	n		1.5E-01	n	
				1.0E-03	I			V		1		6.2E+03	~Furan	110-00-9	7.8E+01	n	1.2E+03	n					1.9E+01	n		7.3E-03	n	
				9.0E-01	I	2.0E+00	I	V		1		1.7E+05	~Tetrahydrofuran	109-99-9	1.8E+04	n	9.5E+04	n	2.1E+03	n	8.8E+03	n	3.4E+03	n		7.5E-01	n	
3.8E+00	H									1	0.1		Furazolidone	67-45-8	1.4E-01	c	6.0E-01	c					2.0E-02	c		3.9E-05	c	
				3.0E-03	I	5.0E-02	H	V		1		1.0E+04	Furfural	98-01-1	2.1E+02	n	2.6E+03	n	5.2E+01	n	2.2E+02	n	3.8E+01	n		8.1E-03	n	
1.5E+00	C	4.3E-04	C							1	0.1		Furium	531-82-8	3.6E-01	c	1.5E+00	c	6.5E-03	c	2.9E-02	c	5.1E-02	c		6.8E-05	c	
3.0E-02	I	8.6E-06	C							1	0.1		Furmecyclox	60568-05-0	1.8E+01	c	7.7E+01	c	3.3E-01	c	1.4E+00	c	1.1E+00	c		1.2E-03	c	
				6.0E-03	O					1	0.1		Glufosinate, Ammonium	77182-82-2	3.8E+02	n	4.9E+03	n					1.2E+02	n		2.6E-02	n	
				1.0E-01	A	8.0E-05	C			1	0.1		Glutaraldehyde	111-30-8	6.0E+03	n	7.0E+04	n	8.3E-02	n	3.5E-01	n	2.0E+03	n		4.0E-01	n	
				4.0E-04	I	1.0E-03	X	V		1		1.1E+05	Glycidaldehyde	765-34-4	2.3E+01	n	2.1E+02	n	1.0E+00	n	4.4E+00	n	1.7E+00	n		3.3E-04	n	
				1.0E-01	I					1	0.1		Glyphosate	1071-83-6	6.3E+03	n	8.2E+04	n					2.0E+03	n	7.0E+02	8.8E+00	n	3.1E+00
				1.0E-02	X			V		1			Guanidine	113-00-8	7.8E+02	n	1.2E+04	n					2.0E+02	n		4.5E-02	n	
				2.0E-02	P					1	0.1		Guanidine Chloride	50-01-1	1.3E+03	n	1.6E+04	n					4.0E+02	n				
				3.0E-02	X					1	0.1		Guanidine Nitrate	506-93-4	1.9E+03	n	2.5E+04	n					6.0E+02	n		1.5E-01	n	
				5.0E-05	I					1	0.1		Haloxyfop, Methyl	69806-40-2	3.2E+00	n	4.1E+01	n					7.6E-01	n		8.4E-03	n	
4.5E+00	I	1.3E-03	I	1.0E-04	A			V		1			Heptachlor	76-44-8	1.3E-01	c*	6.3E-01	c	2.2E-03	c	9.4E-03	c	1.4E-03	c	4.0E-01	1.2E-04	c	3.3E-02
9.1E+00	I	2.6E-03	I	1.3E-05	I			V		1			Heptachlor Epoxide	1024-57-3	7.0E-02	c*	3.3E-01	c*	1.1E-03	c	4.7E-03	c	1.4E-03	c*	2.0E-01	2.8E-05	c*	4.1E-03
						3.0E-03	X	V		1		2.1E+02	Heptanal, n-	111-71-7	2.4E+01	n	1.0E+02	n	3.1E+00	n	1.3E+01	n	6.3E+00	n		1.4E-03	n	
				3.0E-04	X	4.0E-01	P	V		1		5.8E+01	Heptane, N-	142-82-5	2.2E+01	n	2.9E+02	ns	4.2E+02	n	1.8E+03	n	6.0E+00	n		4.8E-02	n	
				2.0E-03	I			V		1			Hexabromobenzene	87-82-1	1.6E+02	n	2.3E+03	n					4.0E+01	n		2.3E-01	n	
				2.0E-04	I					1	0.1		Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2	1.3E+01	n	1.6E+02	n					4.0E+00	n				
1.6E+00	I	4.6E-04	I	1.0E-05	P			V		1			Hexachlorobenzene	118-74-1	2.1E-01	c**	9.6E-01	c*	6.1E-03	c	2.7E-02	c	9.8E-03	c*	1.0E+00	1.2E-04	c*	1.3E-02
7.8E-02	I	2.2E-05	I	1.0E-03	P			V		1		1.7E+01	Hexachlorobutadiene	87-68-3	1.2E+00	c*	5.3E+00	c	1.3E-01	c	5.6E-01	c	1.4E-01	c*		2.7E-04	c*	
6.3E+00	I	1.8E-03	I	8.0E-03	A					1	0.1		Hexachlorocyclohexane, Alpha-	319-84-6	8.6E-02	c	3.6E-01	c	1.6E-03	c	6.8E-03	c	7.2E-03	c		4.2E-05	c	
1.8E+00	I	5.3E-04	I							1	0.1		Hexachlorocyclohexane, Beta-	319-85-7	3.0E-01	c	1.3E+00	c	5.3E-03	c	2.3E-02	c	2.5E-02	c		1.5E-04	c	
1.1E+00	C	3.1E-04	C	1.0E-05	A					1	0.04		Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	5.7E-01	c**	2.5E+00	c**	9.1E-03	c	4.0E-02	c	4.2E-02	c**	2.0E-01	2.4E-04	c**	1.2E-03
1.8E+00	I	5.1E-04	I							1	0.1		Hexachlorocyclohexane, Technical	608-73-1	3.0E-01	c	1.3E+00	c	5.5E-03	c	2.4E-02	c	2.5E-02	c		1.5E-04	c	
				6.0E-03	I	2.0E-04	I	V		1		1.6E+01	Hexachlorocyclopentadiene	77-47-4	1.8E+00	n	7.5E+00	n	2.1E-01	n	8.8E-01	n	4.1E-01	n	5.0E+01	1.3E-03	n	1.6E-01
4.0E-02	I	1.1E-05	C	7.0E-04	I	3.0E-02	I	V		1			Hexachloroethane	67-72-1	1.8E+00	c*	8.0E+00	c*	2.6E-01	c	1.1E+00	c	3.3E-01	c*		2.0E-04	c*	
				3.0E-04	I					1	0.1		Hexachlorophene	70-30-4	1.9E+01	n	2.5E+02	n					6.0E+00	n		8.0E+00	n	
8.0E-02	I			4.0E-03	I					1	0.015		Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	8.3E+00	c*	3.8E+01	c					9.7E-01	c*		3.7E-04	c*	
						1.0E-05	I	V		1		3.4E+03	Hexamethylene Diisocyanate, 1,6-	822-06-0	3.1E+00	n	1.3E+01	n	1.0E-02	n	4.4E-02	n	2.1E-02	n		2.1E-04	n	
						4.0E-04	C			1	0.1		Hexamethylene diisocyanate biuret	4035-89-6	5.7E+05	nm	2.4E+06	nm	4.2E-01	n	1.8E+00	n						
						4.0E-04	C			1	0.1		Hexamethylene diisocyanate isocyanurate	3779-63-3	5.7E+05	nm	2.4E+06	nm	4.2E-01	n	1.8E+00	n						
				4.0E-04	P					1	0.1		Hexamethylphosphoramide	680-31-9	2.5E+01	n	3.3E+02	n					8.0E+00	n		1.8E-03	n	
		2.0E-07	X			6.0E-01	P	V		1		1.4E+02	Hexane, Commercial	E5241997	1.2E+01	c*	5.1E+01	c*	1.4E+01	c*	6.1E+01	c*	2.8E+01	c*		2.0E-01	c*	
						7.0E-01	I	V		1		1.4E+02	Hexane, N-	110-54-3	6.1E+02	ns	2.5E+03	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n		1.0E+01	n	
				2.0E+00	P					1	0.1		Hexanedioic Acid	124-04-9	1.3E+05	nm	1.6E+06	nm					4.0E+04	n		9.9E+00	n	
9.5E-03	P			7.0E-02	P	4.0E-04	P	V		1		2.7E+02	Hexanol, 1-,2-ethyl- (2-Ethyl-1-hexanol)	104-76-7	1.5E+01	n	6.3E+01	n	4.2E-01	n	1.8E+00	n	8.3E-01	n		2.3E-04	n	
				5.0E-03	I	3.0E-02	I	V		1		3.3E+03	Hexanone, 2-	591-78-6	2.0E+02	n	1.3E+03	n	3.1E+01	n	1.3E+02	n	3.8E+01	n		8.8E-03	n	
				3.3E-02	I					1	0.1		Hexazinone	51235-04-2	2.1E+03	n	2.7E+04	n					6.4E+02	n		3.0E-01	n	
				2.5E-02	I					1	0.1		Hexythiazox	78587-05-0	1.6E+03	n	2.1E+04	n					1.1E+02	n		5.0E-01	n	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				1.7E-02	O					1	0.1		Hydramethylnon	67485-29-4	1.1E+03	n	1.4E+04	n					3.4E+02	n		1.2E+05	n	
3.0E+00	I	4.9E-03	I			3.0E-05	P	V		1		1.1E+05	Hydrazine	302-01-2	3.2E-02	c*	1.4E-01	c*	5.7E-04	c*	2.5E-03	c*	1.1E-03	c*		2.2E-07	c*	
3.0E+00	I	4.9E-03	I							1			Hydrazine Sulfate	10034-93-2	2.3E-01	c	1.1E+00	c	5.7E-04	c	2.5E-03	c	2.6E-02	c				
						2.0E-02	I	V		1			Hydrogen Chloride	7647-01-0	2.8E+07	nm	1.2E+08	nm	2.1E+01	n	8.8E+01	n	4.2E+01	n				
				4.0E-02	C	1.4E-02	C	V		1			Hydrogen Fluoride	7664-39-3	3.1E+03	n	4.7E+04	n	1.5E+01	n	6.1E+01	n	2.8E+01	n				
						2.0E-03	I	V		1			Hydrogen Sulfide	7783-06-4	2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n	4.2E+00	n				
6.0E-02	P			4.0E-02	P					1	0.1		Hydroquinone	123-31-9	9.0E+00	c	3.8E+01	c					1.3E+00	c		8.7E-04	c	
6.1E-02	O			1.1E-01	O					1	0.1		Imazalil	35554-44-0	8.9E+00	c	3.8E+01	c					9.0E-01	c		1.5E-02	c	
				2.5E-01	I					1	0.1		Imazaquin	81335-37-7	1.6E+04	n	2.1E+05	nm					4.9E+03	n		2.4E+01	n	
				2.5E+00	O					1	0.1		Imazethapyr	81335-77-5	1.6E+05	nm	2.1E+06	nm					4.7E+04	n		4.1E+01	n	
				1.0E-02	A					1			Iodine	7553-56-2	7.8E+02	n	1.2E+04	n					2.0E+02	n		1.2E+01	n	
				4.0E-02	I					1	0.1		Iprodione	36734-19-7	2.5E+03	n	3.3E+04	n					7.4E+02	n		2.2E-01	n	
				7.0E-01	P					1			Iron	7439-89-6	5.5E+04	n	8.2E+05	nm					1.4E+04	n		3.5E+02	n	
				3.0E-01	I			V		1		1.0E+04	Isobutyl Alcohol	78-83-1	2.3E+04	ns	3.5E+05	nms					5.9E+03	n		1.2E+00	n	
9.5E-04	I			2.0E-01	I	2.0E+00	C			1	0.1		Isophorone	78-59-1	5.7E+02	c*	2.4E+03	c*	2.1E+03	n	8.8E+03	n	7.8E+01	c*		2.6E-02	c*	
				1.5E-02	I			V		1			Isopropalin	33820-53-0	1.2E+03	n	1.8E+04	n					4.0E+01	n		9.2E-01	n	
				2.0E+00	P	2.0E-01	P	V		1		1.1E+05	Isopropanol	67-63-0	5.6E+03	n	2.4E+04	n	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.4E-02	n	
				1.0E-01	I					1	0.1		Isopropyl Methyl Phosphonic Acid	1832-54-8	6.3E+03	n	8.2E+04	n					2.0E+03	n		4.3E-01	n	
				5.0E-02	I					1	0.1		Isoxaben	82558-50-7	3.2E+03	n	4.1E+04	n					7.3E+02	n		2.0E+00	n	
						3.0E-01	A	V		1			JP-7	E1737665	4.3E+08	nm	1.8E+09	nm	3.1E+02	n	1.3E+03	n	6.3E+02	n				
				8.0E-03	O					1	0.1		Lactofen	77501-63-4	5.1E+02	n	6.6E+03	n					1.0E+02	n		4.6E+00	n	
				2.0E-04	X					1	0.1		Lactonitrile	78-97-7	1.3E+01	n	1.6E+02	n					4.0E+00	n		8.1E-04	n	
				5.0E-05	P					1			Lanthanum	7439-91-0	3.9E+00	n	5.8E+01	n					1.0E+00	n				
				2.1E-05	P					1	0.1		Lanthanum Acetate Hydrate	100587-90-4	1.3E+00	n	1.7E+01	n					4.2E-01	n				
				1.9E-05	P					1			Lanthanum Chloride Heptahydrate	10025-84-0	1.5E+00	n	2.2E+01	n					3.7E-01	n				
				2.8E-05	P					1			Lanthanum Chloride, Anhydrous	10099-58-8	2.2E+00	n	3.3E+01	n					5.7E-01	n				
				1.6E-05	P					1			Lanthanum Nitrate Hexahydrate	10277-43-7	1.3E+00	n	1.9E+01	n					3.2E-01	n				
													Lead Compounds																
8.5E-03	C	1.2E-05	C							1			~Lead Phosphate	7446-27-7	8.2E+01	c	3.8E+02	c	2.3E-01	c	1.0E+00	c	9.1E+00	c				
2.1E-01	C	8.0E-05	C							1	0.1		~Lead acetate	301-04-2	2.6E+00	c	1.1E+01	c	3.5E-02	c	1.5E-01	c	3.7E-01	c		7.5E-05	c	
										1			~Lead and Compounds	7439-92-1	4.0E+02	G	8.0E+02	G	1.5E-01	G			1.5E+01	G	1.5E+01			1.4E+01
3.8E-02	C	1.1E-05	C							1	0.1		~Lead subacetate	1335-32-6	1.4E+01	c	6.0E+01	c	2.6E-01	c	1.1E+00	c	2.1E+00	c		4.5E-04	c	
				1.0E-07	I			V		1		2.4E+00	~Tetraethyl Lead	78-00-2	7.8E-03	n	1.2E-01	n					1.3E-03	n		4.7E-06	n	
				5.0E-06	P			V		1		3.8E+02	Lewisite	541-25-3	3.9E-01	n	5.8E+00	n					9.0E-02	n		3.8E-05	n	
				7.7E-03	O					1	0.1		Linuron	330-55-2	4.9E+02	n	6.3E+03	n					1.3E+02	n		1.1E-01	n	
				2.0E-03	P					1			Lithium	7439-93-2	1.6E+02	n	2.3E+03	n					4.0E+01	n		1.2E+01	n	
				5.0E-04	I					1	0.1		MCPA	94-74-6	3.2E+01	n	4.1E+02	n					7.5E+00	n		2.0E-03	n	
				4.4E-03	O					1	0.1		MCPB	94-81-5	2.8E+02	n	3.6E+03	n					6.5E+01	n		2.6E-02	n	
				1.0E-03	I					1	0.1		MCPP	93-65-2	6.3E+01	n	8.2E+02	n					1.6E+01	n		4.7E-03	n	
				2.0E-02	I					1	0.1		Malathion	121-75-5	1.3E+03	n	1.6E+04	n					3.9E+02	n		1.0E-01	n	
				1.0E-01	I	7.0E-04	C			1	0.1		Maleic Anhydride	108-31-6	6.3E+03	n	8.0E+04	n	7.3E-01	n	3.1E+00	n	1.9E+03	n		3.8E-01	n	
				5.0E-01	I					1	0.1		Maleic Hydrazide	123-33-1	3.2E+04	n	4.1E+05	nm					1.0E+04	n		2.1E+00	n	
				1.0E-04	P					1	0.1		Malononitrile	109-77-3	6.3E+00	n	8.2E+01	n					2.0E+00	n		4.1E-04	n	
				3.0E-02	H					1	0.1		Mancozeb	8018-01-7	1.9E+03	n	2.5E+04	n					5.4E+02	n		7.6E-01	n	
				5.0E-03	I					1	0.1		Maneb	12427-38-2	3.2E+02	n	4.1E+03	n					9.8E+01	n		1.4E-01	n	
				1.4E-01	I	5.0E-05	I			1			Manganese (Diet)	7439-96-5					5.2E-02	n	2.2E-01	n						
				2.4E-02	G	5.0E-05	I			0.04			Manganese (Non-diet)	7439-96-5	1.8E+03	n	2.6E+04	n	5.2E-02	n	2.2E-01	n	4.3E+02	n		2.8E+01	n	
				9.0E-05	H					1	0.1		Mephosfolan	950-10-7	5.7E+00	n	7.4E+01	n					1.8E+00	n		2.6E-03	n	
				3.0E-02	I					1	0.1		Mepiquat Chloride	24307-26-4	1.9E+03	n	2.5E+04	n					6.0E+02	n		2.0E-01	n	
1.1E-02	P			4.0E-03	P					1	0.1		Mercaptobenzothiazole, 2-	149-30-4	4.9E+01	c**	2.1E+02	c*					6.3E+00	c*		1.8E-02	c*	
													Mercury Compounds																
				3.0E-04	I	3.0E-04	G			0.07			~Mercuric Chloride (and other Mercury salts)	7487-94-7	2.3E+01	n	3.5E+02	n	3.1E-01	n	1.3E+00	n	5.7E+00	n	2.0E+00			
						3.0E-04	I	V		1		3.1E+00	~Mercury (elemental)	7439-97-6	1.1E+01	ns	4.6E+01	ns	3.1E-01	n	1.3E+00	n	6.3E-01	n	2.0E+00	3.3E-02	n	1.0E-01
				1.0E-04	I					1			~Methyl Mercury	22967-92-6	7.8E+00	n	1.2E+02	n					2.0E+00	n		1.4E+01	n	
				8.0E-05	I					1	0.1		~Phenylmercuric Acetate	62-38-4	5.1E+00	n	6.6E+01	n					1.6E+00	n		5.0E-04	n	
				3.0E-05	I			V		1			Merphos	150-50-5	2.3E+00	n	3.5E+01	n					6.0E-01	n		5.9E-02	n	
				6.0E-02	I					1	0.1		Metalaxyl	57837-19-1	3.8E+03	n	4.9E+04	n					1.2E+03	n		3.3E-01	n	
				1.0E-04	I	3.0E-02	P	V		1		4.6E+03	Methacrylonitrile	126-98-7	7.5E+00	n	1.0E+02	n	3.1E+01	n	1.3E+02	n	1.9E+00	n		4.3E-04	n	
				5.0E-05	I					1	0.1		Methamidophos	10265-92-6	3.2E+00	n	4.1E+01	n					1.0E+00	n		2.1E-04	n	
				2.0E+00	I	2.0E+01	I	V		1		1.1E+05	Methanol	67-56-1	1.2E+05	nms	1.2E+06	nms	2.1E+04	n	8.8E+04	n	2.0E+04	n		4.1E+00	n	
				1.5E-03	O					1	0.1		Methidathion	950-37-8	9.5E+01	n	1.2E+03	n					2.9E+01	n		7.1E-03	n	
				2.5E-02	I					1	0.1		Methomyl	16752-77-5	1.6E+03	n	2.1E+04	n					5.0E+02	n		1.1E-01	n	
4.9E-02	C									1	0.1		Methoxy-5-nitroaniline, 2-	99-59-2	1.1E+01	c	4.7E+01	c					1.5E+00	c		5.3E-04	c	
				5.0E-03	I					1	0.1		Methoxychlor	72-43-5	3.2E+02	n	4.1E+03	n					3.7E+01	n	4.0E+01	2.0E+00	n	2.2E+00
				8.0E-03	P	1.0E-03	P	V		1		1.2E+05	Methoxyethanol Acetate, 2-	110-49-6	1.1E+02	n	5.1E+02	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		4.2E-04	n	
				5.0E-03	P	7.0E-03	P	V		1		1.1E+05	Methoxyethanol, 2-	109-86-4	2.6E+02	n	2.0E+03	n	7.3E+00	n	3.1E+01	n	1.3E+01	n		2.6E-03	n	
				1.0E+00	X			V		1		2.9E+04	Methyl Acetate	79-20-9	7.8E+04	ns	1.2E+06	nms					2.0E+04	n		4.1E+00	n	
						2.0E-02	P	V		1		6.8E+03	Methyl Acrylate	96-33-3	1.5E+02	n	6.1E+02	n	2.1E+01	n	8.8E+01	n	4.2E+01	n		8.9E-03	n	
				6.0E-01	I	5.0E+00	I	V		1		2.8E+04	Methyl Ethyl Ketone (2-Butanone)	78-93-3	2.7E+04	n	1.9E+05	nms	5.2E+03	n	2.2E+04	n	5.6E+03	n		1.2E+00	n	
		1.0E-03	X	1.0E-03	P	2.0E-05	X	V		1		1.8E+05	Methyl Hydrazine	60-34-4	1.4E-01	c**	6.2E-01	c**	2.8E-03	c**	1.2E-02	c**	5.6E-03	c**		1.3E-06	c**	
						3.0E+00	I	V		1		3.4E+03	Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1	3.3E+04	ns	1.4E+05	nms	3.1E+03	n	1.3E+04	n	6.3E+03	n		1.4E+00	n	
						1.0E-03	C	V		1		1.0E+04	Methyl Isocyanate	624-83-9	4.6E+00	n	1.9E+01	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		5.9E-04	n	
				1.4E+00	I	7.0E-01	I	V		1		2.4E+03	Methyl Methacrylate	80-62-6	4.4E+03	ns	1.9E+04	ns	7.3E+02	n	3.1E+03	n	1.4E+03	n		3.0E-01	n	
				2.5E-04	I					1	0.1		Methyl Parathion	298-00-0	1.6E+01	n	2.1E+02	n					4.5E+00	n		7.4E-03	n	
				6.0E-02	X					1	0.1		Methyl Phosphonic Acid	993-13-5	3.8E+03	n	4.9E+04	n					1.2E+03	n		2.4E-01	n	
				6.0E-03	H	4.0E-02	H	V		1		3.9E+02	Methyl Styrene (Mixed Isomers)	25013-15-4	3.2E+02	n	2.6E+03	ns	4.2E+01	n	1.8E+02	n	2.3E+01	n		3.8E-02	n	
9.9E-02	C	2.8E-05	C							1	0.1		Methyl methanesulfonate	66-27-3	5.5E+00	c	2.3E+01	c	1.0E-01	c	4.4E-01	c	7.9E-01	c		1.6E-04	c	
1.8E-03	C	2.6E-07	C			3.0E+00	I	V		1		8.9E+03	Methyl tert-Butyl Ether (MTBE)	1634-04-4	4.7E+01	c	2.1E+02	c	1.1E+01	c	4.7E+01	c	1.4E+01	c		3.2E-03	c	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	volatile	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				3.0E-04	X					1	0.1		Methyl-1,4-benzenediamine dihydrochloride, 2-	615-45-2	1.9E+01	n	2.5E+02	n					6.0E+00	n		3.6E-03	n	
						3.0E+00	X	V		1		2.5E+03	Methyl-2-Pentanol, 4-	108-11-2	5.4E+04	ns	2.3E+05	nms	3.1E+03	n	1.3E+04	n	6.3E+03	n		1.4E+00	n	
9.0E-03	P			2.0E-02	X					1	0.1		Methyl-5-Nitroaniline, 2-	99-55-8	6.0E+01	c*	2.6E+02	c*					8.2E+00	c*		4.6E-03	c*	
8.3E+00	C	2.4E-03	C							1	0.1		Methyl-N-nitro-N-nitrosoguanidine, N-	70-25-7	6.5E-02	c	2.8E-01	c	1.2E-03	c	5.1E-03	c	9.4E-03	c		3.2E-06	c	
1.3E-01	C	3.7E-05	C							1	0.1		Methylaniline Hydrochloride, 2-	636-21-5	4.2E+00	c	1.8E+01	c	7.6E-02	c	3.3E-01	c	6.0E-01	c		2.6E-04	c	
				1.0E-02	A					1	0.1		Methylarsonic acid	124-58-3	6.3E+02	n	8.2E+03	n					2.0E+02	n		5.8E-02	n	
				2.0E-04	X					1	0.1		Methylbenzene,1-4-diamine monohydrochloride, 2-	74612-12-7	1.3E+01	n	1.6E+02	n					4.0E+00	n				
1.0E-01	X			3.0E-04	X					1	0.1		Methylbenzene-1,4-diamine sulfate, 2-	615-50-9	5.4E+00	c**	2.3E+01	c*					7.8E-01	c**				
2.2E+01	C	6.3E-03	C						M	1	0.1		Methylcholanthrene, 3-	56-49-5	5.5E-03	c	1.0E-01	c	1.6E-04	c	1.9E-03	c	1.1E-03	c		2.2E-03	c	
2.0E-03	I	1.0E-08	I	6.0E-03	I	6.0E-01	I	V	M	1		3.3E+03	Methylene Chloride	75-09-2	5.7E+01	c**	1.0E+03	c**	1.0E+02	c**	1.2E+03	c**	1.1E+01	c**	5.0E+00	2.9E-03	c**	1.3E-03
1.0E-01	P	4.3E-04	C	2.0E-03	P				M	1	0.1		Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.2E+00	c	2.3E+01	c*	2.4E-03	c	2.9E-02	c	1.6E-01	c		1.8E-03	c	
4.6E-02	I	1.3E-05	C							1	0.1		Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	1.2E+01	c	5.0E+01	c	2.2E-01	c	9.4E-01	c	7.0E-01	c		3.9E-03	c	
1.6E+00	C	4.6E-04	C			2.0E-02	C			1	0.1		Methylenebisbenzenamine, 4,4'-	101-77-9	3.4E-01	c	1.4E+00	c	6.1E-03	c	2.7E-02	c	4.7E-02	c		2.1E-04	c	
						6.0E-04	I			1	0.1		Methylenediphenyl Diisocyanate	101-68-8	8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n						
				7.0E-02	H			V		1		5.0E+02	Methylstyrene, Alpha-	98-83-9	5.5E+03	ns	8.2E+04	ns					7.8E+02	n		1.2E+00	n	
				1.5E-01	I					1	0.1		Metolachlor	51218-45-2	9.5E+03	n	1.2E+05	nm					2.7E+03	n		3.2E+00	n	
				2.5E-02	I					1	0.1		Metribuzin	21087-64-9	1.6E+03	n	2.1E+04	n					4.9E+02	n		1.5E-01	n	
				2.5E-01	I					1	0.1		Metsulfuron-methyl	74223-64-6	1.6E+04	n	2.1E+05	nm					4.9E+03	n		1.9E+00	n	
		4.5E-06	X	1.0E-02	X	1.0E-01	P	V		1		6.9E+00	Midrange Aliphatic Hydrocarbon Streams	E1790669	6.5E-01	c	2.8E+00	c	6.2E-01	c	2.7E+00	c	1.2E+00	c*		1.8E-02	c*	
				3.0E+00	P			V		1		3.4E-01	Mineral oils	8012-95-1	2.3E+05	nms	3.5E+06	nms					6.0E+04	n		2.4E+03	n	
1.8E+01	C	5.1E-03	C	2.0E-04	I			V		1			Mirex	2385-85-5	3.6E-02	c	1.7E-01	c	5.5E-04	c	2.4E-03	c	8.8E-04	c		6.3E-04	c	
				2.0E-03	I					1	0.1		Molinate	2212-67-1	1.3E+02	n	1.6E+03	n					3.0E+01	n		1.7E-02	n	
				5.0E-03	I	2.0E-03	A			1			Molybdenum	7439-98-7	3.9E+02	n	5.8E+03	n	2.1E+00	n	8.8E+00	n	1.0E+02	n		2.0E+00	n	
				1.0E-01	I					1			Monochloramine	10599-90-3	7.8E+03	n	1.2E+05	nm					2.0E+03	n	4.0E+03(G)			
				2.0E-03	P					1	0.1		Monomethylaniline	100-61-8	1.3E+02	n	1.6E+03	n					3.8E+01	n		1.4E-02	n	
				2.5E-02	I					1	0.1		Myclobutanil	88671-89-0	1.6E+03	n	2.1E+04	n					4.5E+02	n		5.6E+00	n	
				3.0E-04	X					1	0.1		N,N'-Diphenyl-1,4-benzenediamine	74-31-7	1.9E+01	n	2.5E+02	n					3.6E+00	n		3.7E-01	n	
				2.0E-03	I			V		1			Naled	300-76-5	1.6E+02	n	2.3E+03	n					4.0E+01	n		1.8E-02	n	
				3.0E-02	X	1.0E-01	P	V		1			Naphtha, High Flash Aromatic (HFAN)	64742-95-6	2.3E+03	n	3.5E+04	n	1.0E+02	n	4.4E+02	n	1.5E+02	n				
1.8E+00	C	0.0E+00	C							1	0.1		Naphthylamine, 2-	91-59-8	3.0E-01	c	1.3E+00	c					3.9E-02	c		2.0E-04	c	
				1.2E-01	O					1	0.1		Napropamide	15299-99-7	7.6E+03	n	9.8E+04	n					2.0E+03	n		1.3E+01	n	
		2.6E-04	C	1.1E-02	C	1.4E-05	C			1	0.1		Nickel Acetate	373-02-4	6.7E+02	n	8.1E+03	n	1.1E-02	c**	4.7E-02	c**	2.2E+02	n		4.5E-02	n	
		2.6E-04	C	1.1E-02	C	1.4E-05	C			1	0.1		Nickel Carbonate	3333-67-3	6.7E+02	n	8.1E+03	n	1.1E-02	c**	4.7E-02	c**	2.2E+02	n				
		2.6E-04	C	1.1E-02	C	1.4E-05	C	V		1			Nickel Carbonyl	13463-39-3	8.2E+02	n	1.1E+04	n	1.1E-02	c**	4.7E-02	c**	2.2E-02	c**				
		2.6E-04	C	1.1E-02	C	1.4E-05	C			0.04			Nickel Hydroxide	12054-48-7	8.2E+02	n	1.1E+04	n	1.1E-02	c**	4.7E-02	c**	2.0E+02	n				
		2.6E-04	C	1.1E-02	C	2.0E-05	C			0.04			Nickel Oxide	1313-99-1	8.4E+02	n	1.2E+04	n	1.1E-02	c**	4.7E-02	c**	2.0E+02	n				
		2.4E-04	I	1.1E-02	C	1.4E-05	C			0.04			Nickel Refinery Dust	E715532	8.2E+02	n	1.1E+04	n	1.2E-02	c**	5.1E-02	c**	2.2E+02	n		3.2E+01	n	
		2.6E-04	C	2.0E-02	I	9.0E-05	A			0.04			Nickel Soluble Salts	7440-02-0	1.5E+03	n	2.2E+04	n	1.1E-02	c**	4.7E-02	c**	3.9E+02	n		2.6E+01	n	
1.7E+00	C	4.8E-04	I	1.1E-02	C	1.4E-05	C			0.04			Nickel Subsulfide	12035-72-2	4.1E-01	c	1.9E+00	c	5.8E-03	c**	2.6E-02	c**	4.5E-02	c				
9.1E-01	C	2.6E-04	C	1.1E-02	C	1.4E-05	C			1	0.1		Nickelocene	1271-28-9	6.0E-01	c	2.5E+00	c	1.1E-02	c**	4.7E-02	c**	8.6E-02	c				
				1.6E+00	I					1			Nitrate (measured as nitrogen)	14797-55-8	1.3E+05	nm	1.9E+06	nm					3.2E+04	n	1.0E+04			
										1			Nitrate + Nitrite (measured as nitrogen)	E701177											1.0E+04			
				1.0E-01	I					1			Nitrite (measured as nitrogen)	14797-65-0	7.8E+03	n	1.2E+05	nm					2.0E+03	n	1.0E+03			
				1.0E-02	X	5.0E-05	X			1	0.1		Nitroaniline, 2-	88-74-4	6.3E+02	n	8.0E+03	n	5.2E-02	n	2.2E-01	n	1.9E+02	n		8.0E-02	n	
2.0E-02	P			4.0E-03	P	6.0E-03	P			1	0.1		Nitroaniline, 4-	100-01-6	2.7E+01	c**	1.1E+02	c*	6.3E+00	n	2.6E+01	n	3.8E+00	c*		1.6E-03	c*	
		4.0E-05	I	2.0E-03	I	9.0E-03	I	V		1		3.1E+03	Nitrobenzene	98-95-3	5.1E+00	c*	2.2E+01	c*	7.0E-02	c	3.1E-01	c	1.4E-01	c*		9.2E-05	c*	
				3.0E+03	P					1	0.1		Nitrocellulose	9004-70-0	1.9E+08	nm	2.5E+09	nm					6.0E+07	n		1.3E+04	n	
				7.0E-02	H					1	0.1		Nitrofurantoin	67-20-9	4.4E+03	n	5.7E+04	n					1.4E+03	n		6.1E-01	n	
1.3E+00	C	3.7E-04	C							1	0.1		Nitrofurazone	59-87-0	4.2E-01	c	1.8E+00	c	7.6E-03	c	3.3E-02	c	6.0E-02	c		5.4E-05	c	
1.7E-02	P			1.0E-04	P					1	0.1		Nitroglycerin	55-63-0	6.3E+00	n	8.2E+01	n					2.0E+00	n		8.5E-04	n	
				1.0E-01	I					1	0.1		Nitroguanidine	556-88-7	6.3E+03	n	8.2E+04	n					2.0E+03	n		4.8E-01	n	
		8.8E-06	P			5.0E-03	P	V		1		1.8E+04	Nitromethane	75-52-5	5.4E+00	c*	2.4E+01	c*	3.2E-01	c*	1.4E+00	c*	6.4E-01	c*		1.4E-04	c*	
		5.8E-04	X			2.0E-02	I	V		1		4.9E+03	Nitropropane, 2-	79-46-9	6.4E-02	c	2.8E-01	c	4.8E-03	c	2.1E-02	c	9.7E-03	c		2.5E-06	c	
2.7E+01	C	7.7E-03	C						M	1	0.1		Nitroso-N-ethylurea, N-	759-73-9	4.5E-03	c	8.5E-02	c	1.3E-04	c	1.6E-03	c	9.2E-04	c		2.2E-07	c	
1.2E+02	C	3.4E-02	C						M	1	0.1		Nitroso-N-methylurea, N-	684-93-5	1.0E-03	c	1.9E-02	c	3.0E-05	c	3.6E-04	c	2.1E-04	c		4.6E-08	c	
5.4E+00	I	1.6E-03	I					V		1			Nitroso-di-N-butylamine, N-	924-16-3	9.9E-02	c	4.6E-01	c	1.8E-03	c	7.7E-03	c	2.7E-03	c		5.5E-06	c	
7.0E+00	I	2.0E-03	C							1	0.1		Nitroso-di-N-propylamine, N-	621-64-7	7.8E-02	c	3.3E-01	c	1.4E-03	c	6.1E-03	c	1.1E-02	c		8.1E-06	c	
2.8E+00	I	8.0E-04	C							1	0.1		Nitrosodiethanolamine, N-	1116-54-7	1.9E-01	c	8.2E-01	c	3.5E-03	c	1.5E-02	c	2.8E-02	c		5.6E-06	c	
1.5E+02	I	4.3E-02	I						M	1	0.1		Nitrosodiethylamine, N-	55-18-5	8.1E-04	c	1.5E-02	c	2.4E-05	c	2.9E-04	c	1.7E-04	c		6.1E-08	c	
5.1E+01	I	1.4E-02	I	8.0E-06	P	4.0E-05	X	V	M	1		2.4E+05	Nitrosodimethylamine, N-	62-75-9	2.0E-03	c	3.4E-02	c	7.2E-05	c	8.8E-04	c	1.1E-04	c		2.7E-08	c	
4.9E-03	I	2.6E-06	C							1	0.1		Nitrosodiphenylamine, N-	86-30-6	1.1E+02	c	4.7E+02	c	1.1E+00	c	4.7E+00	c	1.2E+01	c		6.7E-02	c	
2.2E+01	I	6.3E-03	C					V		1		1.1E+05	Nitrosomethylethylamine, N-	10595-95-6	2.0E-02	c	9.1E-02	c	4.5E-04	c	1.9E-03	c	7.1E-04	c		2.0E-07	c	
6.7E+00	C	1.9E-03	C							1	0.1		Nitrosomorpholine [N-]	59-89-2	8.1E-02	c	3.4E-01	c	1.5E-03	c	6.5E-03	c	1.2E-02	c		2.8E-06	c	
9.4E+00	C	2.7E-03	C							1	0.1		Nitrosopiperidine [N-]	100-75-4	5.8E-02	c	2.4E-01	c	1.0E-03	c	4.5E-03	c	8.2E-03	c		4.4E-06	c	
2.1E+00	I	6.1E-04	I							1	0.1		Nitrosopyrrolidine, N-	930-55-2	2.6E-01	c	1.1E+00	c	4.6E-03	c	2.0E-02	c	3.7E-02	c		1.4E-05	c	
				1.0E-04	X					1	0.1		Nitrotoluene, m-	99-08-1	6.3E+00	n	8.2E+01	n					1.7E+00	n		1.6E-03	n	
2.2E-01	P			9.0E-04	P			V		1		1.5E+03	Nitrotoluene, o-	88-72-2	3.2E+00	c*	1.5E+01	c*					3.1E-01	c*		3.0E-04	c*	
1.6E-02	P			4.0E-03	P					1	0.1		Nitrotoluene, p-	99-99-0	3.4E+01	c**	1.4E+02	c*					4.3E+00	c*		4.0E-03	c*	
				3.0E-04	X	2.0E-02	P	V		1		6.9E+00	Nonane, n-	111-84-2	1.1E+01	ns	7.2E+01	ns	2.1E+01	n	8.8E+01	n	5.3E+00	n		7.5E-02	n	
				1.5E-03	O					1	0.1		Norflurazon	27314-13-2	9.5E+01	n	1.2E+03	n					2.9E+01	n		1.9E-01	n	
				3.0E-03	I					1	0.1		Octabromodiphenyl Ether	32536-52-0	1.9E+02	n	2.5E+03	n					6.0E+01	n		1.2E+01	n	
				5.0E-02	I					1	0.006		Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	3.9E+03	n	5.7E+04	n					1.0E+03	n		1.3E+00	n	
				2.0E-03	H					1	0.1		Octamethylpyrophosphoramide	152-16-9	1.3E+02	n	1.6E+03	n					4.0E+01	n		9.6E-03	n	
7.8E-03	O			1.9E-01	O					1	0.1		Oryzalin	19044-88-3	7.0E+01	c	2.9E+02	c					7.9E+00	c		1.5E-02	c	
				5.0E-03	I					1	0.1		Oxadiazon	19666-30-9	3.2E+02	n	4.1E+03	n					4.7E+01	n		4.8E-01	n	
				2.5E-02	I					1	0.1		Oxamyl	23135-22-0	1.6E+03	n	2.1E+04	n					5.0E+02	n	2.0E+02	1.1E-01	n	4.4E-02
7.3E-02	O			4.0E-02	O					1	0.1		Oxyfluorfen	42874-03-3	7.4E+00	c	3.1E+01	c					5.4E-01	c		4.3E-02	c	
				1.3E-02	I					1	0.1		Paclobutrazol	76738-62-0	8.2E+02	n	1.1E+04	n					2.3E+02	n		4.6E-01	n	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels													Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD$_o$ (mg/kg-day)	key	RfC$_i$ (mg/m^3)	key	vol	mutagen	GIABS	ABS$_d$	C$_{sat}$ (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
				4.5E-03	I					1	0.1		Paraquat Dichloride	1910-42-5	2.8E+02	n	3.7E+03	n					9.0E+01	n		1.2E+00	n	
				6.0E-03	H					1	0.1		Parathion	56-38-2	3.8E+02	n	4.9E+03	n					8.6E+01	n		4.3E-01	n	
				5.0E-02	H			V		1			Pebulate	1114-71-2	3.9E+03	n	5.8E+04	n					5.6E+02	n		4.5E-01	n	
				3.0E-01	O					1	0.1		Pendimethalin	40487-42-1	1.9E+04	n	2.5E+05	nm					1.4E+03	n		1.6E+01	n	
				2.0E-03	I			V		1		3.1E-01	Pentabromodiphenyl Ether	32534-81-9	1.6E+02	ns	2.3E+03	ns					4.0E+01	n		1.7E+00	n	
				1.0E-04	I					1	0.1		Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9	6.3E+00	n	8.2E+01	n					2.0E+00	n		8.7E-02	n	
				8.0E-04	I			V		1			Pentachlorobenzene	608-93-5	6.3E+01	n	9.3E+02	n					3.2E+00	n		2.4E-02	n	
9.0E-02	P							V		1		4.6E+02	Pentachloroethane	76-01-7	7.7E+00	c	3.6E+01	c					6.5E-01	c		3.1E-04	c	
2.6E-01	H			3.0E-03	I			V		1			Pentachloronitrobenzene	82-68-8	2.7E+00	c*	1.3E+01	c					1.2E-01	c		1.5E-03	c	
4.0E-01	I	5.1E-06	C	5.0E-03	I					1	0.25		Pentachlorophenol	87-86-5	1.0E+00	c	4.0E+00	c	5.5E-01	c	2.4E+00	c	4.1E-02	c	1.0E+00	5.7E-05	c	1.4E-03
4.3E-03	X			9.0E-03	P					1	0.1		Pentaerythritol tetranitrate (PETN)	78-11-5	1.3E+02	c**	5.3E+02	c*					1.7E+01	c**		2.6E-02	c**	
				1.0E-04	X					1	0.1		Pentamethylphosphoramide (PMPA)	10159-46-3	6.3E+00	n	8.2E+01	n					2.0E+00	n		4.1E-04	n	
						1.0E+00	P	V		1		3.9E+02	Pentane, n-	109-66-0	8.1E+02	ns	3.4E+03	ns	1.0E+03	n	4.4E+03	n	2.1E+03	n		1.0E+01	n	
													Per- and Polyfluoroalkyl Substances (PFAS)																
				3.0E-06	D					1	0.1		~Ammonium perfluoro-2-methyl-3-oxahexanoate	62037-80-3	1.9E-01	n	2.5E+00	n					6.0E-02	n		1.3E-05	n	
				3.0E-06	D			V		1			~Hexafluoropropylene oxide dimer acid (HFPO-DA)	13252-13-6	2.3E-01	n	3.5E+00	n					6.0E-02	n				
				3.0E-04	P					1	0.1		~Perfluorobutanesulfonate	45187-15-3	1.9E+01	n	2.5E+02	n					6.0E+00	n		1.9E-03	n	
				3.0E-04	P					1	0.1		~Perfluorobutanesulfonic acid (PFBS)	375-73-5	1.9E+01	n	2.5E+02	n					6.0E+00	n		1.9E-03	n	
				2.0E-05	A					1	0.1		~Perfluorohexanesulfonate	108427-53-8	1.3E+00	n	1.6E+01	n					3.9E-01	n		1.7E-04	n	
				2.0E-05	A					1	0.1		~Perfluorohexanesulfonic acid (PFHxS)	355-46-4	1.3E+00	n	1.6E+01	n					3.9E-01	n		1.7E-04	n	
				3.0E-06	A					1	0.1		~Perfluorononanoate	72007-68-2	1.9E-01	n	2.5E+00	n					5.9E-02	n		2.5E-04	n	
				3.0E-06	A					1	0.1		~Perfluorononanoic acid (PFNA)	375-95-1	1.9E-01	n	2.5E+00	n					5.9E-02	n		2.5E-04	n	
				2.0E-06	A					1	0.1		~Perfluorooctanesulfonate	45298-90-6	1.3E-01	n	1.6E+00	n					4.0E-02	n		3.8E-05	n	
				2.0E-06	A					1	0.1		~Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1.3E-01	n	1.6E+00	n					4.0E-02	n		3.8E-05	n	
7.0E-02	D			3.0E-06	A					1	0.1		~Perfluorooctanoate	45285-51-6	1.9E-01	n	2.5E+00	n					6.0E-02	n		9.1E-04	n	
7.0E-02	D			3.0E-06	A					1	0.1		~Perfluorooctanoic acid (PFOA)	335-67-1	1.9E-01	n	2.5E+00	n					6.0E-02	n		9.1E-04	n	
				3.0E-04	P					1	0.1		~Potassium perfluorobutanesulfonate	29420-49-3	1.9E+01	n	2.5E+02	n					6.0E+00	n		3.0E-03	n	
				2.0E-06	A					1	0.1		~Potassium perfluorooctanesulfonate	2795-39-3	1.3E-01	n	1.6E+00	n					4.0E-02	n				
													Perchlorates																
				7.0E-04	I					1			~Ammonium Perchlorate	7790-98-9	5.5E+01	n	8.2E+02	n					1.4E+01	n				
				7.0E-04	I					1			~Lithium Perchlorate	7791-03-9	5.5E+01	n	8.2E+02	n					1.4E+01	n				
				7.0E-04	I					1			~Perchlorate and Perchlorate Salts	14797-73-0	5.5E+01	n	8.2E+02	n					1.4E+01	n	1.5E+01(G)			
				7.0E-04	I					1			~Potassium Perchlorate	7778-74-7	5.5E+01	n	8.2E+02	n					1.4E+01	n				
				7.0E-04	I					1			~Sodium Perchlorate	7601-89-0	5.5E+01	n	8.2E+02	n					1.4E+01	n				
				5.0E-02	I					1	0.1		Permethrin	52645-53-1	3.2E+03	n	4.1E+04	n					1.0E+03	n		2.4E+02	n	
2.2E-03	C	6.3E-07	C							1	0.1		Phenacetin	62-44-2	2.5E+02	c	1.0E+03	c	4.5E+00	c	1.9E+01	c	3.4E+01	c		9.7E-03	c	
				2.4E-01	O					1	0.1		Phenmedipham	13684-63-4	1.5E+04	n	2.0E+05	nm					3.8E+03	n		2.1E+01	n	
				3.0E-01	I	2.0E-01	C			1	0.1		Phenol	108-95-2	1.9E+04	n	2.5E+05	nm	2.1E+02	n	8.8E+02	n	5.8E+03	n		3.3E+00	n	
				4.0E-03	I					1	0.1		Phenol, 2-(1-methylethoxy)-, methylcarbamate	114-26-1	2.5E+02	n	3.3E+03	n					7.8E+01	n		2.5E-02	n	
				5.0E-04	X					1	0.1		Phenothiazine	92-84-2	3.2E+01	n	4.1E+02	n					4.3E+00	n		1.4E-02	n	
				2.0E-04	X			V		1		1.3E+02	Phenyl Isothiocyanate	103-72-0	1.6E+01	n	2.3E+02	ns					2.6E+00	n		1.7E-03	n	
				6.0E-03	I					1	0.1		Phenylenediamine, m-	108-45-2	3.8E+02	n	4.9E+03	n					1.2E+02	n		3.2E-02	n	
1.2E-01	P			4.0E-03	P					1	0.1		Phenylenediamine, o-	95-54-5	4.5E+00	c*	1.9E+01	c					6.5E-01	c		1.7E-04	c	
				1.0E-03	X					1	0.1		Phenylenediamine, p-	106-50-3	6.3E+01	n	8.2E+02	n					2.0E+01	n		5.4E-03	n	
1.9E-03	H									1	0.1		Phenylphenol, 2-	90-43-7	2.8E+02	c	1.2E+03	c					3.0E+01	c		4.1E-01	c	
				2.0E-04	H					1	0.1		Phorate	298-02-2	1.3E+01	n	1.6E+02	n					3.0E+00	n		3.4E-03	n	
						3.0E-04	I	V		1		1.6E+03	Phosgene	75-44-5	3.1E-01	n	1.3E+00	n	3.1E-01	n	1.3E+00	n	6.3E-01	n		1.6E-04	n	
				2.0E-02	I					1	0.1		Phosmet	732-11-6	1.3E+03	n	1.6E+04	n					3.7E+02	n		8.2E-02	n	
				3.0E-04	I	3.0E-04	I	V		1			Phosphine	7803-51-2	2.3E+01	n	3.5E+02	n	3.1E-01	n	1.3E+00	n	5.7E-01	n				
						1.0E-02	I			1			Phosphoric Acid	7664-38-2	1.4E+07	nm	6.0E+07	nm	1.0E+01	n	4.4E+01	n						
				2.0E-05	I			V		1			Phosphorus, White	7723-14-0	1.6E+00	n	2.3E+01	n					4.0E-01	n		1.5E-03	n	
													Phthalates																
1.4E-02	I	2.4E-06	C	2.0E-02	I					1	0.1		~Bis(2-ethylhexyl)phthalate	117-81-7	3.9E+01	c*	1.6E+02	c	1.2E+00	c	5.1E+00	c	5.6E+00	c*	6.0E+00	1.3E+00	c*	1.4E+00
1.9E-03	P			2.0E-01	I					1	0.1		~Butyl Benzyl Phthalate	85-68-7	2.9E+02	c*	1.2E+03	c					1.6E+01	c		2.4E-01	c	
				1.0E+00	I					1	0.1		~Butylphthalyl Butylglycolate	85-70-1	6.3E+04	n	8.2E+05	nm					1.3E+04	n		3.1E+02	n	
				1.0E-01	I					1	0.1		~Dibutyl Phthalate	84-74-2	6.3E+03	n	8.2E+04	n					9.0E+02	n		2.3E+00	n	
				8.0E-01	I					1	0.1		~Diethyl Phthalate	84-66-2	5.1E+04	n	6.6E+05	nm					1.5E+04	n		6.1E+00	n	
				1.0E-01	I			V		1			~Dimethylterephthalate	120-61-6	7.8E+03	n	1.2E+05	nm					1.9E+03	n		4.9E-01	n	
				1.0E-02	P					1	0.1		~Octyl Phthalate, di-N-	117-84-0	6.3E+02	n	8.2E+03	n					2.0E+02	n		5.7E+01	n	
				5.0E-01	X					1	0.1		~Phthalic Acid, p-	100-21-0	3.2E+04	n	4.1E+05	nm					9.4E+03	n		3.4E+00	n	
				2.0E+00	I	2.0E-02	C			1	0.1		~Phthalic Anhydride	85-44-9	1.3E+05	nm	1.6E+06	nm	2.1E+01	n	8.8E+01	n	3.9E+04	n		8.5E+00	n	
				7.0E-02	I					1	0.1		Picloram	1918-02-1	4.4E+03	n	5.7E+04	n					1.4E+03	n	5.0E+02	3.8E-01	n	1.4E-01
				1.0E-04	X					1	0.1		Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3	6.3E+00	n	8.2E+01	n					2.0E+00	n		1.3E-03	n	
				2.0E-03	X					1	0.1		Picric Acid (2,4,6-Trinitrophenol)	88-89-1	1.3E+02	n	1.6E+03	n					4.0E+01	n		1.9E-01	n	
				7.3E-04	O					1	0.1		Pirimiphos, Methyl	29232-93-7	4.6E+01	n	6.0E+02	n					8.9E+00	n		8.4E-03	n	
3.0E+01	C	8.6E-03	C	7.0E-06	H					1	0.1		Polybrominated Biphenyls	36355-01-8	1.8E-02	c*	7.7E-02	c*	3.3E-04	c	1.4E-03	c	2.6E-03	c*				
													Polychlorinated Biphenyls (PCBs)																
7.0E-02	G	2.0E-05	G	7.0E-05	I			V		1	0.14		~Aroclor 1016	12674-11-2	4.1E+00	n	2.7E+01	c**	1.4E-01	c	6.1E-01	c	2.2E-01	c**		2.1E-02	c**	
2.0E+00	G	5.7E-04	G					V		1	0.14		~Aroclor 1221	11104-28-2	2.0E-01	c	8.3E-01	c	4.9E-03	c	2.1E-02	c	4.7E-03	c		8.0E-05	c	
2.0E+00	G	5.7E-04	G					V		1	0.14		~Aroclor 1232	11141-16-5	1.7E-01	c	7.2E-01	c	4.9E-03	c	2.1E-02	c	4.7E-03	c		8.0E-05	c	
2.0E+00	G	5.7E-04	G					V		1	0.14		~Aroclor 1242	53469-21-9	2.3E-01	c	9.5E-01	c	4.9E-03	c	2.1E-02	c	7.8E-03	c		1.2E-03	c	
2.0E+00	G	5.7E-04	G					V		1	0.14		~Aroclor 1248	12672-29-6	2.3E-01	c	9.4E-01	c	4.9E-03	c	2.1E-02	c	7.8E-03	c		1.2E-03	c	
2.0E+00	G	5.7E-04	G	2.0E-05	I			V		1	0.14		~Aroclor 1254	11097-69-1	2.4E-01	c**	9.7E-01	c*	4.9E-03	c	2.1E-02	c	7.8E-03	c*		2.0E-03	c*	
2.0E+00	G	5.7E-04	G					V		1	0.14		~Aroclor 1260	11096-82-5	2.4E-01	c	9.9E-01	c	4.9E-03	c	2.1E-02	c	7.8E-03	c		5.5E-03	c	
				6.0E-04	X			V		1	0.14		~Aroclor 5460	11126-42-4	3.5E+01	n	4.4E+02	n					1.2E+01	n		2.0E+00	n	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	1.3E-01	c*	5.2E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		2.8E-03	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	1.2E-01	c*	5.1E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.7E-03	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	1.2E-01	c*	5.0E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.7E-03	c	

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information													Contaminant		Screening Levels												Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	1.2E-01	c*	5.0E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.7E-03	c	
3.9E+03	W	1.1E+00	W	2.3E-08	W	1.3E-06	W	V		1	0.14		~Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	1.2E-04	c*	5.1E-04	c*	2.5E-06	c	1.1E-05	c	4.0E-06	c		1.7E-06	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	1.2E-01	c*	4.9E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.0E-03	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	1.2E-01	c*	4.9E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.0E-03	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	1.2E-01	c*	4.9E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.0E-03	c	
3.9E+00	W	1.1E-03	W	2.3E-05	W	1.3E-03	W	V		1	0.14		~Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	1.2E-01	c*	5.0E-01	c*	2.5E-03	c	1.1E-02	c	4.0E-03	c		1.0E-03	c	
1.3E+04	W	3.8E+00	W	7.0E-09	W	4.0E-07	W	V		1	0.14		~Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	3.6E-05	c*	1.5E-04	c*	7.4E-07	c	3.2E-06	c	1.2E-06	c		3.0E-07	c	
2.0E+00	I	5.7E-04	I					V		1	0.14		~Polychlorinated Biphenyls (high risk)	1336-36-3	2.3E-01	c	9.4E-01	c	4.9E-03	c	2.1E-02	c			5.0E-01			
4.0E-01	I	1.0E-04	I					V		1	0.14		~Polychlorinated Biphenyls (low risk)	1336-36-3					2.8E-02	c	1.2E-01	c	4.4E-02	c	5.0E-01	6.8E-03	c	7.8E-02
7.0E-02	I	2.0E-05	I					V		1	0.14		~Polychlorinated Biphenyls (lowest risk)	1336-36-3					1.4E-01	c	6.1E-01	c			5.0E-01			
1.3E+01	W	3.8E-03	W	7.0E-06	W	4.0E-04	W			1	0.14		~Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	3.8E-02	c*	1.6E-01	c*	7.4E-04	c	3.2E-03	c	6.0E-03	c*		9.4E-04	c*	
3.9E+01	W	1.1E-02	W	2.3E-06	W	1.3E-04	W	V		1	0.14		~Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	1.2E-02	c*	4.8E-02	c*	2.5E-04	c	1.1E-03	c	4.0E-04	c		6.2E-05	c	
						6.0E-04	I			1	0.1		Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9	8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n						
													Polynuclear Aromatic Hydrocarbons (PAHs)															
				6.0E-02	I			V		1	0.13		~Acenaphthene	83-32-9	3.6E+03	n	4.5E+04	n					5.3E+02	n		5.5E+00	n	
				3.0E-01	I			V		1	0.13		~Anthracene	120-12-7	1.8E+04	n	2.3E+05	nm					1.8E+03	n		5.8E+01	n	
1.0E-01	E	6.0E-05	E					V	M	1	0.13		~Benz[a]anthracene	56-55-3	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	3.0E-02	c		1.1E-02	c	
				9.0E-05	X	2.0E-06	X			1	0.1		~Benzo(e)pyrene	192-97-2	5.7E+00	n	7.3E+01	n	2.1E-03	n	8.8E-03	n	1.8E+00	n		2.2E+00	n	
1.2E+00	C	1.1E-04	C							1	0.13		~Benzo(j)fluoranthene	205-82-3	4.2E-01	c	1.8E+00	c	2.6E-02	c	1.1E-01	c	6.5E-02	c		7.8E-02	c	
1.0E+00	I	6.0E-04	I	3.0E-04	I	2.0E-06	I		M	1	0.13		~Benzo[a]pyrene	50-32-8	1.1E-01	c	2.1E+00	c	1.7E-03	c**	8.8E-03	n	2.5E-02	c	2.0E-01	2.9E-02	c	2.4E-01
1.0E-01	E	6.0E-05	E						M	1	0.13		~Benzo[b]fluoranthene	205-99-2	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	2.5E-01	c		3.0E-01	c	
1.0E-02	E	6.0E-06	E						M	1	0.13		~Benzo[k]fluoranthene	207-08-9	1.1E+01	c	2.1E+02	c	1.7E-01	c	2.0E+00	c	2.5E+00	c		2.9E+00	c	
				8.0E-02	I			V		1	0.13		~Chloronaphthalene, Beta-	91-58-7	4.8E+03	n	6.0E+04	n					7.5E+02	n		3.9E+00	n	
1.0E-03	E	6.0E-07	E						M	1	0.13		~Chrysene	218-01-9	1.1E+02	c	2.1E+03	c	1.7E+00	c	2.0E+01	c	2.5E+01	c		9.0E+00	c	
1.0E+00	E	6.0E-04	E						M	1	0.13		~Dibenz[a,h]anthracene	53-70-3	1.1E-01	c	2.1E+00	c	1.7E-03	c	2.0E-02	c	2.5E-02	c		9.6E-02	c	
1.2E+01	C	1.1E-03	C							1	0.13		~Dibenzo(a,e)pyrene	192-65-4	4.2E-02	c	1.8E-01	c	2.6E-03	c	1.1E-02	c	6.5E-03	c		8.4E-02	c	
2.5E+02	C	7.1E-02	C						M	1	0.13		~Dimethylbenz(a)anthracene, 7,12-	57-97-6	4.6E-04	c	8.4E-03	c	1.4E-05	c	1.7E-04	c	1.0E-04	c		9.9E-05	c	
				4.0E-02	I					1	0.13		~Fluoranthene	206-44-0	2.4E+03	n	3.0E+04	n					8.0E+02	n		8.9E+01	n	
				4.0E-02	I			V		1	0.13		~Fluorene	86-73-7	2.4E+03	n	3.0E+04	n					2.9E+02	n		5.4E+00	n	
1.0E-01	E	6.0E-05	E						M	1	0.13		~Indeno[1,2,3-cd]pyrene	193-39-5	1.1E+00	c	2.1E+01	c	1.7E-02	c	2.0E-01	c	2.5E-01	c		9.8E-01	c	
2.9E-02	P			7.0E-02	A			V		1	0.13	3.9E+02	~Methylnaphthalene, 1-	90-12-0	1.8E+01	c	7.3E+01	c					1.1E+00	c		6.0E-03	c	
				4.0E-03	I			V		1	0.13		~Methylnaphthalene, 2-	91-57-6	2.4E+02	n	3.0E+03	n					3.6E+01	n		1.9E-01	n	
1.2E-01	C	3.4E-05	C	2.0E-02	I	3.0E-03	I	V		1	0.13		~Naphthalene	91-20-3	2.0E+00	c*	8.6E+00	c*	8.3E-02	c*	3.6E-01	c*	1.2E-01	c*		3.8E-04	c*	
1.2E+00	C	1.1E-04	C							1	0.13		~Nitropyrene, 4-	57835-92-4	4.2E-01	c	1.8E+00	c	2.6E-02	c	1.1E-01	c	1.9E-02	c		3.3E-03	c	
				3.0E-02	I			V		1	0.13		~Pyrene	129-00-0	1.8E+03	n	2.3E+04	n					1.2E+02	n		1.3E+01	n	
1.5E-01	I			9.0E-03	I					1	0.1		Prochloraz	67747-09-5	3.6E+00	c	1.5E+01	c					3.8E-01	c		1.9E-03	c	
				6.0E-03	H			V		1			Profluralin	26399-36-0	4.7E+02	n	7.0E+03	n					2.6E+01	n		1.6E+00	n	
				1.5E-02	I					1	0.1		Prometon	1610-18-0	9.5E+02	n	1.2E+04	n					2.5E+02	n		1.2E-01	n	
				4.0E-02	O					1	0.1		Prometryn	7287-19-6	2.5E+03	n	3.3E+04	n					6.0E+02	n		9.0E-01	n	
				7.5E-02	I					1	0.1		Pronamide	23950-58-5	4.7E+03	n	6.2E+04	n					1.2E+03	n		1.2E+00	n	
				1.3E-02	I					1	0.1		Propachlor	1918-16-7	8.2E+02	n	1.1E+04	n					2.5E+02	n		1.5E-01	n	
				5.0E-03	I					1	0.1		Propanil	709-98-8	3.2E+02	n	4.1E+03	n					8.2E+01	n		4.5E-02	n	
1.9E-01	O			4.0E-02	O					1	0.1		Propargite	2312-35-8	2.8E+00	c	1.2E+01	c					1.6E-01	c		1.1E-02	c	
				2.0E-03	I			V		1		1.1E+05	Propargyl Alcohol	107-19-7	1.6E+02	n	2.3E+03	n					4.0E+01	n		8.1E-03	n	
				2.0E-02	I					1	0.1		Propazine	139-40-2	1.3E+03	n	1.6E+04	n					3.4E+02	n		3.0E-01	n	
				2.0E-02	I					1	0.1		Propham	122-42-9	1.3E+03	n	1.6E+04	n					3.5E+02	n		2.2E-01	n	
				1.0E-01	O					1	0.1		Propiconazole	60207-90-1	6.3E+03	n	8.2E+04	n					1.6E+03	n		5.3E+00	n	
						8.0E-03	I	V		1		3.3E+04	Propionaldehyde	123-38-6	7.5E+01	n	3.1E+02	n	8.3E+00	n	3.5E+01	n	1.7E+01	n		3.4E-03	n	
				1.0E-01	X	1.0E+00	X	V		1		2.6E+02	Propyl benzene	103-65-1	3.8E+03	ns	2.4E+04	ns	1.0E+03	n	4.4E+03	n	6.6E+02	n		1.2E+00	n	
						3.0E+00	C	V		1		3.5E+02	Propylene	115-07-1	2.2E+03	ns	9.3E+03	ns	3.1E+03	n	1.3E+04	n	6.3E+03	n		6.0E+00	n	
				2.0E+01	P					1	0.1		Propylene Glycol	57-55-6	1.3E+06	nm	1.6E+07	nm					4.0E+05	n		8.1E+01	n	
						2.7E-04	A			1	0.1		Propylene Glycol Dinitrate	6423-43-4	3.9E+05	nm	1.6E+06	nm	2.8E-01	n	1.2E+00	n						
				7.0E-01	H	2.0E+00	I	V		1		1.1E+05	Propylene Glycol Monomethyl Ether	107-98-2	4.1E+04	n	3.7E+05	nms	2.1E+03	n	8.8E+03	n	3.2E+03	n		6.5E-01	n	
2.4E-01	I	3.7E-06	I			3.0E-02	I	V		1		7.8E+04	Propylene Oxide	75-56-9	2.1E+00	c	9.7E+00	c	7.6E-01	c*	3.3E+00	c*	2.7E-01	c		5.6E-05	c	
				1.0E-03	I			V		1		5.3E+05	Pyridine	110-86-1	7.8E+01	n	1.2E+03	n					2.0E+01	n		6.8E-03	n	
				5.0E-04	I					1	0.1		Quinalphos	13593-03-8	3.2E+01	n	4.1E+02	n					5.1E+00	n		4.3E-02	n	
3.0E+00	I									1	0.1		Quinoline	91-22-5	1.8E-01	c	7.7E-01	c					2.4E-02	c		7.8E-05	c	
				9.0E-03	I					1	0.1		Quizalofop-ethyl	76578-14-8	5.7E+02	n	7.4E+03	n					1.2E+02	n		1.9E+00	n	
						3.0E+04	A			1			Refractory Ceramic Fibers (units in fibers)	E715557					3.1E+04	G	1.3E+05	G						
				3.0E-02	I					1	0.1		Resmethrin	10453-86-8	1.9E+03	n	2.5E+04	n					6.7E+01	n		4.2E+01	n	
				5.0E-02	H			V		1			Ronnel	299-84-3	3.9E+03	n	5.8E+04	n					4.1E+02	n		3.7E+00	n	
				4.0E-03	I					1	0.1		Rotenone	83-79-4	2.5E+02	n	3.3E+03	n					6.1E+01	n		3.2E+01	n	
2.2E-01	C	6.3E-05	C						M	1	0.1		Safrole	94-59-7	5.5E-01	c	1.0E+01	c	1.6E-02	c	1.9E-01	c	9.6E-02	c		5.9E-05	c	
				5.0E-03	I					1			Selenious Acid	7783-00-8	3.9E+02	n	5.8E+03	n					1.0E+02	n				
				5.0E-03	I	2.0E-02	C			1			Selenium	7782-49-2	3.9E+02	n	5.8E+03	n	2.1E+01	n	8.8E+01	n	1.0E+02	n	5.0E+01	5.2E-01	n	2.6E-01
				5.0E-03	C	2.0E-02	C			1			Selenium Sulfide	7446-34-6	3.9E+02	n	5.8E+03	n	2.1E+01	n	8.8E+01	n	1.0E+02	n				
				1.4E-01	O					1	0.1		Sethoxydim	74051-80-2	8.8E+03	n	1.1E+05	nm					1.6E+03	n		1.4E+01	n	
						3.0E-03	C			1			Silica (crystalline, respirable)	7631-86-9	4.3E+06	nm	1.8E+07	nm	3.1E+00	n	1.3E+01	n						
				5.0E-03	I					0.04			Silver	7440-22-4	3.9E+02	n	5.8E+03	n					9.4E+01	n		8.0E-01	n	
1.2E-01	H			5.0E-03	I					1	0.1		Simazine	122-34-9	4.5E+00	c*	1.9E+01	c					6.1E-01	c	4.0E+00	3.0E-04	c	2.0E-03
				1.3E-02	I					1	0.1		Sodium Acifluorfen	62476-59-9	8.2E+02	n	1.1E+04	n					2.6E+02	n		2.1E+00	n	
				4.0E-03	I					1			Sodium Azide	26628-22-8	3.1E+02	n	4.7E+03	n					8.0E+01	n				
2.7E-01	H			3.0E-02	I					1	0.1		Sodium Diethyldithiocarbamate	148-18-5	2.0E+00	c	8.5E+00	c					2.9E-01	c		1.8E-04	c	
				5.0E-02	A	1.3E-02	C			1			Sodium Fluoride	7681-49-4	3.9E+03	n	5.8E+04	n	1.4E+01	n	5.7E+01	n	1.0E+03	n	4.0E+03	1.5E+02	n	6.0E+02
				2.0E-05	I					1	0.1		Sodium Fluoroacetate	62-74-8	1.3E+00	n	1.6E+01	n					4.0E-01	n		8.1E-05	n	
				1.0E-03	H					1			Sodium Metavanadate	13718-26-8	7.8E+01	n	1.2E+03	n					2.0E+01	n				
				8.0E-04	P					1			Sodium Tungstate	13472-45-2	6.3E+01	n	9.3E+02	n					1.6E+01	n				
				8.0E-04	P					1			Sodium Tungstate Dihydrate	10213-10-2	6.3E+01	n	9.3E+02	n					1.6E+01	n				

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
2.4E-02	H			3.0E-02	I					1	0.1		Stirofos (Tetrachlorovinphos)	961-11-5	2.3E+01	c*	9.6E+01	c					2.8E+00	c		8.2E-03	c	
				6.0E-01	I					1			Strontium, Stable	7440-24-6	4.7E+04	n	7.0E+05	nm					1.2E+04	n		4.2E+02	n	
				3.0E-04	I					1	0.1		Strychnine	57-24-9	1.9E+01	n	2.5E+02	n					5.9E+00	n		6.5E-02	n	
				2.0E-01	I	1.0E+00	I	V		1		8.7E+02	Styrene	100-42-5	6.0E+03	ns	3.5E+04	ns	1.0E+03	n	4.4E+03	n	1.2E+03	n	1.0E+02	1.3E+00	n	1.1E-01
				3.0E-03	P					1	0.1		Styrene-Acrylonitrile (SAN) Trimer (THNA isomer)	57964-39-3	1.9E+02	n	2.5E+03	n					4.8E+01	n				
				3.0E-03	P					1	0.1		Styrene-Acrylonitrile (SAN) Trimer (THNP isomer)	57964-40-6	1.9E+02	n	2.5E+03	n					4.8E+01	n				
				1.0E-03	P	2.0E-03	X			1	0.1		Sulfolane	126-33-0	6.3E+01	n	8.2E+02	n	2.1E+00	n	8.8E+00	n	2.0E+01	n		4.4E-03	n	
				8.0E-04	P					1	0.1		Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9	5.1E+01	n	6.6E+02	n					1.1E+01	n		6.5E-02	n	
						1.0E-03	C	V		1			Sulfur Trioxide	7446-11-9	1.4E+06	nm	6.0E+06	nm	1.0E+00	n	4.4E+00	n	2.1E+00	n				
						1.0E-03	C			1			Sulfuric Acid	7664-93-9	1.4E+06	nm	6.0E+06	nm	1.0E+00	n	4.4E+00	n						
2.5E-02	I	7.1E-06	I	5.0E-02	H					1	0.1		Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl	140-57-8	2.2E+01	c	9.2E+01	c	4.0E-01	c	1.7E+00	c	1.3E+00	c		1.5E-02	c	
				3.0E-02	H					1	0.1		TCMTB	21564-17-0	1.9E+03	n	2.5E+04	n					4.8E+02	n		3.3E+00	n	
				7.0E-02	I					1	0.1		Tebuthiuron	34014-18-1	4.4E+03	n	5.7E+04	n					1.4E+03	n		3.9E-01	n	
				2.0E-02	H					1	0.1		Temephos	3383-96-8	1.3E+03	n	1.6E+04	n					4.0E+02	n		7.6E+01	n	
				1.3E-02	I					1	0.1		Terbacil	5902-51-2	8.2E+02	n	1.1E+04	n					2.5E+02	n		7.5E-02	n	
				2.5E-05	H			V		1		3.1E+01	Terbufos	13071-79-9	2.0E+00	n	2.9E+01	n					2.4E-01	n		5.2E-04	n	
				1.0E-03	I					1	0.1		Terbutryn	886-50-0	6.3E+01	n	8.2E+02	n					1.3E+01	n		1.9E-02	n	
5.0E-03	C	1.3E-06	C					V		1			Tert-Butyl Acetate	540-88-5	8.1E+00	c	3.6E+01	c	2.2E+00	c	9.4E+00	c	3.3E+00	c		7.6E-04	c	
				1.0E-04	I					1	0.1		Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1	6.3E+00	n	8.2E+01	n					2.0E+00	n		5.3E-02	n	
				3.0E-05	P			V		1			Tetrachlorobenzene, 1,2,4,5-	95-94-3	2.3E+00	n	3.5E+01	n					1.7E-01	n		7.9E-04	n	
2.6E-02	I	7.4E-06	I	3.0E-02	I			V		1		6.8E+02	Tetrachloroethane, 1,1,1,2-	630-20-6	2.0E+00	c	8.8E+00	c	3.8E-01	c	1.7E+00	c	5.7E-01	c		2.2E-04	c	
2.0E-01	I	5.8E-05	C	2.0E-02	I			V		1		1.9E+03	Tetrachloroethane, 1,1,2,2-	79-34-5	6.0E-01	c	2.7E+00	c	4.8E-02	c	2.1E-01	c	7.6E-02	c		3.0E-05	c	
2.1E-03	I	2.6E-07	I	6.0E-03	I	4.0E-02	I	V		1		1.7E+02	Tetrachloroethylene	127-18-4	2.4E+01	c**	1.0E+02	c**	1.1E+01	c**	4.7E+01	c**	1.1E+01	c**	5.0E+00	5.1E-03	c**	2.3E-03
				3.0E-02	I					1	0.1		Tetrachlorophenol, 2,3,4,6-	58-90-2	1.9E+03	n	2.5E+04	n					2.4E+02	n		1.8E-01	n	
1.6E+01	X			6.0E-05	X			V		1			Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	4.3E-02	c	2.0E-01	c					1.7E-03	c		5.7E-06	c	
				5.0E-04	I					1	0.1		Tetraethyl Dithiopyrophosphate	3689-24-5	3.2E+01	n	4.1E+02	n					7.1E+00	n		5.2E-03	n	
						8.0E+01	I	V		1		2.1E+03	Tetrafluoroethane, 1,1,1,2-	811-97-2	1.0E+05	nms	4.3E+05	nms	8.3E+04	n	3.5E+05	n	1.7E+05	n		9.3E+01	n	
				1.0E-04	X					1	0.1		Tetramethylphosphoramide, -N,N,N',N" (TMPA)	16853-36-4	6.3E+00	n	8.2E+01	n					2.0E+00	n				
				2.0E-03	P					1	0.00065		Tetryl (Trinitrophenylmethylnitramine)	479-45-8	1.6E+02	n	2.3E+03	n					3.9E+01	n		3.7E-01	n	
				2.0E-05	G					1			Thallic Oxide	1314-32-5	1.6E+00	n	2.3E+01	n					4.0E-01	n				
				1.0E-05	X					1			Thallium (I) Nitrate	10102-45-1	7.8E-01	n	1.2E+01	n					2.0E-01	n				
				1.0E-05	X					1			Thallium (Soluble Salts)	7440-28-0	7.8E-01	n	1.2E+01	n					2.0E-01	n	2.0E+00	1.4E-02	n	1.4E-01
				1.0E-05	X			V		1			Thallium Acetate	563-68-8	7.8E-01	n	1.2E+01	n					2.0E-01	n		4.1E-05	n	
				2.0E-05	X					1	0.1		Thallium Carbonate	6533-73-9	1.3E+00	n	1.6E+01	n					4.0E-01	n		8.3E-05	n	
				1.0E-05	X					1			Thallium Chloride	7791-12-0	7.8E-01	n	1.2E+01	n					2.0E-01	n				
				1.0E-05	G					1			Thallium Selenite	12039-52-0	7.8E-01	n	1.2E+01	n					2.0E-01	n				
				2.0E-05	X					1			Thallium Sulfate	7446-18-6	1.6E+00	n	2.3E+01	n					4.0E-01	n				
				4.3E-02	O					1	0.1		Thifensulfuron-methyl	79277-27-3	2.7E+03	n	3.5E+04	n					8.6E+02	n		2.6E-01	n	
				1.0E-02	I					1	0.1		Thiobencarb	28249-77-6	6.3E+02	n	8.2E+03	n					1.6E+02	n		5.5E-01	n	
				7.0E-02	X					1	0.0075		Thiodiglycol	111-48-8	5.4E+03	n	7.9E+04	n					1.4E+03	n		2.8E-01	n	
				3.0E-04	H					1	0.1		Thiofanox	39196-18-4	1.9E+01	n	2.5E+02	n					5.3E+00	n		1.8E-03	n	
1.2E-02	O			1.6E-01	O					1	0.1		Thiophanate, Methyl	23564-05-8	4.7E+01	c	2.0E+02	c					6.7E+00	c		5.7E-03	c	
				1.5E-02	O					1	0.1		Thiram	137-26-8	9.5E+02	n	1.2E+04	n					2.9E+02	n		4.2E-01	n	
				6.0E-01	H					1			Tin	7440-31-5	4.7E+04	n	7.0E+05	nm					1.2E+04	n		3.0E+03	n	
						1.0E-04	A	V		1			Titanium Tetrachloride	7550-45-0	1.4E+05	nm	6.0E+05	nm	1.0E-01	n	4.4E-01	n	2.1E-01	n				
				8.0E-02	I	5.0E+00	I	V		1		8.2E+02	Toluene	108-88-3	4.9E+03	ns	4.7E+04	ns	5.2E+03	n	2.2E+04	n	1.1E+03	n	1.0E+03	7.6E-01	n	6.9E-01
3.9E-02	C	1.1E-05	C			8.0E-06	C	V		1			Toluene-2,4-diisocyanate	584-84-9	6.4E+00	n	2.7E+01	n	8.3E-03	n	3.5E-02	n	1.7E-02	n		2.5E-04	n	
1.8E-01	X			2.0E-04	X					1	0.1		Toluene-2,5-diamine	95-70-5	3.0E+00	c**	1.3E+01	c*					4.3E-01	c**		1.3E-04	c**	
3.9E-02	C	1.1E-05	C			8.0E-06	C	V		1		1.7E+03	Toluene-2,6-diisocyanate	91-08-7	5.3E+00	n	2.2E+01	n	8.3E-03	n	3.5E-02	n	1.7E-02	n		2.6E-04	n	
				1.0E-04	X					1	0.1		Toluenediamine, 2,3-	2687-25-4	6.3E+00	n	8.2E+01	n					2.0E+00	n		6.2E-04	n	
				1.0E-04	X					1	0.1		Toluenediamine, 3,4-	496-72-0	6.3E+00	n	8.2E+01	n					2.0E+00	n		6.2E-04	n	
				5.0E-03	P					1	0.1		Toluic Acid, p-	99-94-5	3.2E+02	n	4.1E+03	n					9.0E+01	n		2.3E-02	n	
1.6E-02	P	5.1E-05	C							1	0.1		Toluidine, o- (Methylaniline, 2-)	95-53-4	3.4E+01	c	1.4E+02	c	5.5E-02	c	2.4E-01	c	4.7E+00	c		2.0E-03	c	
3.0E-02	P			4.0E-03	X					1	0.1		Toluidine, p-	106-49-0	1.8E+01	c*	7.7E+01	c*					2.5E+00	c*		1.1E-03	c*	
				3.0E+00	P			V		1		3.4E-01	Total Petroleum Hydrocarbons (Aliphatic High)	E1790670	2.3E+05	nms	3.5E+06	nms					6.0E+04	n		2.4E+03	n	
						6.0E-01	P	V		1		1.4E+02	Total Petroleum Hydrocarbons (Aliphatic Low)	E1790666	5.2E+02	ns	2.2E+03	ns	6.3E+02	n	2.6E+03	n	1.3E+03	n		8.8E+00	n	
				1.0E-02	X	1.0E-01	P	V		1		6.9E+00	Total Petroleum Hydrocarbons (Aliphatic Medium)	E1790668	9.6E+01	ns	4.4E+02	ns	1.0E+02	n	4.4E+02	n	1.0E+02	n		1.5E+00	n	
				4.0E-02	P					1	0.13		Total Petroleum Hydrocarbons (Aromatic High)	E1790676	2.4E+03	n	3.0E+04	n					8.0E+02	n		8.9E+01	n	
				4.0E-03	P	3.0E-02	P	V		1		1.8E+03	Total Petroleum Hydrocarbons (Aromatic Low)	E1790672	8.2E+01	n	4.2E+02	n	3.1E+01	n	1.3E+02	n	3.3E+01	n		1.7E-02	n	
				4.0E-03	P	3.0E-03	P	V		1	0.13		Total Petroleum Hydrocarbons (Aromatic Medium)	E1790674	9.7E+01	n	5.6E+02	n	3.1E+00	n	1.3E+01	n	5.5E+00	n		2.3E-02	n	
1.1E+00	I	3.2E-04	I	9.0E-05	P					1	0.1		Toxaphene	8001-35-2	4.9E-01	c*	2.1E+00	c*	8.8E-03	c	3.8E-02	c	7.1E-02	c*	3.0E+00	1.1E-02	c*	4.6E-01
				3.0E-05	X					1	0.1		Toxaphene, Weathered	E1841606	1.9E+00	n	2.5E+01	n					6.0E-01	n		9.3E-02	n	
				7.5E-03	I					1	0.1		Tralomethrin	66841-25-6	4.7E+02	n	6.2E+03	n					1.5E+02	n		5.8E+01	n	
				3.0E-04	A			V		1			Tri-n-butyltin	688-73-3	2.3E+01	n	3.5E+02	n					3.7E+00	n		8.2E-02	n	
				8.0E+01	X					1	0.1		Triacetin	102-76-1	5.1E+06	nm	6.6E+07	nm					1.6E+06	n		4.5E+02	n	
				3.4E-02	O					1	0.1		Triadimefon	43121-43-3	2.1E+03	n	2.8E+04	n					6.3E+02	n		5.0E-01	n	
7.2E-02	O			2.5E-02	O			V		1			Triallate	2303-17-5	9.7E+00	c	4.6E+01	c					4.7E-01	c		1.0E-03	c	
				1.0E-02	I					1	0.1		Triasulfuron	82097-50-5	6.3E+02	n	8.2E+03	n					2.0E+02	n		2.1E-01	n	
				8.0E-03	I					1	0.1		Tribenuron-methyl	101200-48-0	5.1E+02	n	6.6E+03	n					1.6E+02	n		6.1E-02	n	
				5.0E-03	I			V		1			Tribromobenzene, 1,2,4-	615-54-3	3.9E+02	n	5.8E+03	n					4.5E+01	n		6.4E-02	n	
				9.0E-03	X					1	0.1		Tribromophenol, 2,4,6-	118-79-6	5.7E+02	n	7.4E+03	n					1.2E+02	n		2.2E-01	n	
				2.0E-04	O					1	0.1		Tribufos	78-48-8	1.3E+01	n	1.6E+02	n					5.7E-01	n		2.8E-03	n	
9.0E-03	P			1.0E-02	P					1	0.1		Tributyl Phosphate	126-73-8	6.0E+01	c*	2.6E+02	c*					5.2E+00	c*		2.5E-02	c*	
				3.0E-04	P					1	0.1		Tributyltin Compounds	E1790679	1.9E+01	n	2.5E+02	n					6.0E+00	n				
				3.0E-04	I					1	0.1		Tributyltin Oxide	56-35-9	1.9E+01	n	2.5E+02	n					5.7E+00	n		2.9E+02	n	
										1	0.1		Trichloramine	10025-85-1											4.0E+03(G)			
				3.0E+01	I	5.0E+00	P	V		1		9.1E+02	Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1	6.7E+03	ns	2.8E+04	ns	5.2E+03	n	2.2E+04	n	1.0E+04	n		2.6E+01	n	
7.0E-02	I			2.0E-02	I					1	0.1		Trichloroacetic Acid	76-03-9	7.8E+00	c	3.3E+01	c					1.1E+00	c	6.0E+01(G)	2.2E-04	c	1.2E-02

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; D = OW; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; W = TEF applied; E = RPF applied; G = user's guide Section 5; M = mutagen; V = volatile; R = RBA applied ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = ceiling limit exceeded; s = Csat exceeded.

Toxicity and Chemical-specific Information												Contaminant		Screening Levels										Protection of Groundwater SSLs		
SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfD_o (mg/kg-day)	key	RfC_i (mg/m^3)	key	vol	mutagen	GIABS	ABS_d	C_{sat} (mg/kg)	Analyte	CAS No.	Resident Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Resident Air (ug/m^3)	key	Industrial Air (ug/m^3)	key	Tapwater (ug/L)	key	MCL (ug/L)	Risk-based SSL (mg/kg)	key	MCL-based SSL (mg/kg)
2.9E-02	H									1	0.1		Trichloroaniline HCl, 2,4,6-	33663-50-2	1.9E+01	c	7.9E+01	c					2.7E+00	c		7.4E-03	c	
7.0E-03	X			3.0E-05	X					1	0.1		Trichloroaniline, 2,4,6-	634-93-5	1.9E+00	n	2.5E+01	n					4.0E-01	n		3.6E-03	n	
				8.0E-04	X			V		1			Trichlorobenzene, 1,2,3-	87-61-6	6.3E+01	n	9.3E+02	n					7.0E+00	n		2.1E-02	n	
2.9E-02	P			1.0E-02	I	2.0E-03	P	V		1		4.0E+02	Trichlorobenzene, 1,2,4-	120-82-1	2.4E+01	c**	1.1E+02	c**	2.1E+00	n	8.8E+00	n	1.2E+00	c**	7.0E+01	3.4E-03	c**	2.0E-01
				2.0E+00	I	5.0E+00	I	V		1		6.4E+02	Trichloroethane, 1,1,1-	71-55-6	8.1E+03	ns	3.6E+04	ns	5.2E+03	n	2.2E+04	n	8.0E+03	n	2.0E+02	2.8E+00	n	7.0E-02
5.7E-02	I	1.6E-05	I	4.0E-03	I	2.0E-04	X	V		1		2.2E+03	Trichloroethane, 1,1,2-	79-00-5	1.1E+00	c**	5.0E+00	c**	1.8E-01	c**	7.7E-01	c**	2.8E-01	c**	5.0E+00	8.9E-05	c**	1.6E-03
4.6E-02	I	4.1E-06	I	5.0E-04	I	2.0E-03	I	V	M	1		6.9E+02	Trichloroethylene	79-01-6	9.4E-01	c**	6.0E+00	c**	4.8E-01	c**	3.0E+00	c**	4.9E-01	c**	5.0E+00	1.8E-04	c**	1.8E-03
				3.0E-01	I			V		1		1.2E+03	Trichlorofluoromethane	75-69-4	2.3E+04	ns	3.5E+05	nms					5.2E+03	n		3.3E+00	n	
				1.0E-01	I					1	0.1		Trichlorophenol, 2,4,5-	95-95-4	6.3E+03	n	8.2E+04	n					1.2E+03	n		4.0E+00	n	
1.1E-02	I	3.1E-06	I	1.0E-03	P					1	0.1		Trichlorophenol, 2,4,6-	88-06-2	4.9E+01	c**	2.1E+02	c**	9.1E-01	c	4.0E+00	c	4.1E+00	c**		4.0E-03	c**	
				1.0E-02	I					1	0.1		Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5	6.3E+02	n	8.2E+03	n					1.6E+02	n		6.8E-02	n	
				8.0E-03	I					1	0.1		Trichlorophenoxypropionic acid, -2,4,5	93-72-1	5.1E+02	n	6.6E+03	n					1.1E+02	n	5.0E+01	6.1E-02	n	2.8E-02
				5.0E-03	I			V		1		1.3E+03	Trichloropropane, 1,1,2-	598-77-6	3.9E+02	n	5.8E+03	ns					8.8E+01	n		3.5E-02	n	
3.0E+01	I			4.0E-03	I	3.0E-04	I	V	M	1		1.4E+03	Trichloropropane, 1,2,3-	96-18-4	5.1E-03	c	1.1E-01	c	3.1E-01	n	1.3E+00	n	7.5E-04	c		3.2E-07	c	
				3.0E-03	X	3.0E-04	P	V		1		3.1E+02	Trichloropropene, 1,2,3-	96-19-5	7.3E-01	n	3.1E+00	n	3.1E-01	n	1.3E+00	n	6.2E-01	n		3.1E-04	n	
				2.0E-02	A					1	0.1		Tricresyl Phosphate (TCP)	1330-78-5	1.3E+03	n	1.6E+04	n					1.6E+02	n		1.5E+01	n	
				3.0E-03	I					1	0.1		Tridiphane	58138-08-2	1.9E+02	n	2.5E+03	n					1.8E+01	n		1.3E-01	n	
						7.0E-03	I	V		1		2.8E+04	Triethylamine	121-44-8	1.2E+02	n	4.8E+02	n	7.3E+00	n	3.1E+01	n	1.5E+01	n		4.4E-03	n	
				2.0E+00	P					1	0.1		Triethylene Glycol	112-27-6	1.3E+05	nm	1.6E+06	nm					4.0E+04	n		8.8E+00	n	
						2.0E+01	P	V		1		4.8E+03	Trifluoroethane, 1,1,1-	420-46-2	1.5E+04	ns	6.2E+04	ns	2.1E+04	n	8.8E+04	n	4.2E+04	n		1.3E+02	n	
7.7E-03	I			7.5E-03	I			V		1			Trifluralin	1582-09-8	9.0E+01	c**	4.2E+02	c*					2.6E+00	c*		8.4E-02	c*	
2.0E-02	P			1.0E-02	P					1	0.1		Trimethyl Phosphate	512-56-1	2.7E+01	c*	1.1E+02	c*					3.9E+00	c*		8.6E-04	c*	
				1.0E-02	I	6.0E-02	I	V		1		2.9E+02	Trimethylbenzene, 1,2,3-	526-73-8	3.4E+02	ns	2.0E+03	ns	6.3E+01	n	2.6E+02	n	5.5E+01	n		8.1E-02	n	
				1.0E-02	I	6.0E-02	I	V		1		2.2E+02	Trimethylbenzene, 1,2,4-	95-63-6	3.0E+02	ns	1.8E+03	ns	6.3E+01	n	2.6E+02	n	5.6E+01	n		8.1E-02	n	
				1.0E-02	I	6.0E-02	I	V		1		1.8E+02	Trimethylbenzene, 1,3,5-	108-67-8	2.7E+02	ns	1.5E+03	ns	6.3E+01	n	2.6E+02	n	6.0E+01	n		8.7E-02	n	
				1.0E-02	X			V		1		3.0E+01	Trimethylpentene, 2,4,4-	25167-70-8	7.8E+02	ns	1.2E+04	ns					3.8E+01	n		1.3E-01	n	
				3.0E-02	I					1	0.019		Trinitrobenzene, 1,3,5-	99-35-4	2.2E+03	n	3.2E+04	n					5.9E+02	n		2.1E+00	n	
3.0E-02	I			5.0E-04	I					1	0.032		Trinitrotoluene, 2,4,6-	118-96-7	2.1E+01	c**	9.6E+01	c**					2.5E+00	c**		1.5E-02	c**	
				2.0E-02	P					1	0.1		Triphenylphosphine Oxide	791-28-6	1.3E+03	n	1.6E+04	n					3.6E+02	n		1.5E+00	n	
				2.0E-02	A					1	0.1		Tris(1,3-Dichloro-2-propyl) Phosphate	13674-87-8	1.3E+03	n	1.6E+04	n					3.6E+02	n		8.0E+00	n	
				1.0E-02	X					1	0.1		Tris(1-chloro-2-propyl)phosphate	13674-84-5	6.3E+02	n	8.2E+03	n					1.9E+02	n		6.5E-01	n	
2.3E+00	C	6.6E-04	C					V		1		4.7E+02	Tris(2,3-dibromopropyl)phosphate	126-72-7	2.8E-01	c	1.3E+00	c	4.3E-03	c	1.9E-02	c	6.8E-03	c		1.3E-04	c	
2.0E-02	P			7.0E-03	P					1	0.1		Tris(2-chloroethyl)phosphate	115-96-8	2.7E+01	c*	1.1E+02	c*					3.8E+00	c*		3.8E-03	c*	
3.2E-03	P			1.0E-01	P					1	0.1		Tris(2-ethylhexyl)phosphate	78-42-2	1.7E+02	c*	7.2E+02	c					2.4E+01	c*		1.2E+02	c*	
				8.0E-04	P					1			Tungsten	7440-33-7	6.3E+01	n	9.3E+02	n					1.6E+01	n		2.4E+00	n	
				2.0E-04	A	4.0E-05	A			1			Uranium	7440-61-1	1.6E+01	n	2.3E+02	n	4.2E-02	n	1.8E-01	n	4.0E+00	n	3.0E+01	1.8E+00	n	1.4E+01
1.0E+00	C	2.9E-04	C						M	1	0.1		Urethane	51-79-6	1.2E-01	c	2.3E+00	c	3.5E-03	c	4.2E-02	c	2.5E-02	c		5.6E-06	c	
		8.3E-03	P	9.0E-03	I	7.0E-06	P			0.026			Vanadium Pentoxide	1314-62-1	4.6E+02	c**	2.0E+03	c**	3.4E-04	c*	1.5E-03	c*	1.5E+02	n				
				5.0E-03	G	1.0E-04	A			0.026			Vanadium and Compounds	7440-62-2	3.9E+02	n	5.8E+03	n	1.0E-01	n	4.4E-01	n	8.6E+01	n		8.6E+01	n	
				1.0E-03	I			V		1			Vernolate	1929-77-7	7.8E+01	n	1.2E+03	n					1.1E+01	n		8.9E-03	n	
				1.2E-03	O					1	0.1		Vinclozolin	50471-44-8	7.6E+01	n	9.8E+02	n					2.1E+01	n		1.6E-02	n	
				1.0E+00	H	2.0E-01	I	V		1		2.8E+03	Vinyl Acetate	108-05-4	9.1E+02	n	3.8E+03	ns	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.7E-02	n	
		1.5E-05	P			3.0E-03	I	V		1		2.5E+03	Vinyl Bromide	593-60-2	2.6E-01	c*	1.1E+00	c*	1.9E-01	c*	8.2E-01	c*	3.7E-01	c*		1.1E-04	c*	
7.2E-01	I	4.4E-06	I	3.0E-03	I	8.0E-02	A	V	M	1		3.9E+03	Vinyl Chloride	75-01-4	5.9E-02	c	1.7E+00	c	1.7E-01	c	2.8E+00	c	1.9E-02	c	2.0E+00	6.5E-06	c	6.9E-04
				3.0E-04	I					1	0.1		Warfarin	81-81-2	1.9E+01	n	2.5E+02	n					5.6E+00	n		5.9E-03	n	
				2.0E-01	G	1.0E-01	G	V		1		3.9E+02	Xylene, m-	108-38-3	5.5E+02	ns	2.4E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	G	1.0E-01	G	V		1		4.3E+02	Xylene, o-	95-47-6	6.4E+02	ns	2.8E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	G	1.0E-01	G	V		1		3.9E+02	Xylene, p-	106-42-3	5.6E+02	ns	2.4E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n		1.9E-01	n	
				2.0E-01	I	1.0E-01	I	V		1		2.6E+02	Xylenes	1330-20-7	5.8E+02	ns	2.5E+03	ns	1.0E+02	n	4.4E+02	n	1.9E+02	n	1.0E+04	1.9E-01	n	9.9E+00
				3.0E-04	I					1			Zinc Phosphide	1314-84-7	2.3E+01	n	3.5E+02	n					6.0E+00	n				
				3.0E-01	I					1			Zinc and Compounds	7440-66-6	2.3E+04	n	3.5E+05	nm					6.0E+03	n		3.7E+02	n	
				5.0E-02	I					1	0.1		Zineb	12122-67-7	3.2E+03	n	4.1E+04	n					9.9E+02	n		2.9E+00	n	
				8.0E-05	X					1			Zirconium	7440-67-7	6.3E+00	n	9.3E+01	n					1.6E+00	n		4.8E+00	n	