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SUPPLEMENTAL REMEDIAL INVESTIGATION INFORMATION RESPORT NIROP FRIDLEY MN

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TETRA TECH

Supplemental Remedial Investigation Information Report

Naval Industrial Reserve Ordnance Plant

Fridley, Minnesota

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

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SUPPLEMENTAL REMEDIAL INVESTIGATION INFORMATION REPORT FOR

NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT
FRIDLEY, MINNESOTA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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1.0 INTRODUCTION

This Supplemental Remedial Investigation Information Report was prepared for the Naval Industrial Reserve Ordnance Plant in Fridley, Minnesota (NIROP Fridley) through the U.S. Navy (Navy) Southern Division Naval Facilities Engineering Command (NAVFAC) under Contract Task Order (CTO) 0003, for the Comprehensive Long-term Environmental Action Navy (CLEAN III), contract number N62467-94-D-0888.

1.1 PURPOSE OF THE SUPPLEMENTAL REPORT

The OU-3 sampling program incorporated both soil sampling and groundwater sampling. Soil samples were collected throughout the main NIROP building in order to evaluate the risk to typical workers and construction workers. These exposure scenarios were developed in the OU-3 Work Plan, and represent an industrial land reuse scenario. The OU-2 soil sampling, generally from areas outside the main NIROP building, resulted in evaluation against different exposure scenarios – that is different personnel, plus evaluation for scenarios other than an industrial land reuse scenario. Additionally, the OU-2 Feasibility Study deferred remedy selection for OU-2 until such time as the OU-3 remedy could also be evaluated to examine the potential for the OU-2 and OU-3 to share a common remedy. In order for this evaluation to proceed, it is now necessary to evaluate key OU-2 sampling results against the benchmarks developed to evaluate the OU-3 sampling results. The information in this document provides that analysis.

It is not the intent of this supplemental report to summarize the results or conclusions of either the OU-1 or OU-2 reports.

1.2 SITE BACKGROUND

1.2.1 Facility Description

NIROP Fridley is located on the southernmost tip of Anoka County, Minnesota. The plant is situated approximately one-quarter mile east of the Mississippi River and less than 1 mile south of Interstate 694 (Figure 1-1).

The site is currently active and consists of 80.35 acres of government-owned land, of which approximately 50 acres are paved or covered with buildings. The plant is bordered on the east by the Burlington Northern rail yard, on the north by various industrial facilities, on the south by United Defense Limited Partnership (UDLP) property, and on the west by East River Road. The 46 acre area adjacent to

the southern border of the site is owned by UDLP, the NIROP (government-owned contractor operated) (GOCO) operator, and is designated USEPA Superfund Site Number 17 on Update 6 of the National Priorities List (NPL) (RMT, July 1988). The area encompassed within a 3-mile radius of the NIROP site includes parts of Minneapolis/St. Paul, New Brighton, St. Anthony, and most of Fridley and Brooklyn Center.

1.2.2 Facility History

NIROP Fridley dates back to 1940 when Northern Pump Company negotiated with the Navy for the construction of a new manufacturing plant on approximately 80.35 acres of land situated in the northern portion of the Minneapolis-St. Paul metropolitan area (Envirodyne, June 1983). Northern Pump had been under contract to the Navy throughout the 1930s. These defense contracts eventually reached a level where Northern Pump's existing plant in Minneapolis was inadequate. When Northern Pump received a contract from the Navy to produce 100 five-inch gun mounts, a move to a new manufacturing plant was needed (Envirodyne, June 1983).

The arrangement to construct the new plant was unique in that the plant was partially owned by the government and partially by Northern Pump Company. NIROP Fridley was the GOCO facility. The site chosen for the plant was a cornfield just north of the Minneapolis city limits, within the City of Fridley. The new plant was completed in just 60 days with machinery, office equipment, and records moved intact by flat car from the old plant. By January 1941, the plant was in full production (Envirodyne, June 1983). The general layout of the site is shown on Figure 1-2.

In June of 1942, Northern Pump Company established Northern Ordnance, Incorporated, as an operating subsidiary to conduct the government portion of Northern Pump's business. Thereafter, the facility was often referred to as Northern Ordnance, Inc., and later as Northern Ordnance Division (NOD) (Envirodyne, June 1983).

On January 31, 1964, Northern Ordnance was acquired from Northern Pump Company by FMC Corporation (FMC). Northern Ordnance was assigned divisional status within FMC's Ordnance Group (Envirodyne, June 1983). In 1994, FMC Corporation and Harsco Corporation formed UDLP, and the Armament Systems Division of UDLP currently operates the facility.

Production at the NIROP facility began in January 1941. During World War II, the plant was operated in two 12-hour shifts, 365 days a year, to produce gun mounts. A production level of about 150 single gun mounts and 20 twin gun mounts per month was eventually reached. During the height of the war, 11,400

people were employed at the plant. By the end of the war, more than 6,000 gun mounts had been produced, and the plant received awards annually from 1941 through 1946 from the Navy for meritorious production (Envirodyne, June 1983).

Following the end of the war, production of gun mounts dropped substantially, and the workforce at the plant was reduced to its pre-war level of less than 1,000 employees. The plant undertook various overhaul projects for the Navy and designed a new, dual-purpose, 5-inch, 54-caliber, single gun mount, the Mark 42. This was one of the first fully automated gun mounts in the world. Production of the Mark 42 commenced in 1948 and was the major production activity at the plant for the next 10 years (Envirodyne, June 1983).

During the 1950s, the Navy had demand for new and advanced missile launching systems. Northern Ordnance responded to this need by producing the first automatic guided missile launching system in the world in 1956, the Mark 4. Other missile launching systems-the Mark 7, Mark 10, Mark 13, Mark 22 and Mark 26 -were also produced at the plant. These were all highly reliable shipboard systems designed to store, transfer, warm up, position, and launch the missiles. All of these systems were designed for the "3-T Missiles": Talos, Terrier, and Tarter (Envirodyne, June 1983). During this same period, a series of torpedo launching tubes, the Mark 23, Mark 24, and Mark 25, were produced at the plant (Envirodyne, June 1983).

After FMC Corporation's takeover of Northern Ordnance in 1964, the plant continued to produce gun mounts and advanced missile launching systems. However, there was a shift toward smaller, lighter systems. The plant produced a 5-inch, 54-caliber gun mount, the Mark 45, which was the smallest and lightest 5-inch gun mount in the world. This gun mount was used on the Navy's latest cruisers and destroyers. The Mark 75, which was a fast firing 76-millimeter, 62-caliber gun mount, was also produced at the plant (Envirodyne, June 1983).

The guided missile launching systems that were produced at the plant in the 1970s and 1980s, the Mark 13, Mark 26, and the Mark 41 Vertical Launching Systems (VLS), were designed for the Navy’s newer, smaller class ships. However, today the mainstay of the Navy’s launching platform is the MK41 VLS.

There were no major functional changes in the industrial operations at NIROP since the plant was constructed in 1941, although some of the operations were modernized or relocated. The processing, assembly, and manufacturing operations associated with the facility include plating, welding, heat treating, machining, and foundry. Testing facilities currently at NIROP include an electronics laboratory, a

metallurgical laboratory, hydraulic test bays, and shock/vibration test equipment (Envirodyne, June 1983). These areas are shown on Figure 1-3.

The plant layout consists of 29 avenues that run west to east and north to south. Broadway is the main north-south avenue; it is located in the center of the plant. East of Broadway, building columns are numbered from 1E to 21E; to the west, columns are numbered 1W to 29W. The Navy-owned portion of the plant extends from 5th Avenue to the north wall of the main building.

NIROP Fridley has previously stored and disposed of industrial wastes, scrap materials, drummed wastes, and chemicals at the facility. The following paragraphs discuss the former chemical and waste disposal, storage, and removal practices.

In 1975, an estimated 150 55-gallon drums of industrial waste were removed from NIROP. Prior to disposal, such waste material was collected and stored at a central waste storage area located outside near the northeastern corner of NIROP. The area consisted of a 30-foot by 30-foot asphalt and concrete pad graded toward the middle, which drained to a dry well that could be pumped if a spill occurred (Envirodyne, June 1983).

Two trenches were excavated at NIROP for waste disposal purposes in 1972 in the area north of the main plant building. The trenches were used on a one-time basis. Each trench was approximately 10 feet wide and 8 to 10 feet deep, with a combined length of 75 to 100 feet. Between 50 and 100 drums containing wastes were placed into the trenches on their sides, stacked two or three deep, and covered with excavated soils. The material potentially disposed of in the drums included waste oil, plating sludge, cleaning solvent, and degreasing solvent (Envirodyne, June 1983).

During the late 1960s or early 1970s, two borrow pits were used on a one-time basis for the disposal of drummed wastes on the northeast portion of NIROP: one near the railroad gate, the other near the first railroad switch. Each of the pits was approximately 8 feet deep and irregularly shaped and contained about 25 barrels containing the same types of wastes as disposed of in the trenches. In addition to the barrels, the disposal pits contained miscellaneous construction debris, such as metal scraps, lumber, and concrete (Envirodyne, June 1983).

Through various geophysical and remote sensing techniques, nine areas were selected for excavation based on their likelihood for containing drummed wastes in the northern portion of the outside property. These areas were excavated in the fall of 1983 and the spring of 1984. Forty-three excavated drums and 1,200 cubic yards of underlying soil were found to contain volatile organic compounds (VOCs),

polychlorinated biphenyls (PCBs), oil and grease, pesticides, and metal-bearing wastes. The drums and contaminated soil were disposed of at a USEPA-approved landfill.

Based on the results of a geophysical investigation conducted in 1995, a total of twenty-three 55-gallon drums and 12 smaller containers were found in the north 40 area. These drums were excavated during a removal action conducted in April through June 1996. Eleven drums were determined to be non-hazardous, 11 drums contained contaminated soil, 1 drum contained hazardous waste, 4 1-gallon containers were determined to be non-hazardous, and 8 quart-sized containers contained ingredients such as brake fluid and paint thinner. The non-hazardous containers were disposed of as scrap metal by the UDLP metal recycling program, and their soil contents were placed in roll-offs for disposal as Special Waste [materials containing volatiles but having Toxic Characteristic Leaching Procedure (TCLP) results below hazardous levels as mandated in 40 CFR 261). The remaining 13 drums and 8 containers, with contents, were sampled for disposal and sent to Emelle, Alabama for disposition and subsequent incineration at Port Arthur, Texas. In addition, approximately 100 cubic yards of soil and debris consisting of trash, scrap metal, tires, construction and demolition rubble, metal casting waste, equipment parts, and cast concrete structures were removed and disposed of as non-hazardous waste (Morrison Knudsen Corp, December 1996, see Appendix H).

Large quantities of sand are consumed in the casting process at NIROP. Foundry core butts contain mostly sand with minor amounts of metal and resin or binders. Most foundry core butt disposal operations occurred off Navy property. However, it was reported that core butts were disposed of in the northern portion of NIROP on a very limited basis. An analysis of the foundry sand, both before and after use, was performed in November 1978. This analysis did not show any hazardous materials (Envirodyne, June 1983).

In 1972, with the approval of the MPCA, foundry sand was used as one of the fill materials to raise the elevation of the land west of the site which is now part of the Anoka County Park.

A large storage lot and scrap yard were maintained at the north end of the facility since the plant was built in the early 1940s. A wide variety of scrap metal parts was found in the yard. Items include old gun barrels, cranes, machining jigs, and gun mounts (Envirodyne, June 1983).

In the location of the existing hazardous materials storage building, a metal shavings and milling waste loading area existed where the wastes were loaded for removal from the plant.

Plating chemical storage, oil/solvent storage, and cyanide storage areas were located on the west end of the plant on 22nd and 23rd Avenues. Cyanide was stored in this area from 1973 to 1988. Flammable materials were stored in the oil/solvent storage area until 1991.

Prior to the late 1980s, the plant used five interim storage areas named Storage Areas A through D. Storage Areas A, B, B', and D have been closed in accordance with MPCA and USEPA procedures. Storage Area C is currently undergoing final closure.

1.2.3 Previous Environmental Investigations

The NIROP Fridley site is divided into three Operable Units (OUs): OU1 addresses groundwater; OU2 addresses soil contamination outside the footprint of the building; and OU3 originally addressed only soil contamination under the footprint of the building. In a letter dated August 30, 1995, the MPCA requested that OU2 be incorporated into OU3 and that contamination sources [e.g., dense non-aqueous phase liquids (DNAPLs)] within the saturated zone be added to OU3. The MPCA requested that OU2 and OU3 be incorporated and that OU3 include sources in the saturated zone beneath the building. The decision to combine remedy selection and investigate the saturated zone beneath the building was made by the NIROP Partnering Team.

Previous investigations have identified contaminants of concern (COCs) for OU1 and OU2. COCs identified for OU1 (groundwater) include trichloroethene (TCE), tetrachloroethene (PCE), and 1,2-dichloroethene (1,2-DCE) (RMT, Inc., July 1988). COCs identified for OU2 include toluene, carcinogenic polyaromatic hydrocarbons (cPAHs), ethylbenzene, TCE, PCE, 1,2-DCE, 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (TCA), and 1,1-dichloroethane (1,1-DCA) (MPCA, January 1995). The following paragraphs and Table 1-1 are chronological summaries of events that have occurred at the NIROP facility from 1940 to the present.

In September 1980, Navy officials implemented the nationwide Navy Assessment and Control of Installation Pollutants (NACIP) program to identify and control environmental contamination from past waste management and disposal practices (USEPA, March 1991).

In March 1981, an anonymous telephone call to the MPCA led to the discovery of CERCLA hazardous substance TCE in the three NIROP Fridley water supply wells finished in the Prairie du Chien/Jordan Dolomite aquifer. These onsite water supply wells were shut down on April 24, 1981. The groundwater flows west/southwest from NIROP Fridley, and then enters the Mississippi River. Sampling at the City of Minneapolis Mississippi River water intake plant also revealed measurable concentrations of TCE. The

city of Minneapolis draws its municipal water from the Mississippi River approximately 2,000 feet downstream from the NIROP site (USEPA, March 1991).

The Navy Energy and Environmental Support Activity (NEESA) initiated the Initial Assessment Study (IAS) in June 1983. The IAS report (Envirodyne, June 1983) determined that drummed wastes had occasionally been buried in trenches or pits 8 to 10 feet below the surface on site in the northern portion of NIROP Fridley and that the area beneath NIROP Fridley production building might be contributing to groundwater contamination. The exact site location of the buried wastes was not recorded. As a result of the IAS recommendations, the Navy contracted with the U.S. Army Corps of Engineers (USACE), Omaha District, to continue investigations (USEPA, March 1991).

The cleanup activities involved excavation of nine areas that contained 43 drums and 1,200 cubic yards of underlying soils. The 43 drums and 1,200 cubic yards of underlying soils were found to contain volatile organic compounds (VOCs), PCBs, oil and grease, pesticides, and metal-bearing wastes. The excavated materials were disposed of at a USEPA-approved landfill (USEPA, March 1991).

Four phases of groundwater monitoring well installation were initiated in June 1983. The network consists of 53 monitoring wells. Shallow, intermediate, and deep monitoring wells were installed in the unconsolidated aquifer underlying NIROP Fridley. Monitoring wells were also installed in the Prairie du Chien/Jordan Dolomite aquifer, which underlies the unconsolidated aquifer under NIROP Fridley. The objective of the monitoring well network is to determine the physical and chemical characteristics of the unconsolidated and Prairie du Chien/Jordan Dolomite aquifers underlying NIROP and adjacent areas (USEPA, March 1991).

The OU1 Remedial Investigation Report (RMT, June 1987) was issued in June 1987 in partial fulfillment of an MPCA Request for Response Action issued to the Navy in May 1984. The purpose of the report was to use existing information to evaluate the impacts of past disposal practices on subsoils and groundwater. The report included evaluations of the eight sampling rounds and the no-action alternative. Results of the RI confirmed earlier findings that groundwater was contaminated with VOCs (primarily TCE) and that groundwater flow was primarily to the southwest toward the Mississippi River.

To address the need for further information defining the nature and extent of contamination, the Navy issued a Conceptual Work Plan for Additional Investigations in June 1987. Implementation of the Conceptual Work Plan was completed between November 1987 and March 1988. The work consisted of installing and sampling of 16 new groundwater monitoring wells, testing soil pore gas, installing two shallow aquifer pumping wells, and sampling two storm sewers. The results of these investigations were

included in the addendum to the RI Report issued for groundwater (OU1) in July 1988 (USEPA, March 1991).

RMT conducted a soil pore gas survey at the site to screen and identify areas of potential VOC contaminated soil that might be contributing to groundwater contamination. The results were included in the A-E Quality Control Summary Report for the Soil Gas Survey (RMT, February 1988) and concluded that the following three contiguous areas had the greatest concentrations in the pore space of the near-surface soils:

- Former disposal trench
- Permanent decontamination pad
- New water main trench area

The OU1 Feasibility Study (FS) Report (RMT, July 1988) was issued in July 1988. Based on the initial screening of alternatives, three remedial alternatives were recommended for detailed evaluations and comparison. These alternatives consisted of two source-control alternatives and an alternative addressing management of contaminant migration (USEPA, March 1991).

In August 1988, an Addendum to the Feasibility Report (RMT, August 1988) for OU1 was issued. This report accounted for the changes found in the Addendum to the RI Report and recommended a pumping and treating remedial action that was to be implemented in two phases (USEPA, March 1991).

On February 8, 1989, the Navy held the initial Technical Review Committee (TRC) meeting at NIROP Fridley. TRC membership included the following: USEPA, MPCA, U.S. Navy, Corps of Engineers, Anoka County (Minnesota), City of Fridley, FMC Corp., Metropolitan Waste Control Commission, Minnesota Department of Natural Resources, and RMT, Inc. The committee periodically met at NIROP Fridley to review progress of the RI/FS and Remedial Design/Remedial Action (RD/RA) (USEPA, March 1991).

Hazardous Waste Storage Area C, located on NIROP Fridley, was used for hazardous waste storage and was addressed by FMC Corporation, a Navy contractor. Soils in the storage area were remediated under the hazardous waste permit that was issued to FMC Corporation and the Navy pursuant to Minnesota Rules Ch. 7045. The closure plan and schedule in the permit required the removal and disposal of contaminated soil beneath the storage area. During April 1989, approximately 317 tons of contaminated soil and debris were excavated and disposed of from Hazardous Waste Storage Area C. No soils outside the perimeter of Hazardous Waste Storage Area C were removed.

The Navy held a public information meeting to discuss the preferred alternative for groundwater remediation on May 22, 1989 (USEPA, March 1991).

On July 14, 1989, NIROP Fridley was proposed for placement on the National Priorities List (54 Fed. Reg. 29820, July 14, 1989) (USEPA, March 1991).

On July 31, 1989, the U.S. Navy established a Public Information Repository for documents relating to NIROP Fridley. The repository is located at the Anoka County Branch Library, 410 N.E. Mississippi Street, Fridley, Minnesota. The Transcript of Proceedings from the Public Forum held on May 22, 1989 was placed in the Information Repository at the Anoka County Branch Library, Fridley, Minnesota (USEPA, March 1991).

On November 21, 1989, NIROP Fridley was placed on the National Priorities List (USEPA, March 1991) because of receiving an HRS score of 28.5 or greater. Initial discovery/notification documented a release of VOCs into the groundwater beneath NIROP (USEPA, March 1991).

On May 1, 1990, the Proposed Plan for groundwater remediation was made available to the public by placing a copy of the Proposed Plan in the Public Information Repository. Prior to and on May 1, 1990, notice of the commencement of a period of public comment was provided by publication of a notice in local newspapers. Members of the public were notified that they had a period of 30 days in which they could provide oral or written comments to the USEPA or Navy concerning the Proposed Plan. A public meeting was held on May 9, 1990, in Fridley, Minnesota, during which representatives of the Navy, USEPA, and MPCA answered questions and solicited both written and oral comments from members of the public. The public comment period continued until May 30, 1990 (USEPA, March 1991).

A CERCLA ROD (USEPA, June 1986) was signed for OU1, groundwater remediation at NIROP, on September 28, 1990. The U.S. Navy entered into an FFA with the USEPA, the Navy, and the MPCA in March 1991.

On April 16, 1995, the first NIROP Fridley Restoration Advisory Board (RAB) meeting was held. The RAB was the expansion of the TRC with the addition of community members. The mission of the RAB is to establish and maintain a forum for the exchange of information, in an open and constructive atmosphere, concerning restoration activities at NIROP Fridley and to provide advice/comment on such activities.

Initial investigative activities related to environmental issues at NIROP Fridley began in 1981. After an initial assessment and focused drum removal action, the site issues were divided into three operable units (OUs). OU1 addressed the groundwater beneath the site. The OU1 Remedial Investigation/Feasibility Study (RI/FS) and Record of Decision (ROD) are complete, and implementation of the selected remedy is under way. The selected remedy includes installation and operation of groundwater containment and recovery wells, with a two-phased plan for disposal of the groundwater from the well system.

Under Phase I, the contaminated groundwater from the containment and recovery well system will be discharged directly to the existing sanitary sewer system for treatment at the local wastewater treatment facility. Under Phase II, design documents for a groundwater treatment system will be completed to permit discharge of treated groundwater to the Mississippi River via an NPDES storm sewer discharge.

A groundwater extraction (and containment) system has been constructed based on design documents approved by the USEPA Region V and the MPCA. A pumping capacity test was performed during construction at each of the four extraction wells and included groundwater sampling and analysis. The results indicated that groundwater pretreatment was required prior to discharge to the sanitary sewer to meet discharge limits. Therefore, a pretreatment system was also constructed at NIROP as part of the original facilities, for use during the interim Phase I discharge to the sanitary sewer.

The groundwater extraction system and pretreatment facilities began operating in September 1992. As required by the ROD, an evaluation of the effectiveness of the groundwater extraction system in achieving hydraulic containment of contaminated groundwater during the initial 90-day operating period was submitted to the USEPA and the MPCA in December 1992 (RMT, 1992). The document concluded that additional groundwater extraction well(s) would be needed to achieve effective capture and hydraulic containment of contaminated groundwater. A work plan for upgrading the original groundwater extraction system was prepared (RMT, 1995a) and approved by the USEPA and the MPCA. As provided in that work plan, two additional extraction wells (AT-5A and AT-5B) were constructed and placed into operation in June 1995. At that time, the groundwater extraction system consisted of six wells.

It was recommended that the 1999 AMR (TtNUS, 2000b) that upgrades to the remedial system should be evaluated to increase system performance. Based upon these recommendations, possible modifications to the system were evaluated (TtNUS, 2000b, 2000c, and 2001). The modifications to the extraction system were approved by the USEPA and MPCA. The regulatory agency approved modifications were to continue the operation of AT-3A, AT5A and AT-5B; eliminate wells AT-1A, AT-2, and AT-4; and include new wells AT-10. The groundwater extraction system now, therefore; consists of seven wells. These changes were initiated in July 2000 and were completed by late 2001.

An Annual Monitoring Report (AMR) is provided by the Navy to fulfill requirements for other types of environmental monitoring, e.g., groundwater treatment system, air stripper, monitoring NPDES discharge monitoring for TCE treated groundwater.

OU2 addresses the unsaturated soils outside of the building footprint area. The OU2 RI has been completed. A Draft FS for OU2 was submitted to the USEPA and MPCA for review (RMT, 1995). It was agreed that OU2 would be combined with OU3. The OU2 FS was considered final by the U.S. EPA, but was never approved.

The final operable unit, OU3, has been defined to address sources in the unsaturated and saturated zones at NIROP Fridley.

In August 1995, efforts began to address OU3. Due to the size of the NIROP main building and limited understanding of past operations that could have released TCE into the environment, a site evaluation was conducted for OU3, and the Site Evaluation Report (Brown & Root Environmental, September 1995) presented the findings. The site evaluation consisted of a site visit, records search, and a personnel interview survey at the NIROP main building. The primary objective of the site evaluation was to identify sites that could have been sources of potential TCE releases to the soil beneath the main building. The Site Evaluation Report (Brown & Root Environmental, September 1995) described and located 59 areas that were considered potential sources of TCE contamination within specific industrial operations. In addition, the sanitary and storm sewer systems were considered potential source areas for contamination. Nine additional potential areas of concern (AOCs 60-68), which were identified during the site evaluation but not included in the Site Evaluation Report because they were not suspected sources of TCE contamination, were added later. In addition, the locations of several previously identified AOCs were modified. An updated list of AOCs, updated AOC locations, and a description of each newly identified AOC were issued (Brown & Root Environmental, February 1996). The list of AOCs was further modified (Brown & Root Environmental, January 1997) to include seven additional AOCs (AOCs 69-75).

TABLE 1-1

CHRONOLOGICAL SUMMARY OF EVENTS
NIROP FRIDLEY, MINNESOTA

Date	Event
1940 - 1941	Naval ordnance manufacturing facility was constructed.
1947	U.S. Navy purchased what is now the Federally-owned portion of NIROP.
1942 - 1964	Northern Ordnance, Inc., a subsidiary of Northern Pump Company, operated the naval ordnance manufacturing complex.
1964	FMC Corporation purchased the southern portion of the manufacturing facility property from Northern Pump Company.
Early 1970s	Limited disposal at NIROP of paint sludge and chlorinated solvents in pits and trenches was performed.
1980	
September	U.S. Navy implemented the NACIP program to identify and control environmental contamination from past use and disposal practices.
1981	
March	Anonymous phone call to the MPCA regarding disposal practices at the FMC-operated facility.
March 16 - April 23	Three production wells at the site were sampled by the MPCA. Analysis results showed 0.035 to 0.200 milligrams per liter (mg/L) of TCE detected (RMT, July 1988).
April 24	Wells FMC-1 and NIROP -2 and -3 were discontinued for drinking water usage. Well FMC-1 was intermittently used for process cooling water until June 1983.
December 31	TCE was detected at 0.0012 mg/L at the Minneapolis water supply intake. Earlier in 1981, TCE was detected at unquantifiable levels during four sample rounds.
	Storm sewer outfalls were sampled for several constituents. Quantifiable levels of volatiles were detected in the sanitary sewer and at National Pollutant Discharge Elimination System (NPDES) outfall 20200.
	The site was divided into the North Study area (government-owned property) and South Study Area (FMC-owned property) for additional investigations by Hickok and Associates (Hickok, 1981).
1982	
March 31	Investigation of the North Study area began.
1983	
May	U.S. Navy authorized the Installation Restoration (IR) Program.
June	Initial Assessment Study (IAS) for the NIROP site was completed by Envirodyne Engineers (June 1983).
	As a result of the IAS, the U.S. Army Corps of Engineers (USACE) was assigned to manage site remediation. The Corps installed 33 monitoring wells on and around the site over the next 3 years.

TABLE 1-1

CHRONOLOGICAL SUMMARY OF EVENTS
NIROP FRIDLEY, MINNESOTA

Date	Event
1983 - 1984	
November - March	Approximately 1,200 cubic yards of soil considered hazardous and 43 drums were excavated from the North 40 area and disposed of at an offsite Resource Conservation and Recovery Act (RCRA)-permitted facility. Samples were analyzed from the soils at the base of each excavation. Trenches 3, 6, and 7 showed greater than 1 mg/L total volatiles.
May 22, 1984	The MPCA issued a Request for Response Action at the site to the U.S. Navy and FMC Corporation.
1983 - 1986	Eight rounds of groundwater sampling were completed. The last round was conducted in November 1986 by RMT, Inc. (RMT).
1986	
June	RMT, Inc. was retained by the USACE to complete the Remedial Investigation/Feasibility Study for OU1 (groundwater).
	FMC established an agreement with the MPCA to pump contaminated groundwater until total volatile levels in certain wells were less than 0.270 mg/L. Pumped water was discharged to the Pig's Eye Wastewater Treatment Plant.
1987	
March	All use of trichloroethene at NIROP was discontinued. 1,1,1-trichloroethane was put into use in place of trichloroethene.
June	Remedial Investigation Report (RMT, June 1987) issued for OU1.
September	During excavation of an onsite utility trench, a strong odor was detected in the trench by construction workers. Soil exposed during the excavation was later monitored by MPCA using an HNu photoionization detector (PID). The trench is along the northern property line of NIROP.
	An anonymous phone call to FMC directed the MPCA's attention to a potential hazardous waste site in the vicinity of the Dealers Manufacturing facility located approximately 1,000 feet to the east of NIROP.
November	Results of soil pore gas survey included in the A-E Quality Control Summary Report for the Soil Gas Survey (RMT, February 1988).
1988	
July	Feasibility Study Report (RMT, July 1988) issued for OU1.
1989	
February 8	The U.S. Navy established the Technical Review Committee (TRC) for the project and convened the first meeting.
July 14	NIROP listed as a proposed site on the NPL by the USEPA.
November 21	NIROP listed as a final site on NPL by USEPA.

TABLE 1-1

CHRONOLOGICAL SUMMARY OF EVENTS
NIROP FRIDLEY, MINNESOTA

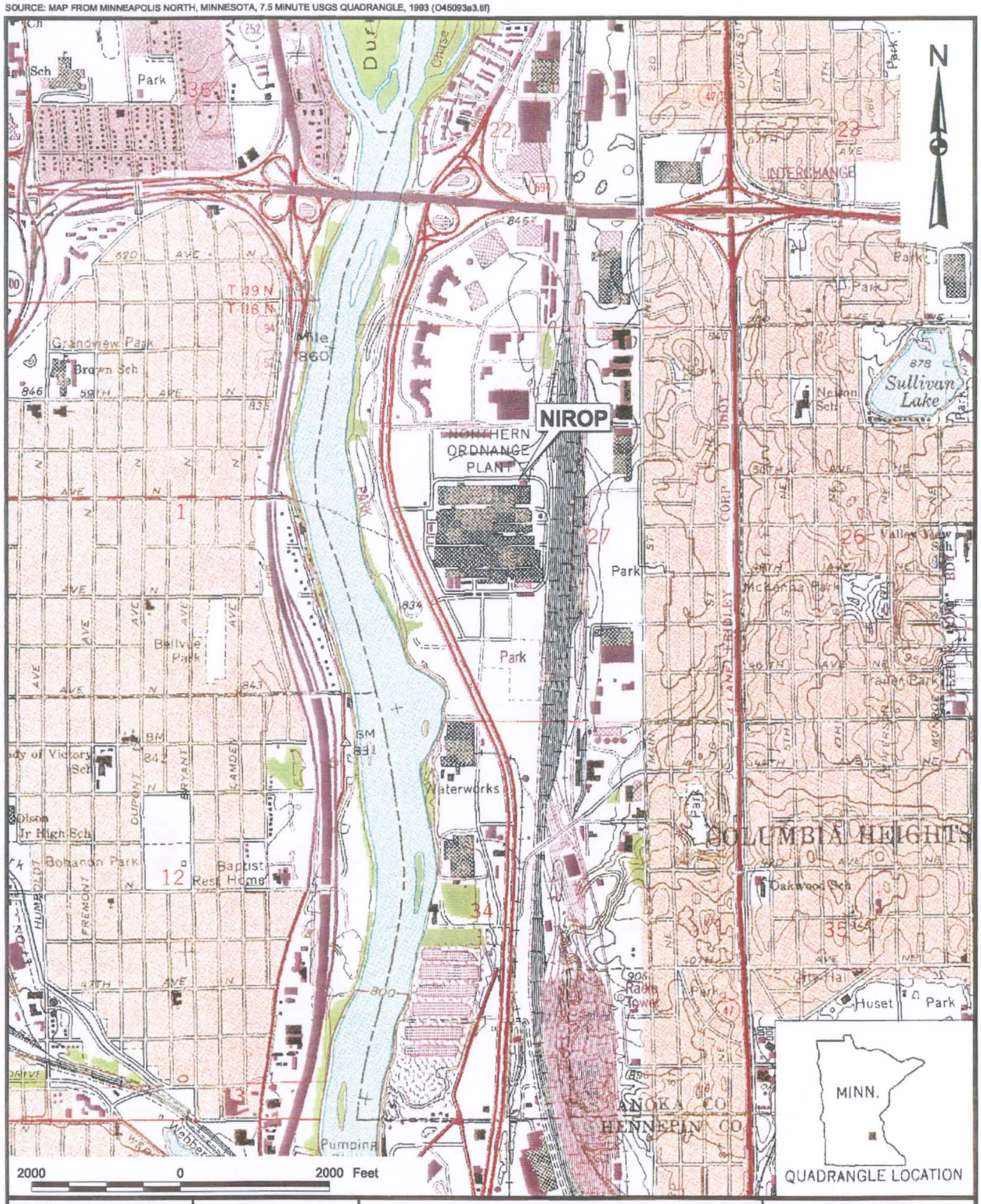
Date	Event
1990	
September	A Record of Decision (ROD) was signed for OU1. A groundwater pump-and-treat alternative was the alternative selected in the ROD.
October - November	Fifty-five soil borings were advanced to assess the extent of soil contamination in four specific areas (background area, North 40 area, Hazardous Waste Storage Area C, and the southeast area near Well 9-S). The North 40 area included 22 soil borings to investigate potential soil contamination due to past disposal practices, the locations of former Hazardous Waste Storage Area C included 28 soil borings to investigate potential soil contamination associated with the storage area, and the Southeast Area included four soil borings to attempt to delineate the source(s) of volatiles reported in groundwater monitoring wells in the area. The results reported the highest concentrations of volatiles, up to 62,000 micrograms per kilogram (µg/kg), from near the decontamination pad (RMT, February 1991)
1991	
March	Federal Facility Agreement (USEPA, March 1991) issued for NIROP Fridley
August	An initial aerial photographic review was conducted by RMT staff that included photographs spanning the period from 1945 to 1977.
	The installation of four groundwater recovery and containment wells, as well as additional groundwater monitoring wells, was completed in late 1991 for OU1.
December	A second review of the aerial photographs, including additional photographs, was performed jointly by representatives of the Navy, the USEPA, the MPCA, FMC, and RMT. As a result of the review and subsequent discussions, additional areas of investigation were included as part of the OU2 Remedial Investigation.
1992	
January	A Remedial Action Work Plan (RMT, January 1992) was issued for OU2. The RI of the soils operable unit addresses soil contamination in the unsaturated zone (i.e., above the water table) in areas of NIROP Fridley that are not covered by buildings or other surface structures. The scope of the soil RI was intended to investigate potential outdoor sources that may contribute to groundwater contamination.
August 20	Emergency Removal Operation (Bay West, August 1992) report issued which discussed the investigation of the area referred to as the North 40 area. A total of 31 drums were excavated, sampled, and overpacked, and the drums, along with approximately 900 cubic yards of soil and debris, were removed from the excavation. Excavated drums were disposed of via incineration at USEPA Superfund RCRA-licensed facility. Associated debris (screened material) was disposed of at a sanitary landfill or a RCRA-secure landfill according to analytical results.
September	The groundwater recovery system and monitoring for OU1 were started.
December	A 90-Day Determination Document (RMT, December 1992) was prepared which evaluated the effectiveness of the OU1 recovery system's operation over the first few months.
1993	
September	A Remedial Investigation Report (RMT, September 1993) was issued for OU2. Results indicated that volatile, semivolatile, pesticide, hydrocarbon, and metal contamination was present in the soils at several locations.

TABLE 1-1

CHRONOLOGICAL SUMMARY OF EVENTS
NIROP FRIDLEY, MINNESOTA

Date	Event
1994	
September	Results of East Plating Shop soil sampling were issued to the Southern Division of the Naval Facilities Engineering Command (NAVFACENGCOM) in a letter report (Bay West, September 1994). Two soil borings were completed, and several metals and cyanide were identified at concentrations greater than background levels determined during the OU2 RI.
1995	
March	A Work Plan (Halliburton NUS, March 1995) was issued for the East Plating Shop. Proposed field activities for the soil and groundwater investigation included the installation of six soil borings and three temporary monitoring wells.
April 16	First NIROP Fridley Restoration Advisory Board meeting was held.
May	Results of East Plating Shop soil and groundwater investigation were issued (Halliburton NUS, May 1995). The report identified soil and groundwater contamination under the East Plating Shop. TCE was the primary contaminant found. Other volatile organic compounds, including 1,1,1-trichloroethane (TCA), acetone, styrene, and metals such as chromium, lead, and cyanide, were detected at concentrations greater than background levels determined during the OU2 RI.
June	Thirty former areas of concern, located within the NIROP facility, were identified on a Solid Waste Management Unit (SWMU) map (UDLP, June 1995).
September	Results of a site evaluation conducted at the NIROP facility in August 1995 were presented in the Site Evaluation Report (Brown & Root Environmental, September 1995). Fifty-nine areas of concern, the sanitary sewer system, and the storm sewer system were identified as potential areas requiring further investigation.
1996	
February	Revisions to the Final Site Evaluation Report (Brown & Root Environmental, September 1995) identified nine additional potential areas of concern (AOCs 60-68) which were identified but not previously reported because they were not suspected sources of TCE contamination.

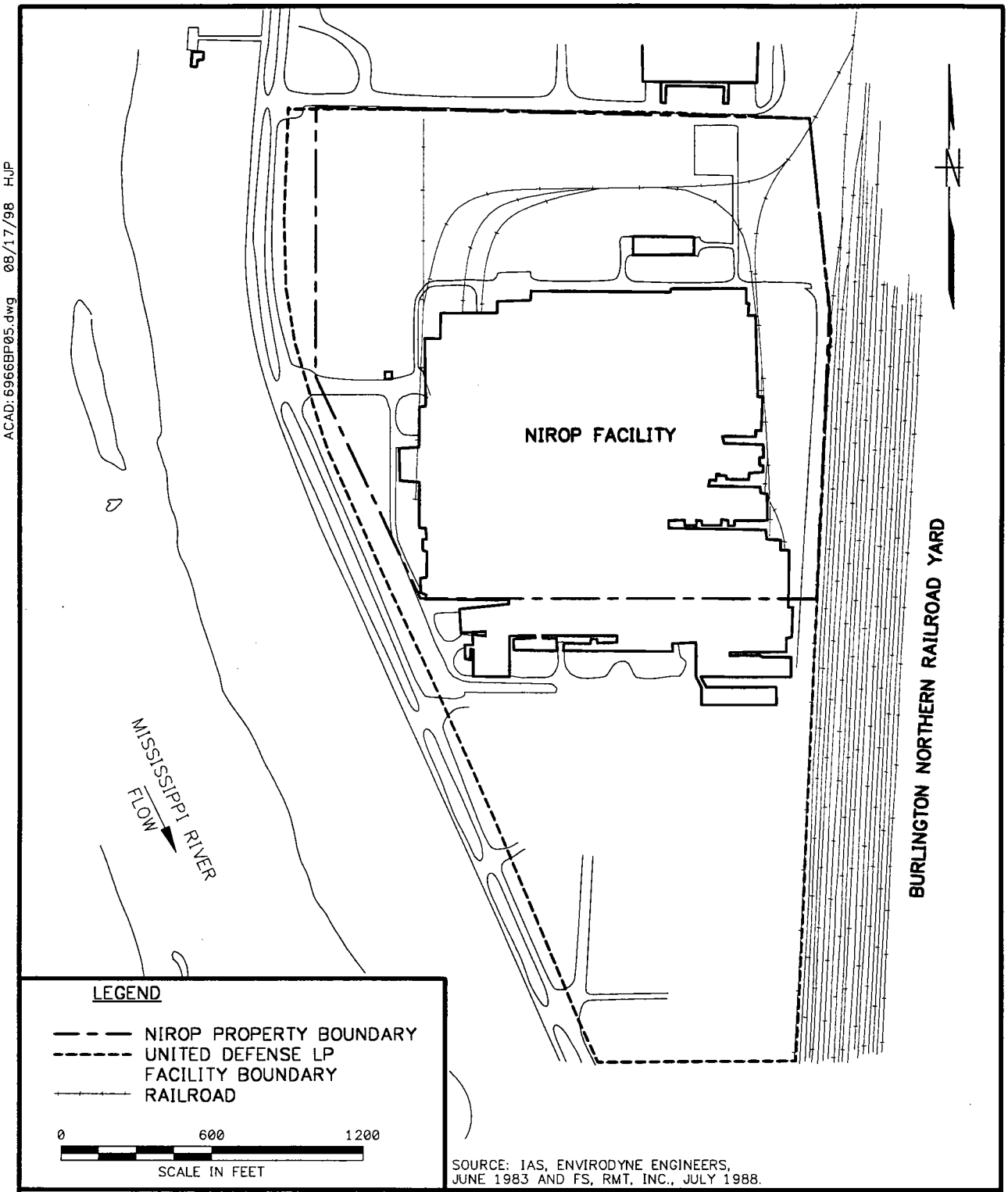
SOURCE: MAP FROM MINNEAPOLIS NORTH, MINNESOTA, 7.5 MINUTE USGS QUADRANGLE, 1993 (O45093a3.tif)



DRAWN BY D. PERRY	DATE 12-AUG-98	SITE LOCATION MAP NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA	CONTRACT NUMBER —
CHECKED BY	DATE		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY [signature] DATE 8/12/94
SCALE AS NOTED			DRAWING NO. FIGURE 1-1 REV 0

P:\GIS\FRIDLEY\6966_SITE_ASSESSMENT.APR 12-AUG-98 DNP LOCATION MAP LAYOUT

ACAD:6966BP05.dwg 08/17/98 HJP



SOURCE: IAS, ENVIRODYNE ENGINEERS, JUNE 1983 AND FS, RMT, INC., JULY 1988.

DRAWN BY HJP 8/17/98	Tetra Tech NUS, Inc.	CONTRACT NO. 6966	OWNER NO. ----
CHECKED BY DATE	PROPERTY BOUNDARIES NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT FRIDLEY, MINNESOTA	APPROVED BY	DATE
COST/SCHED-AREA		APPROVED BY	DATE 8/12/99
SCALE AS NOTED		DRAWING NO. FIGURE 1-2	REV. 0

FORM CADD NO. TtNUS_AV.DWG - REV 0 - 1/22/98

2.0 HUMAN HEALTH RISK ASSESSMENT

The baseline human health risk assessment (HHRA) summarized in this section was performed to evaluate OU2 sampling results using the benchmarks developed to evaluate the OU3 sampling results. This HHRA consists of four components: data selection; selection of chemicals of potential concern (COPCs), screening risk evaluation; and refined risk evaluation. The data selection presents the data that was used in the analysis. The selection of COPCs is a qualitative screening process limiting the number of chemicals that are quantitatively evaluated in the HHRA to those site-related constituents that dominate overall potential risks.

The screening risk evaluation is a qualitative process that uses all available site data to conservatively estimate the potential risk associated with the COPCs. Areas that pass the screening risk evaluation have risks that are within acceptable levels. Areas that fail the screening risk evaluation were further evaluated in the refined risk evaluation and may or may not require remedy evaluation. The need for remedy evaluation will be determined in future documents.

The same receptor groups that were evaluated in the HHRA for OU3 were evaluated in this HHRA. The HHRA for OU3 evaluated exposures to soil for three receptor groups: typical industrial workers, minor frequent construction workers, and major infrequent construction workers. MPCA standard default exposure assumptions were used for typical industrial workers and major infrequent construction workers. Site-specific exposure assumptions were used for minor frequent construction workers. Typical industrial workers and minor frequent construction workers were assumed to be exposed to soil to 0 to 4 feet below ground surface (bgs). Major infrequent construction workers were assumed to be exposed to surface and subsurface (0 to 12 feet bgs). Additional information on the risk assessment information methodology is provided in the OU3 RI Report (TtNUS, 2001).

2.1 DATA SELECTION

Data used in this HHRA was obtained from the following reports.

> Remedial Investigation Report for the Soils Operable Unit at the Naval Industrial Reserve Ordnance Plant, Fridley, Minnesota, September 1993, RMT, Inc.
>
> Completion Report for Removal Action at North 40, Naval Industrial Reserve Ordnance Plant, Fridley, Minnesota, Revision 1, December 1996, Morrison Knudsen Corporation.

Final Site Closeout Report Former Storage Area C, Naval Industrial Reserve Ordnance Plant, Fridley, Minnesota, August 1997, Wenck

All data in the above reports were used in the HHRA with the exception of samples AB035A (1 - 3 feet) and AB035C (6 - 8 feet) which were collected during the OU2 RI field investigation. A buried drum was encountered during the installation of boring AB035, which resulted in a removal action near the permanent decontamination pad. After the drum was removed the soil was returned to the excavation and new soil borings were installed. Although soil was returned to the excavation after the drum removal, sample location AB035 no longer exists. Therefore the sampling results for boring AB035 are no longer representative of soil conditions at this location and the samples associated with boring AB035 were not used in the HHRA.

In the OU3 HHRA, surface soil was defined as 0 to 4 feet bgs. Soil samples were collected in the 3 to 5 feet bgs interval during the OU2 RI, consequently, surface soil is defined as 0 to 5 feet bgs in this HHRA. Subsurface soil is defined as 5 to 20 feet bgs in this HHRA.

OU2 was divided in to 10 sub areas for evaluation in the HHRA: A1, A2, A3, A4, B1, B2, D, E, and F. An additional sub area designated as "Other" includes all samples that are not located in any of the listed sub areas. The sub areas and soil sampling locations are shown on Figure 2-1. A copy of the sampling data associated with each sub area is included in Appendix A.

Former Storage Area C is located in sub area D. The soil samples collected during the close out of Former Storage C were added to the existing database for sub area D.

2.2 SELECTION OF COPCS

The selection of COPCs is a semi-qualitative process which identifies chemicals which may be of concern and therefore warrant evaluation in a HHRA. COPCs were selected for each sub area by comparing the maximum detected concentration in surface and subsurface soil to MPCA Tier I soil reference values (SRVs) for residential exposures. The SRVs are derived for most chemicals using a target incremental cancer risk (ICR) level of 1×10^{-6} and a target hazard quotient (HQ) of 0.2. Chemicals were retained as COPCs if the maximum detected concentrations exceeded 10 percent of the SRV (which corresponds to an ICR of 10^{-7} for carcinogens and HQ of 0.02 for noncarcinogens for most chemicals). Using 10 percent of the SRV accounts for the potential additive effects from different chemicals. All surface and subsurface soil samples were used to select COPCs. Table 2-1 lists the chemicals that were retained as COPCs for

evaluation in the screening analysis. COPC selection tables for the individual sub areas are presented in Tables 2-2 through 2-11.

2.3 SCREENING RISK EVALUATION

The first step in the HHRA consisted of conducting a screening risk evaluation. The objective of the screening assessment is to identify COCs and areas of concern which warrant a more in depth evaluation. In the HHRA for OU3, typical industrial workers and minor frequent construction workers were assumed only to be exposed to surface soil. Since it is not known if deeper soils will be excavated and brought to the surface at a later date, subsurface soil data was also evaluated in the screening analysis. Residential receptors were also included in the screening risk evaluation for the same reason. Major infrequent construction workers were not evaluated in the screening risk evaluation since this receptor is assumed to be exposed to both surface and subsurface soil. Major infrequent construction workers were evaluated in the refined risk evaluation. The screening risk evaluation was conducted utilizing spreadsheets that were provided by MPCA that compared the maximum detected concentration in surface and subsurface soil at each sub area to Tier I SRVs for residential receptors and Tier II SRVs for industrial receptors. If the screening risk evaluation indicated that hazard quotients (HQs) and/or incremental cancer risks (ICRs) were below MPCA acceptable risk levels (HQ < 0.2, ICR < 10^{-5}) for a receptor (typical industrial workers, minor frequent construction worker, and residents) in a sub area, then no further analysis was required for that receptor (typical industrial workers, minor frequent construction worker, and residents). If the screening risk evaluation indicates that HQs and ICRs exceeded MPCA acceptable risk levels for a receptor in a sub area then that receptor and sub area was evaluated further. Results and copies of the spreadsheets used in the screening risk evaluation are presented in Appendix B.

The results of the screening risk evaluation for residential receptors indicated that HQs and/or ICRs exceeded MPCA acceptable risk levels in all sub areas with the exception of the "Other" sub area. Since the future site use is expected to be limited to industrial, residential receptors were not retained for further evaluation.

HQs and ICRs for typical industrial workers were within MPCA acceptable risk levels for all sub areas with the exception of sub areas A3 and A4. HQs and ICRs for minor frequent construction workers were within MPCA acceptable risk levels for all sub areas with the exception of sub areas A3, A4, and E. Therefore, typical industrial workers at sub areas A3 and A4 and minor frequent construction workers at sub areas A3, A4, and E were retained for further evaluation.

2.4 REFINED RISK EVALUATION

The screening risk evaluation conservatively estimated ICRs and HQs for typical industrial workers and minor frequent construction workers using the maximum detected concentrations in surface soil and subsurface soil at all sub areas. The results of the screening risk evaluation indicated that HQs and ICRs exceeded acceptable levels at sub areas A3 and A4 for typical industrial workers and sub areas A3, A4, and E for minor frequent construction workers. Sub areas identified in the screening risk evaluation as having risks for the typical industrial workers and minor frequent construction workers exceeding MPCA acceptable risk levels were further evaluated in the refined risk evaluation using the 95 percent UCL in surface soil (0 to 5 feet bgs) as the exposure point concentration. Exposures to surface and subsurface soil at all sub areas by major infrequent construction workers were also evaluated in the refined risk evaluation.

Data summary tables for surface soil samples sub areas A3, A4, and E are presented in Tables 2-12 through 2-14. A summary of the exposure point concentrations for typical industrial workers and minor frequent construction workers are presented in Table 2-15. Exposure point concentrations for major infrequent construction workers were based on the maximum detected concentration in surface and subsurface soil and are presented in Table 2-16. Detailed exposure point concentration tables are presented in Appendix C. Copies of the spreadsheets used in the analysis are included in Appendix D.

Typical Industrial Workers

Table 2-17 presents the results of the refined risk evaluation and Table 2-18 lists the chemicals which were major contributors to the risk for exposures to soil at sub areas A3 and A4 by typical industrial workers. HQs for the typical industrial worker exposed to surface soil were less than the MPCA acceptable level of 0.2 and EPA acceptable level of 1 at sub areas A3 and A4. The ICR for typical industrial workers exposed to surface soil at sub area A3 was 6×10^{-6} which is below the MPCA target level of 1×10^{-5} and within EPA's target risk range of 10^{-4} to 10^{-6}. The ICR for typical industrial workers exposed to surface soil at sub area A4 was 2×10^{-5}, which slightly exceeds the MPCA target level but is within EPA's target risk range. Carcinogenic PAHs (ICR = 1×10^{-5}) were the major contributors to the cancer risk in surface soil at sub area A4. The maximum detected concentration of carcinogenic PAHs occurred in sample AB032A. If this sample is removed from sub area A4 then the ICR is 1×10^{-5}, which is equal to the MPCA target level.

Since it is not known if deeper soils will be excavated at a later date, potential exposures to subsurface soils were evaluated using the maximum detected concentrations in subsurface soil (greater than 5 feet

bgs). Copies of the spreadsheets used in the analysis are included in Appendix D. HQs and ICRs for the typical industrial worker exposed to subsurface soil at sub area A3 exceeded MPCA and EPA acceptable levels. Tetrachloroethane, 1,1,1-trichloroethane, trichloroethene, and total xylenes at boring AT009D1 (8 to 10 feet bgs) and iron and manganese at boring AT007C (6 to 8 feet bgs) were the major contributors to the risk for subsurface soil at sub area A3. HQs and ICRs for typical industrial workers exposed to subsurface soil at sub area A4 were within MPCA and EPA acceptable levels.

Minor Frequent Construction Workers

Table 2-17 presents the results of the refined risk evaluation and Table 2-19 lists the chemicals which were major contributors to the risk for exposures to soil at sub areas A3, A4, and E by minor frequent construction workers. HQs for minor frequent construction workers exposed to surface soil were less than the acceptable level of 0.2 and EPA acceptable level of 1 at sub areas A3, A4, and E. The ICR for minor frequent construction workers exposed to surface soil at sub area A3 was 8×10^{-6}, which is below the MPCA target level of 1×10^{-5} and within EPA's target risk range of 10^{-4} to 10^{-6}. The ICR for minor frequent construction workers at sub area A4 was 2×10^{-5}, which slightly exceeds the MPCA target level, but was within EPA's target risk range. Carcinogenic PAHs (ICR = 1×10^{-5}) were the major contributors to the cancer risk at sub area A4. The maximum detected concentration of carcinogenic PAHs occurred in sample AB032A (1 to 3 feet bgs). If this sample is removed from sub area A4 then the ICR is 1×10^{-5}, which is equal to the MPCA target level. The ICR for minor frequent construction workers at sub area E was 2×10^{-5}, which slightly exceeds the MPCA target level, but is within EPA's target risk range. Carcinogenic PAHs (ICR = 1×10^{-5}) were the major contributors to the cancer risk at sub area E. There were an insufficient number of samples to calculate an UCL for sub area E; therefore, the maximum detected concentration was used as the exposure point concentration. The maximum detected concentration of PAHs occurred in sample EB004A (1 to 3 feet bgs). If this sample is removed from sub area E then the ICR is 8×10^{-6}, which is less than the MPCA target level.

Since it is not known if deeper soils will be excavated at a later date, potential exposures to subsurface soils were evaluated using the maximum detected concentrations in subsurface soil (greater than 5 feet bgs). Copies of the spreadsheets used in the analysis are included in Appendix D. HQs for the minor frequent construction worker exposed to subsurface soil at sub area A3 exceeded MPCA and EPA acceptable levels. The ICR for minor frequent construction workers exposed to subsurface soil at sub area A3 exceeded MPCA acceptable risk levels but was within EPA's target risk range. Tetrachloroethane and 1,1,1-trichloroethane at boring AT009D1 (8 to 10 feet bgs), carcinogenic PAHs at boring AB043D (8 to 10 feet bgs), and iron and manganese at boring AT007C (6 to 8 feet bgs) were the major contributors to the risk for subsurface soil at sub area A3. HQs and ICRs for minor frequent

construction workers exposed to subsurface soil at sub area A4 and E were within MPCA and EPA acceptable levels.

Major Infrequent Construction Workers

Table 2-20 presents the results of the refined risk evaluation for major infrequent construction workers. HQs for major infrequent construction workers exposed to surface and subsurface soil were less than the acceptable level of 1 at all sub areas with the exception of sub area A3. ICRs for major infrequent construction workers exposed to surface and subsurface soil were less than or equal to the MPCA acceptable level of 1×10^{-6} for subchronic exposures at all sub areas with the exception of sub areas A3 (ICR = 2×10^{-5}) and A4 (ICR = 2×10^{-5}). ICRs for major frequent construction workers were within EPA's target risk range of 10^{-4} to 10^{-6} at all sub areas.

Table 2-21 lists the chemicals that were major contributors to the HQs and ICRs for major infrequent construction workers. At sub area A3, antimony, iron, manganese, 1,1,1-trichloroethane, 1,1-dichloroethane, 2-butanone, tetrachloroethene, toluene, trichloroethene, and xylenes were identified as the major contributors to the estimated potential risk. The exceedances for 1,1,1-trichloroethene 1,1-dichloroethene, 2-butanone, tetrachloroethene, and toluene occurred at boring AT009D1 (8 to 10 feet bgs). The exceedances for trichloroethene occurred at borings AT009D1 (8 to 10 feet bgs) and AB043D (8 to 10 feet bgs). The exceedance for antimony occurred at boring AT008D-D (8 to 10 feet bgs). The exceedances for iron occurred at borings AT008D-D (8 to 10 feet bgs) and AT007C (6 to 8 feet bgs). Sample AT008D-D is a duplicate to sample AT008D. The risks associated with concentrations of antimony and iron in sample AT008D were within acceptable levels.

At sub area A4, the ICRs for carcinogenic PAHs and trichloroethene exceeded 1×10^{-6}. The exceedances for carcinogenic PAHs occurred at borings AB030A, AB032A, and AT001A, which were all collected at a depth of 1 to 3 feet bgs. The exceedances for trichloroethene occurred at borings SA3-SCS-40-D and AT004B, which were collected at a depth of 3 to 5 feet bgs. The maximum detected concentration of trichloroethene occurred in sample SA3-SCS-40-D, which is a duplicate to sample SA3-SCS-40. The risks associated with concentrations of trichloroethene in sample SA3-SCS-40 were within acceptable levels.

TABLE 2-1

CHEMICALS WITH MAXIMUM DETECTED CONCENTRATION GREATER THAN 10 PERCENT OF TIER I SOIL REFERENCE VALUE (SRV) NIROP FRIDLEY, MINNESOTA

Chemicals	Residential SRV	Maximum Concentration (mg/kg)									
		Sub Area A1	Sub Area A2	Sub Area A3	Sub Area A4	Sub Area B1	Sub Area B2	Sub Area D	Sub Area E	Sub Area F	Other (1)
Volatile Organics Summary (mg/kg)											
1,1,1-Trichloroethane	140	--	--	2600	--	--	--	--	--	--	--
1,1-Dichloroethane	34	--	--	34	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	8	--	--	1.8	14	--	--	--	--	--	--
2-Butanone	1400	--	--	3500	--	--	--	--	--	--	--
Ethylbenzene	200	--	--	140	--	--	--	--	--	--	--
Tetrachloroethene	72	--	--	1200	--	--	--	--	--	--	--
Toluene	107	--	--	190	--	--	--	--	--	--	--
Trichloroethene	29	--	4.1	120	96	--	--	--	--	--	--
Xylenes, Total	110	--	--	580	28	--	--	--	--	--	--
Semivolatile Organics Summary (mg/kg)											
BaP Equivalent	2	--	0.341	3.17	60.7	0.759	0.40	1.59	4.15	0.491	0.236
Fluoranthene	1080	--	--	--	160	--	--	--	--	--	--
Naphthalene	10	--	--	2.7	1.1	--	--	--	--	--	--
Pyrene	890	--	--	--	130	--	--	--	--	--	--
Inorganics (mg/kg)											
Aluminum	26000	4190	5270	6370	6830	4580	3960	5420	4620	5920	--
Antimony	14	--	--	105	2.3	2.3	--	--	--	--	--
Arsenic	10	3.4	8.3	6.6	11.4	9.4	3	6	3.5	4.8	--
Barium	1200	--	227	327	306	197	--	129	--	173	261
Cadmium	35	--	--	5.3	--	--	--	4.3	--	--	--
Chromium	71	13.6	11.3	114	22.6	12.8	7.8	43.2	28.3	18.2	--
Copper	100	10.3	158	1290	1900	43.1	11.5	937	176	26.2	--
Iron	7000	24300	18000	275000	38100	12300	9910	30100	14500	16200	--
Lead	400	--	143	453	274	--	--	373	292	--	--
Manganese	1400	927	2230	20700	5950	1560	747	1960	387	1610	--
Mercury	0.7	--	--	0.19	0.12	--	--	--	--	--	--
Nickel	520	--	--	142	--	--	--	--	--	--	--
Vanadium	210	--	--	32.9	26.1	24.6	--	21.4	23.4	--	--

Notes:
1 - "Other" includes samples not located within any of the sub areas.
-- Chemical was not a COPC for this sub area.

TABLE 2-2

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A1
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,2-Dichloroethene (total)	1/6	2	10 - 12	AB040A	2	8000	0.0003	No
Acetone	4/6	600 - 2700	4 - 11	AB041A	2700	320000	0.008	No
Ethylbenzene	1/6	3	10 - 12	AB040A	3	200000	0.00002	No
Xylenes, Total	1/6	5	10 - 12	AB040A	5	110000	0.00005	No
Semivolatile Organics (ug/kg)								
Benzo(g,h,i)perylene	1/4	350	340 - 390	AB041C	350	NA	NA	NA
Inorganics (mg/kg)								
Aluminum	4/4	1410 - 4190	NA	AB041A	4190	**26000**	**0.2**	**Yes**
Arsenic	3/4	1.4 - 3.4	0.64 - 0.98	AB042A	3.4	**10**	**0.3**	**Yes**
Barium	3/4	21.9 - 113	10.3 - 10.4	AB041A	113	1200	0.09	No
Calcium	4/4	12600 - 37300	NA	AB042G	37300	NA	NA	NA
Chromium	4/4	4.7 - 13.6	NA	AB041C	13.6	**71**	**0.2**	**Yes**
Copper	2/4	6.7 - 10.3	4.3 - 5.1	AB042A	10.3	**100**	**0.1**	**Yes**
Iron	4/4	5110 - 24300	NA	AB042A	24300	**7000**	**3.5**	**Yes**
Lead	4/4	1.5 - 5.6	NA	AB041A	5.6	400	0.01	No
Magnesium	4/4	1600 - 10500	NA	AB042G	10500	NA	NA	NA
Manganese	4/4	162 - 927	NA	AB041A	927	**1400**	**0.7**	**Yes**
Nickel	2/4	12.1 - 14.7	8.6 - 9.5	AB042G-D	14.7	520	0.03	No
Potassium	1/4	208	104 - 327	AB041A	208	NA	NA	NA
Sodium	1/4	141	103 - 165	AB041A	141	NA	NA	NA
Vanadium	3/4	12.7 - 14	10.3 - 10.4	AB042A	14	210	0.07	No
Zinc	4/4	8 - 26	NA	AB042A	26	8700	0.003	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
SRV = Soil Reference Value.
NA = No SRV available.

Associated samples:

AB040A	AB042A
AB040D	AB042G
AB041A	AB042G-AVG
AB041C	AB042G-D

TABLE 2-3

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A2
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,2-Dichloroethene (total)	1/14	2	10 - 1500	AB202B	2	8000	0.0003	No
Acetone	2/14	170 - 410	6 - 1500	AB222C	410	320000	0.001	No
Tetrachloroethene	6/14	0.7 - 35	10 - 1500	AB222A-D	35	72000	0.0005	No
Trichloroethene	9/14	0.9 - 4100	10 - 11	AB025B	4100	**29000**	**0.1**	**Yes**
Semivolatile Organics (ug/kg)								
BaP Equivalents	1/4	340.52	350 - 400	AB024A	340.52	**2000**	**0.2**	**Yes**
Benzo(a)anthracene	1/4	140	350 - 400	AB024A	140	NA	NA	NA
Benzo(a)pyrene	1/4	120	350 - 400	AB024A	120	NA	NA	NA
Benzo(b)fluoranthene	1/4	130	350 - 400	AB024A	130	NA	NA	NA
Benzo(k)fluoranthene	1/4	87	350 - 400	AB024A	87	NA	NA	NA
Chrysene	1/4	150	350 - 400	AB024A	150	NA	NA	NA
Fluoranthene	1/4	290	350 - 400	AB024A	290	1080000	0.0003	No
Phenanthrene	1/4	180	350 - 400	AB024A	180	NA	NA	NA
Pyrene	1/4	290	350 - 400	AB024A	290	890000	0.0003	No
Total cPAHs	1/4	627	350 - 400	AB024A	627	NA	NA	NA
Total PAHs	1/4	1387	350 - 400	AB024A	1387	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	2/4	4.4 - 4.8	3.5 - 3.6	AB025A	4.8	56000	0.0001	No
4,4'-DDE	2/4	5.3 - 9.6	3.5 - 3.6	AB025A	9.6	40000	0.0002	No
4,4'-DDT	3/4	4.5 - 28	3.5	AB025A	28	15000	0.0019	No
Inorganics (mg/kg)								
Aluminum	4/4	1470 - 5270	NA	AB024A	5270	**26000**	**0.2**	**Yes**
Arsenic	4/4	1.4 - 8.3	NA	AB025B	8.3	**10**	**0.8**	**Yes**
Barium	3/4	43.6 - 227	10.4	AB025B	227	**1200**	**0.2**	**Yes**
Calcium	4/4	8180 - 67400	NA	AB025B	67400	NA	NA	NA
Chromium	4/4	4.2 - 11.3	NA	AB024A	11.3	**71**	**0.2**	**Yes**
Copper	3/4	11.1 - 158	4.5	AB024A	158	**100**	**1.6**	**Yes**
Iron	4/4	4160 - 18000	NA	AB025B	18000	**7000**	**2.6**	**Yes**
Lead	4/4	1.8 - 143	NA	AB024A	143	**400**	**0.4**	**Yes**

TABLE 2-3

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A2
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Magnesium	4/4	2400 - 7830	NA	AB024G	7830	NA	NA	NA
Manganese	4/4	230 - 2230	NA	AB025B	2230	**1400**	**1.6**	**Yes**
Nickel	4/4	10.7 - 24.2	NA	AB024G	24.2	520	0.05	No
Vanadium	4/4	10.9 - 19.7	NA	AB025B	19.7	210	0.09	No
Zinc	4/4	12 - 141	NA	AB024A	141	8700	0.02	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

AB024A	AB201A	AB222A	AB223A
AB024G	AB201H	AB222A-AVG	AB223C
AB025A	AB202A	AB222A-D	AB230A
AB025B	AB202B	AB222C	AB230B

TABLE 2-4

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A3
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,1,1-Trichloroethane	36/91	0.4 - 2600000	10 - 71	AT009D1	2600000	**140000**	**19**	**Yes**
1,1,2-Trichloroethane	1/81	3	10 - 67000	AB214C	3	9000	0.0003	No
1,1-Dichloroethane	18/91	0.5 - 34000	10 - 1300	AT009D1	34000	**34000**	**1.0**	**Yes**
1,2-Dichloroethane	1/81	4	10 - 67000	AB043D	4	4000	0.001	No
1,2-Dichloroethene (total)	49/91	1 - 1800	10 - 67000	AB043D	1800	**8000**	**0.2**	**Yes**
2-Butanone	1/81	3500000	3 - 1300	AT009D1	3500000	**1400000**	**2.5**	**Yes**
2-Hexanone	1/81	2	10 - 67000	AT008D	2	NA	NA	NA
4-Methyl-2-pentanone	1/81	1	10 - 67000	AT008D	1	NA	NA	NA
Acetone	1/81	210 - 12000	2 - 67000	AB043H	12000	320000	0.04	No
Benzene	2/81	1 - 14	10 - 67000	AT007C	14	1500	0.009	No
Ethylbenzene	3/91	25 - 140000	10 - 1300	AT009D1	140000	**200000**	**0.7**	**Yes**
Tetrachloroethene	31/91	0.8 - 1200000	10 - 56	AT009D1	1200000	**72000**	**17**	**Yes**
Toluene	4/91	27 - 190000	1 - 1300	AT009D1	190000	**107000**	**1.8**	**Yes**
Trichloroethene	78/91	0.6 - 120000	10 - 13	AT009D1	120000	**29000**	**4.1**	**Yes**
Xylenes, Total	6/81	17 - 580000	4 - 110	AT009D1	580000	**110000**	**5.3**	**Yes**
Semivolatile Organics (ug/kg)								
Acenaphthene	2/31	120 - 160	340 - 13000	AB037A	160	1200000	0.0001	No
Anthracene	3/21	330 - 660	340 - 13000	AB043D	660	7880000	0.00008	No
BaP Equivalents	5/31	216.897 - 3166.1	340 - 13000	AB043D	3166.1	**2000**	**1.6**	**Yes**
Benzo(a)anthracene	4/31	39 - 2100	340 - 13000	AB043D	2100	NA	NA	NA
Benzo(a)pyrene	4/31	36 - 1700	340 - 13000	AB043D	1700	NA	NA	NA
Benzo(b)fluoranthene	5/31	24 - 1800	340 - 13000	AB043D	1800	NA	NA	NA
Benzo(g,h,i)perylene	3/21	340 - 1100	340 - 13000	AB043D	1100	NA	NA	NA
Benzo(k)fluoranthene	4/31	45 - 1400	340 - 13000	AB043D	1400	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	3/21	1300 - 20000	340 - 13000	AT009D1	20000	570000	0.04	No
Carbazole	1/31	240	340 - 13000	AB037A	240	700000	0.0003	No
Chrysene	4/31	47 - 2100	340 - 13000	AB043D	2100	NA	NA	NA
Dibenzofuran	1/21	110	340 - 13000	AB036A	110	58000	0.002	No
Fluoranthene	6/21	110 - 4400	340 - 13000	AB043D	4400	1080000	0.004	No

TABLE 2-4

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A3
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Fluorene	2/21	170 - 240	340 - 13000	AB036A	240	850000	0.0003	No
Indeno(1,2,3-cd)pyrene	4/31	18 - 1100	340 - 13000	AB043D	1100	NA	NA	NA
Naphthalene	1/21	2700	340 - 13000	AT009D1	2700	**10000**	**0.3**	**Yes**
Phenanthrene	5/21	180 - 2700	340 - 13000	AB043D	2700	NA	NA	NA
Phenol	3/31	1000 - 1300	340 - 13000	AB036A	1300	1100000	0.001	No
Pyrene	7/31	27 - 5100	340 - 13000	AB043D	5100	890000	0.006	No
Total cPAHs	5/31	24 - 10200	340 - 13000	AB043D	10200	NA	NA	NA
Total PAHs	9/31	29 - 24160	340 - 13000	AB043D	24160	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	7/21	21 - 220	3.4 - 89	AB037A	220	56000	0.004	No
4,4'-DDD	7/21	21 - 220	3.4 - 89	AT009B1-D	220	56000	0.004	No
4,4'-DDE	9/21	8.5 - 450	3.4 - 89	AB037A	450	40000	0.01	No
4,4'-DDT	8/21	6.3 - 430	3.4 - 89	AT009B1-D	430	15000	0.03	No
Aldrin	1/21	3.1	1.8 - 46	AB036A	3.1	1000	0.003	No
Dieldrin	2/21	4 - 43	3.4 - 89	AT009D1	43	800	0.05	No
Endosulfan II	2/21	37 - 54	3.4 - 89	AT009B1-D	54	NA	NA	NA
Gamma-Chlordane	1/21	3.4	1.8 - 46	AB036A	3.4	NA	NA	NA
Heptachlor Epoxide	1/21	2.6	1.8 - 46	AB036A	2.6	400	0.007	No
delta-BHC	1/21	2.6	1.8 - 46	AT009D2	2.6	NA	NA	NA
Inorganics (mg/kg)								
Aluminum	21/21	1010 - 6370	NA	AT007C	6370	**26000**	**0.2**	**Yes**
Antimony	1/31	22.5 - 105	0.3 - 3.9	AT008D-D	105	**14**	**7.5**	**Yes**
Arsenic	20/21	0.91 - 6.6	0.61	AT007C	6.6	**10**	**0.7**	**Yes**
Barium	21/31	3.9 - 327	10.2 - 10.9	AT007C	327	**1200**	**0.3**	**Yes**
Cadmium	10/31	0.04 - 5.3	0.04 - 2	AB043D	5.3	**35**	**0.2**	**Yes**
Calcium	21/21	3710 - 61800	NA	AT007C	61800	NA	NA	NA
Chromium	31/31	2.3 - 114	NA	AT008D-D	114	**71**	**1.6**	**Yes**
Cobalt	2/21	12.3 - 34.5	10.2 - 12.2	AT007C	34.5	2000	0.02	No
Copper	23/31	2 - 1290	4.1 - 4.4	AT008D-D	1290	**100**	**13**	**Yes**
Cyanide	2/31	5.3 - 5.4	0.1 - 3.1	AT007C	5.4	62	0.09	No

TABLE 2-4

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A3
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Iron	21/21	2990 - 275000	NA	AT007C	275000	**7000**	**39**	**Yes**
Lead	31/31	0.99 - 453	NA	AT008D	453	**400**	**1.1**	**Yes**
Magnesium	21/21	1730 - 20600	NA	AB043D	20600	NA	NA	NA
Manganese	21/21	155 - 20700	NA	AT007C	20700	**1400**	**15**	**Yes**
Mercury	2/31	0.04 - 0.19	0.03 - 0.2	AT009B1-D	0.19	**0.7**	**0.3**	**Yes**
Nickel	24/31	5.1 - 142	8.2 - 8.4	AT008D-D	142	**520**	**0.3**	**Yes**
Potassium	8/21	113 - 497	102 - 1000	AT007C	497	NA	NA	NA
Selenium	2/21	0.82 - 2	0.61 - 0.74	AT007C	2	170	0.01	No
Silver	3/31	4.4 - 11.8	0.19 - 2.5	AB043D	11.8	170	0.07	No
Sodium	3/21	122 - 195	102 - 197	AB043D	195	NA	NA	NA
Vanadium	9/21	13.6 - 32.9	10.2 - 10.9	AT007C	32.9	**210**	**0.2**	**Yes**
Zinc	31/31	6.2 - 329	NA	AB043D	329	8700	0.04	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

AB035A	AB213A-D	AB236A	AB246A	AT008D-AVG
AB036A	AB213B	AB236H	AB246B	AT008D-D
AB036H	AB214A	AB237A	AB247A	AT009B1
AB037A	AB214C	AB237C	AB247C	AT009B1-AVG
AB037D	AB215A	AB238A	AB248A	AT009B1-D
AB039A	AB215H	AB238H	AB248C	AT009D1
AB039H	AB216A	AB238H-AVG	AB248C-AVG	AT009D2
AB039H-AVG	AB216D	AB238H-D	AB248C-D	AT009D3
AB039H-D	AB217A	AB239A	AB251A	AT009E1
AB043D	AB217D	AB239G	AB251C	AT009E2

TABLE 2-4

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A3
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
AB043H	AB218A		AB240A		AB252A		SA1-SCS-01	
AB044D	AB218H		AB240H		AB252H		SA1-SCS-01-AVG	
AB044H	AB231A		AB241A		AB253A		SA1-SCS-01-D	
AB209A	AB231H		AB241C		AB253H		SA1-SCS-02	
AB209B	AB233A		AB242A		AB254A		SA1-SCS-03	
AB210A	AB233H		AB242B		AB254A-AVG		SA2-SCS-027	
AB210D	AB234A		AB244A		AB254A-D		SA2-SCS-028	
AB211A	AB234A-AVG		AB244H		AB254C		SA2-SCS-029	
AB211B	AB234A-D		AB244H-AVG		AT007A		SB28-SCS-04	
AB212A	AB234D		AB244H-D		AT007C		SB28-SCS-05	
AB212B	AB235A		AB245A		AT008A		SB30-SCS-06	
AB213A	AB235H		AB245G		AT008D		SB30-SCS-07	
AB213A-AVG								

TABLE 2-5

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A4
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,1,1-Trichloroethane	6/73	0.8 - 8	10 - 14	AB028G	8	140000	0.00006	No
1,1,2,2-Tetrachloroethane	2/62	2	10 - 62	AB031A	2	3500	0.0006	No
1,1,2,2-Tetrachloroethane	2/62	2	10 - 62	AT004B	2	3500	0.0006	No
1,1,2-Trichloroethane	2/62	3 - 7	10 - 62	AT004B	7	9000	0.0008	No
1,1-Dichloroethane	2/73	0.4 - 2	10 - 62	AB243B	2	34000	0.00006	No
1,2-Dichloroethene (total)	29/73	1 - 14000	10 - 14	SA3-SCS-40-D	14000	**8000**	**1.8**	**Yes**
Acetone	3/62	190 - 1200	3 - 87	AB038A	1200	320000	0.004	No
Ethylbenzene	3/73	72 - 3400	10 - 62	AB031G	3400	200000	0.02	No
Tetrachloroethene	17/73	0.6 - 2700	10 - 13	AT004B	2700	72000	0.04	No
Toluene	4/73	10 - 45	0.6 - 62	AB031G	45	107000	0.0004	No
Trichloroethene	56/73	0.8 - 96000	0.9 - 12	SA3-SCS-40-D	96000	**29000**	**3.3**	**Yes**
Xylenes, Total	3/62	550 - 28000	2 - 62	AB031G	28000	**110000**	**0.3**	**Yes**
Semivolatile Organics (ug/kg)								
2-Methylnaphthalene	4/32	170 - 3400	330 - 4100	AB031A	3400	NA	NA	NA
Acenaphthene	7/43	23 - 3400	330 - 4100	AB032A	3400	1200000	0.003	No
Acenaphthylene	2/32	380 - 2600	330 - 4100	AB032A	2600	NA	NA	NA
Anthracene	10/32	130 - 15000	330 - 4100	AB032A	15000	7880000	0.002	No
BaP Equivalents	22/43	188.34 - 60733	340 - 4100	AB032A	60733	**2000**	**30**	**Yes**
Benzo(a)anthracene	17/43	130 - 43000	340 - 4100	AB032A	43000	NA	NA	NA
Benzo(a)pyrene	18/43	73 - 41000	340 - 4100	AB032A	41000	NA	NA	NA
Benzo(b)fluoranthene	19/43	22 - 46000	340 - 4100	AB032A	46000	NA	NA	NA
Benzo(g,h,i)perylene	16/32	210 - 34000	340 - 4100	AB032A	34000	NA	NA	NA
Benzo(k)fluoranthene	16/43	100 - 29000	340 - 4100	AB032A	29000	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	3/32	140 - 7200	330 - 3700	AT004B	7200	570000	0.01	No
Carbazole	12/43	25 - 4900	330 - 4100	AB032A	4900	700000	0.007	No
Chrysene	19/43	18 - 43000	340 - 4100	AB032A	43000	NA	NA	NA
Dibenzo(a,h)anthracene	6/43	20 - 7700	330 - 4100	AB032A	7700	NA	NA	NA
Dibenzofuran	4/32	55 - 5500	330 - 4100	AB032A	5500	58000	0.09	No
Fluoranthene	17/32	240 - 160000	340 - 4100	AB032A	160000	**1080000**	**0.1**	**Yes**
Fluorene	7/32	110 - 8400	330 - 4100	AB032A	8400	850000	0.010	No
Indeno(1,2,3-cd)pyrene	15/43	84 - 28000	340 - 4100	AB032A	28000	NA	NA	NA
Naphthalene	2/32	950 - 1100	330 - 4100	AB031G	1100	**10000**	**0.1**	**Yes**

TABLE 2-5

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A4
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Phenanthrene	16/32	130 - 95000	340 - 4100	AB032A	95000	NA	NA	NA
Pyrene	24/43	22 - 130000	340 - 4100	AB032A	130000	**890000**	**0.1**	**Yes**
Total cPAHs	22/43	22 - 237700	340 - 4100	AB032A	237700	NA	NA	NA
Total PAHs	25/43	44 - 678650	340 - 4100	AB032A	678650	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	14/32	3.7 - 2900	3.4 - 41	AT001A	2900	56000	0.05	No
4,4'-DDE	12/32	22 - 1900	3.4 - 37	AT001A	1900	40000	0.05	No
4,4'-DDT	16/32	4.2 - 1400	3.4 - 36	AT006A	1400	15000	0.09	No
Alpha-Chlordane	2/32	2.8 - 36	1.7 - 45	AT001A	36	13000	0.003	No
Dieldrin	1/32	4	3.4 - 88	AB038A	4	800	0.005	No
Endosulfan Sulfate	3/32	4.8 - 15	3.3 - 88	AB028A	15	NA	NA	NA
Endrin	2/32	8.7 - 14	3.3 - 88	AB034A	14	8000	0.002	No
Endrin Aldehyde	2/32	5.9 - 7.1	3.3 - 88	AT005A	7.1	NA	NA	NA
Gamma-Chlordane	1/32	3	1.7 - 45	AB026A	3	NA	NA	NA
Heptachlor Epoxide	1/32	30	1.7 - 45	AT001A	30	400	0.08	No
Methoxychlor	1/32	19	17 - 450	AB031G	19	11000	0.002	No
delta-BHC	1/32	25	1.7 - 45	AT004B	25	NA	NA	NA
Inorganics (mg/kg)								
Aluminum	32/32	1130 - 6830	NA	AT003B	6830	**26000**	**0.3**	**Yes**
Antimony	1/43	2.3	0.3 - 2.6	AB026A	2.3	**14**	**0.2**	**Yes**
Arsenic	28/32	0.86 - 11.4	0.62 - 1	AB031G	11.4	**10**	**1.1**	**Yes**
Barium	34/43	3.9 - 306	10.3 - 12	AB026A	306	**1200**	**0.3**	**Yes**
Cadmium	9/43	0.04 - 0.39	0.04 - 1.3	SA3-SCS-40	0.39	35	0.01	No
Calcium	32/32	4290 - 34900	NA	AB034D	34900	NA	NA	NA
Chromium	43/43	2.5 - 22.6	NA	AB031A	22.6	**71**	**0.3**	**Yes**
Copper	33/43	1.3 - 1900	4.1 - 5.3	AB026A	1900	**100**	**19**	**Yes**
Cyanide	4/43	0.16 - 4.6	0.1 - 3.3	AT006A	4.6	62	0.07	No
Iron	32/32	3080 - 38100	NA	AT003B	38100	**7000**	**5.4**	**Yes**
Lead	43/43	0.86 - 274	NA	AB028A	274	**400**	**0.7**	**Yes**
Magnesium	32/32	1750 - 13900	NA	AB034D	13900	NA	NA	NA
Manganese	32/32	165 - 5950	NA	AT005C-D	5950	**1400**	**4.3**	**Yes**
Mercury	1/43	0.12	0.02 - 0.13	AB034A	0.12	**0.7**	**0.2**	**Yes**
Nickel	37/43	3.5 - 32.3	8.2 - 9.6	AB026A	32.3	520	0.06	No

TABLE 2-5

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA A4
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Potassium	20/32	121 - 582	104 - 473	AT002B-D	582	NA	NA	NA
Selenium	1/32	1.3	0.61 - 0.78	AB026A	1.3	170	0.008	No
Sodium	4/32	112 - 162	103 - 131	AB031G	162	NA	NA	NA
Vanadium	24/32	12.1 - 26.1	10.3 - 12	AT002A	26.1	**210**	**0.1**	**Yes**
Zinc	43/43	5.5 - 489	NA	AT001A	489	8700	0.06	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

AB026A	AB034A	AB208A-D	AB229A	AT006A
AB026G	AB034D	AB208H	AB229H	AT006B
AB027A	AB038A	AB219A	AB243A	SA3-SCS-40
AB027H	AB038G	AB219F	AB243B	SA3-SCS-40-AVG
AB028A	AB203A	AB220A	AT001A	SA3-SCS-40-D
AB028G	AB203B	AB220G	AT001C	SA3-SCS-42
AB029A	AB204A	AB221A	AT002A	SA4-SCS-43
AB029H	AB204A-AVG	AB221G	AT002B	SA4-SCS-44
AB030A	AB204A-D	AB224A	AT002B-AVG	SA5-SCS-023
AB030G	AB204B	AB224H	AT002B-D	SA5-SCS-024
AB030G-AVG	AB205A	AB226B	AT003A	SA5-SCS-024-AVG
AB030G-D	AB205G	AB226G	AT003B	SA5-SCS-024-D
AB031A	AB206A	AB227A	AT004A	SA5-SCS-025
AB031G	AB206B	AB227A-AVG	AT004B	SA6-SCS-21
AB032A	AB207A	AB227A-D	AT005A	SA6-SCS-22
AB032D	AB207H	AB227G	AT005C	SB20-SCS-037
AB033B	AB208A	AB228A	AT005C-AVG	SB20-SCS-038
AB033H	AB208A-AVG	AB228F	AT005C-D	

TABLE 2-6

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA B1
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,1-Dichloroethane	1/18	2	10 - 170	BB002B	2	34000	0.00006	No
1,2-Dichloroethene (total)	2/18	120 - 160	10 - 15	BB002B	160	8000	0.02	No
Acetone	5/18	130 - 2600	5 - 100	BB001C	2600	320000	0.008	No
Tetrachloroethene	1/18	14	10 - 170	BB204G	14	72000	0.0002	No
Trichloroethene	2/18	4 - 27	10 - 170	BB204G	27	29000	0.0009	No
Semivolatile Organics (ug/kg)								
Anthracene	2/11	89 - 150	340 - 970	BT001A	150	7880000	0.00002	No
BaP Equivalents	3/11	336.16 - 759.3	350 - 970	BT001A	759.3	**2000**	**0.4**	**Yes**
Benzo(a)anthracene	3/11	140 - 450	350 - 970	BT001A	450	NA	NA	NA
Benzo(a)pyrene	3/11	120 - 450	350 - 970	BT001A	450	NA	NA	NA
Benzo(b)fluoranthene	3/11	140 - 490	350 - 970	BT001A	490	NA	NA	NA
Benzo(g,h,i)perylene	1/11	290	340 - 970	BT001A	290	NA	NA	NA
Benzo(k)fluoranthene	3/11	98 - 380	350 - 970	BT001A	380	NA	NA	NA
Carbazole	1/11	77	340 - 970	BT001A	77	700000	0.0001	No
Chrysene	3/11	180 - 500	350 - 970	BT001A	500	NA	NA	NA
Fluoranthene	5/11	110 - 990	350 - 480	BT001A	990	1080000	0.0009	No
Fluorene	1/11	51	340 - 970	BT001A	51	850000	0.00006	No
Indeno(1,2,3-cd)pyrene	1/11	310	340 - 970	BT001A	310	NA	NA	NA
Phenanthrene	3/11	170 - 580	350 - 970	BT001A	580	NA	NA	NA
Pyrene	5/11	110 - 810	350 - 480	BT001A	810	890000	0.0009	No
Total cPAHs	3/11	678 - 2580	350 - 970	BT001A	2580	NA	NA	NA
Total PAHs	5/11	220 - 5400	350 - 480	BT001A	5400	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	3/11	26 - 180	3.5 - 9.7	BB002B	180	56000	0.003	No
4,4'-DDE	3/11	37 - 160	3.5 - 9.7	BB002B	160	40000	0.004	No
4,4'-DDT	4/11	8.2 - 160	3.5 - 9.7	BB002B	160	15000	0.01	No
Alpha-Chlordane	1/11	4.8	1.8 - 5	BT001A	4.8	13000	0.0004	No
Endosulfan Sulfate	1/11	7.7	3.4 - 9.7	BB002B	7.7	NA	NA	NA
Endrin	2/11	4.7 - 5.1	3.4 - 9.7	BT001A	5.1	8000	0.0006	No
Endrin Aldehyde	2/11	5.8 - 5.9	3.4 - 9.7	BB002B	5.9	NA	NA	NA

TABLE 2-6

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA B1
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Inorganics (mg/kg)								
Aluminum	11/11	1160 - 4580	NA	BB003A	4580	**26000**	**0.2**	**Yes**
Antimony	1/11	2.3	2.1 - 7	BT001A	2.3	**14**	**0.2**	**Yes**
Arsenic	10/11	1.2 - 9.4	0.64 - 0.66	BB001C	9.4	**10**	**0.9**	**Yes**
Barium	10/11	22.5 - 197	10.7 - 11	BT002B	197	**1200**	**0.2**	**Yes**
Calcium	11/11	682 - 25500	NA	BB001C	25500	NA	NA	NA
Chromium	10/11	3.3 - 12.8	7	BB002B	12.8	**71**	**0.2**	**Yes**
Copper	8/11	7.6 - 43.1	4.3 - 14	BB002B	43.1	**100**	**0.4**	**Yes**
Iron	11/11	2700 - 12300	NA	BB003A	12300	**7000**	**1.8**	**Yes**
Lead	10/11	2.6 - 37	2.1	BB002B	37	400	0.09	No
Magnesium	11/11	720 - 7230	NA	BB002B	7230	NA	NA	NA
Manganese	11/11	55.6 - 1560	NA	BT002B	1560	**1400**	**1.1**	**Yes**
Nickel	6/11	9.1 - 17.2	8.6 - 28.1	BT002B	17.2	520	0.03	No
Potassium	7/11	157 - 465	107 - 1000	BB002B	465	NA	NA	NA
Selenium	1/11	1.3	0.64 - 2.1	BT002B	1.3	170	0.008	No
Sodium	1/11	536	107 - 153	BB001C	536	NA	NA	NA
Vanadium	6/11	10.8 - 24.6	10.7 - 35.1	BB003D	24.6	**210**	**0.1**	**Yes**
Zinc	10/11	6.6 - 49.6	14	BB002B	49.6	8700	0.006	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds includedin BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

BB001A	BB003D	BB206A-AVG
BB001B	BB202B	BB206A-D
BB001C	BB204A	BB206G
BB002B	BB204G	BT001A
BB002G	BB205A	BT001B
BB002G-AVG	BB205G	BT002A
BB002G-D	BB206A	BT002B
BB003A		

TABLE 2-7

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA B2
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Semivolatile Organics (ug/kg)								
BaP Equivalents	1/2	399.268	360 - 390	BT004A	399.268	**2000**	**0.200**	**Yes**
Benzo(a)anthracene	1/2	64	360 - 390	BT004A	64	NA	NA	NA
Benzo(b)fluoranthene	1/2	130	360 - 390	BT004A	130	NA	NA	NA
Chrysene	1/2	68	360 - 390	BT004A	68	NA	NA	NA
Fluoranthene	1/2	86	360 - 390	BT004A	86	1080000	0.00008	No
Pyrene	1/2	96	360 - 390	BT004A	96	890000	0.0001	No
Total cPAHs	1/2	262	360 - 390	BT004A	262	NA	NA	NA
Total PAHs	1/2	444	360 - 390	BT004A	444	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	1/2	11	3.6 - 3.9	BT004A	11	56000	0.0002	No
4,4'-DDE	1/2	18	3.6 - 3.9	BT004A	18	40000	0.0005	No
4,4'-DDT	1/2	3.7	3.6 - 3.9	BT004A	3.7	15000	0.0002	No
Inorganics (mg/kg)								
Aluminum	2/2	1110 - 3960	NA	BT004A	3960	**26000**	**0.2**	**Yes**
Arsenic	2/2	1.8 - 3	NA	BT004D-D	3	**10**	**0.3**	**Yes**
Barium	1/2	93.9	11 - 11.5	BT004A	93.9	1200	0.08	No
Calcium	2/2	1160 - 7220	NA	BT004A	7220	NA	NA	NA
Chromium	2/2	2.7 - 7.8	NA	BT004A	7.8	**71**	**0.1**	**Yes**
Copper	1/2	11.5	4.4 - 4.6	BT004A	11.5	**100**	**0.1**	**Yes**
Iron	2/2	3330 - 9910	NA	BT004A	9910	**7000**	**1.4**	**Yes**
Lead	2/2	2 - 12	NA	BT004A	12	400	0.03	No
Magnesium	2/2	703 - 2870	NA	BT004A	2870	NA	NA	NA
Manganese	2/2	29.7 - 747	NA	BT004A	747	**1400**	**0.5**	**Yes**
Nickel	1/2	14.1	8.8 - 9.2	BT004A	14.1	520	0.03	No
Potassium	1/2	246	110 - 1000	BT004A	246	NA	NA	NA
Vanadium	1/2	13.8	11 - 11.5	BT004A	13.8	210	0.07	No
Zinc	2/2	30.5 - 49.9	NA	BT004D-D	49.9	8700	0.006	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

BT003A	BT004A	BT004D-AVG
BT003D	BT004D	BT004D-D

TABLE 2-8

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNT 2 - SUB AREA D
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,1,1-Trichloroethane	2/18	0.8 - 2	10 - 53	DB034C	2	140000	0.00001	No
Acetone	4/18	130 - 1400	4 - 82	DB034C	1400	320000	0.004	No
Tetrachloroethene	7/18	1 - 43	10 - 25	CB13-97(04-08)	43	72000	0.0006	No
Trichloroethene	5/18	7 - 140	10 - 53	CB13-97(04-08)	140	29000	0.005	No
Semivolatile Organics (ug/kg)								
Anthracene	1/12	85	340 - 3600	DB029A	85	7880000	0.00001	No
BaP Equivalents	1/12	1594.46	340 - 3600	DB029A	1594.46	**2000**	**0.8**	**Yes**
Benzo(a)anthracene	1/12	520	340 - 3600	DB029A	520	NA	NA	NA
Benzo(a)pyrene	1/12	980	340 - 3600	DB029A	980	NA	NA	NA
Benzo(b)fluoranthene	1/12	1600	340 - 3600	DB029A	1600	NA	NA	NA
Benzo(g,h,i)perylene	1/12	990	340 - 3600	DB029A	990	NA	NA	NA
Benzo(k)fluoranthene	1/12	760	340 - 3600	DB029A	760	NA	NA	NA
Carbazole	1/12	84	340 - 3600	DB029A	84	700000	0.0001	No
Chrysene	1/12	860	340 - 3600	DB029A	860	NA	NA	NA
Dibenzo(a,h)anthracene	1/12	310	340 - 3600	DB029A	310	NA	NA	NA
Fluoranthene	2/12	170 - 680	340 - 3600	DB029A	680	1080000	0.0006	No
Indeno(1,2,3-cd)pyrene	1/12	840	340 - 3600	DB029A	840	NA	NA	NA
Phenanthrene	1/12	220	340 - 3600	DB029A	220	NA	NA	NA
Pyrene	2/12	140 - 960	340 - 3600	DB029A	960	890000	0.001	No
Total cPAHs	1/12	5870	340 - 3600	DB029A	5870	NA	NA	NA
Total PAHs	2/18	310 - 8805	25 - 3600	DB029A	8805	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	3/12	7.4 - 70	3.4 - 3.8	DB031A	70	56000	0.001	No
4,4'-DDE	5/12	4.8 - 140	3.4 - 3.7	DB031A	140	40000	0.004	No
4,4'-DDT	6/12	5.4 - 200	3.4 - 3.7	DB033A	200	15000	0.01	No
Dieldrin	1/12	16	3.4 - 3.8	DB029A	16	800	0.02	No
Endrin	1/12	15	3.4 - 3.8	DB029A	15	8000	0.002	No
Inorganics (mg/kg)								
Aluminum	12/12	1570 - 5420	NA	DB032A	5420	**26000**	**0.2**	**Yes**
Arsenic	12/12	0.88 - 6	NA	DB032A	6	**10**	**0.6**	**Yes**
Barium	10/12	16.6 - 129	10.3 - 10.4	DB033A	129	**1200**	**0.1**	**Yes**

TABLE 2-8

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNT 2 - SUB AREA D
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Cadmium	1/12	4.3	1 - 1.2	DB029A	4.3	**35**	**0.1**	**Yes**
Calcium	12/12	3060 - 23900	NA	DB033A	23900	NA	NA	NA
Chromium	12/12	3 - 43.2	NA	DB029A	43.2	**71**	**0.6**	**Yes**
Cobalt	1/12	11	10.3 - 11.6	DB029A	11	2000	0.006	No
Copper	12/12	5.6 - 937	NA	DB029A	937	**100**	**9.4**	**Yes**
Iron	12/12	3890 - 30100	NA	DB029A	30100	**7000**	**4.3**	**Yes**
Lead	12/12	1 - 373	NA	DB029A	373	**400**	**0.9**	**Yes**
Magnesium	12/12	1300 - 6250	NA	DB032A	6250	NA	NA	NA
Manganese	12/12	66.5 - 1960	NA	DB029A	1960	**1400**	**1.4**	**Yes**
Nickel	6/12	9.5 - 40.7	8.3 - 8.9	DB029A	40.7	520	0.08	No
Potassium	7/12	104 - 509	103 - 1000	DB029A	509	NA	NA	NA
Sodium	2/12	107 - 251	103 - 116	DB029A	251	NA	NA	NA
Vanadium	12/12	10.7 - 21.4	NA	DB032A	21.4	**210**	**0.1**	**Yes**
Zinc	12/12	7.3 - 325	NA	DB029A	325	8700	0.04	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

B97(12-16)	DB030A
B97(16-20)	DB030E
CB13-97(00-04)	DB031A
CB13-97(04-08)	DB031F
CB20-97(00-04)	DB032A
CB20-97(04-08)	DB032C
DB029A	DB033A
DB029E	DB033E
DB029E-AVG	DB034A
DB029E-D	DB034C

TABLE 2-9

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA E
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
1,2-Dichloroethene (total)	2/20	4 - 33	10 - 53	EB208F	33	8000	0.004	No
Acetone	2/20	120	9 - 84	EB004A	120	320000	0.0004	No
Acetone	2/20	120	9 - 84	EB004D	120	320000	0.0004	No
Tetrachloroethene	4/20	0.7 - 3	10 - 53	EB004D	3	72000	0.00004	No
Trichloroethene	11/20	0.6 - 31	10 - 53	EB203A	31	29000	0.001	No
Semivolatile Organics (ug/kg)								
Acenaphthene	3/8	55 - 380	340 - 390	EB004A	380	1200000	0.0003	No
Anthracene	4/8	120 - 860	340 - 390	EB004A	860	7880000	0.0001	No
BaP Equivalents	4/8	360.47 - 4148.4	340 - 390	EB004A	4148.4	**2000**	**2.1**	**Yes**
Benzo(a)anthracene	4/8	100 - 3300	340 - 390	EB004A	3300	NA	NA	NA
Benzo(a)pyrene	4/8	140 - 2900	340 - 390	EB004A	2900	NA	NA	NA
Benzo(b)fluoranthene	4/8	170 - 3400	340 - 390	EB004A	3400	NA	NA	NA
Benzo(g,h,i)perylene	4/8	300 - 2000	340 - 390	EB004A	2000	NA	NA	NA
Benzo(k)fluoranthene	4/8	83 - 2000	340 - 390	EB004A	2000	NA	NA	NA
Carbazole	3/8	82 - 250	340 - 390	EB001A	250	700000	0.0004	No
Chrysene	4/8	140 - 3400	340 - 390	EB004A	3400	NA	NA	NA
Dibenzofuran	2/8	50 - 160	340 - 390	EB004A	160	58000	0.003	No
Fluoranthene	4/8	260 - 7600	340 - 390	EB004A	7600	1080000	0.007	No
Fluorene	2/8	130 - 390	340 - 390	EB004A	390	850000	0.0005	No
Indeno(1,2,3-cd)pyrene	3/8	300 - 1800	340 - 390	EB004A	1800	NA	NA	NA
Phenanthrene	4/8	150 - 3100	340 - 390	EB004A	3100	NA	NA	NA
Pyrene	4/8	300 - 6600	340 - 390	EB004A	6600	890000	0.007	No
Total cPAHs	4/8	633 - 16800	340 - 390	EB004A	16800	NA	NA	NA
Total PAHs	4/8	1863 - 37340	340 - 390	EB004A	37340	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	2/8	42 - 110	3.4 - 35	EB002A	110	56000	0.002	No
4,4'-DDE	3/8	69 - 700	3.4 - 3.9	EB001A	700	40000	0.02	No
4,4'-DDT	2/8	500 - 930	3.4 - 37	EB001A	930	15000	0.06	No
Endrin	1/8	5.3	3.4 - 37	EB004D	5.3	8000	0.0007	No
Gamma-Chlordane	1/8	1.8	1.8 - 19	EB004D	1.8	NA	NA	NA

TABLE 2-9

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA E
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Inorganics (mg/kg)								
Aluminum	8/8	1530 - 4620	NA	EB003A	4620	**26000**	**0.2**	**Yes**
Arsenic	7/8	0.83 - 3.5	0.62	EB004A	3.5	**10**	**0.4**	**Yes**
Barium	6/8	19 - 62.9	10.3 - 10.6	EB003A	62.9	1200	0.05	No
Cadmium	1/8	2.3	1 - 1.2	EB004A	2.3	35	0.07	No
Calcium	8/8	4500 - 41900	NA	EB001A	41900	NA	NA	NA
Chromium	8/8	2.3 - 28.3	NA	EB004A	28.3	**71**	**0.4**	**Yes**
Copper	8/8	6 - 176	NA	EB004A	176	**100**	**1.8**	**Yes**
Iron	8/8	3810 - 14500	NA	EB003F	14500	**7000**	**2.1**	**Yes**
Lead	8/8	1.2 - 292	NA	EB004A	292	**400**	**0.7**	**Yes**
Magnesium	8/8	1440 - 15000	NA	EB002A	15000	NA	NA	NA
Manganese	8/8	82.3 - 387	NA	EB003A	387	**1400**	**0.3**	**Yes**
Nickel	5/8	12.4 - 26.7	8.2 - 8.5	EB004A	26.7	520	0.05	No
Potassium	2/8	383 - 1090	1000	EB003A	1090	NA	NA	NA
Selenium	1/8	0.73	0.62 - 0.7	EB003F	0.73	170	0.004	No
Sodium	4/8	129 - 921	103 - 106	EB003A	921	NA	NA	NA
Vanadium	7/8	11.1 - 23.4	10.6	EB003F	23.4	**210**	**0.1**	**Yes**
Zinc	8/8	8.6 - 232	NA	EB004A	232	8700	0.03	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

EB001A	EB203A	EB208A-D
EB001E	EB203B	EB208F
EB002A	EB206A	EB209A
EB002D	EB206E	EB209B
EB003A	EB207A	EB210A
EB003F	EB207F	EB210A-AVG
EB004A	EB208A	EB210A-D
EB004D	EB208A-AVG	EB210E

TABLE 2-10

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA F
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
Acetone	4/9	180 - 1600	5 - 140	FB003E	1600	320000	0.005	No
Semivolatile Organics (ug/kg)								
BaP Equivalents	1/9	490.83	330 - 3700	FB001A	490.83	**2000**	**0.2**	**Yes**
Benzo(a)anthracene	1/9	200	330 - 3700	FB001A	200	NA	NA	NA
Benzo(a)pyrene	1/9	170	330 - 3700	FB001A	170	NA	NA	NA
Benzo(b)fluoranthene	1/9	240	330 - 3700	FB001A	240	NA	NA	NA
Benzo(k)fluoranthene	1/9	160	330 - 3700	FB001A	160	NA	NA	NA
Chrysene	1/9	230	330 - 3700	FB001A	230	NA	NA	NA
Fluoranthene	2/9	96 - 390	330 - 3700	FB001A	390	1080000	0.0004	No
Phenanthrene	1/9	220	330 - 3700	FB001A	220	NA	NA	NA
Pyrene	2/9	79 - 410	330 - 3700	FB001A	410	890000	0.0005	No
Total cPAHs	1/9	1000	330 - 3700	FB001A	1000	NA	NA	NA
Total PAHs	2/9	175 - 2020	330 - 3700	FB001A	2020	NA	NA	NA
Pesticides (ug/kg)								
4,4'-DDD	1/9	30	3.3 - 5	FB003A	30	56000	0.0005	No
4,4'-DDE	3/9	6.5 - 18	3.3 - 3.8	FB001A	18	40000	0.0005	No
4,4'-DDT	2/9	9.9 - 21	3.3 - 3.8	FB001A	21	15000	0.001	No
Inorganics (mg/kg)								
Aluminum	9/9	1240 - 5920	NA	FB003A	5920	**26000**	**0.2**	**Yes**
Arsenic	7/9	0.7 - 4.8	0.62 - 0.63	FB001A	4.8	**10**	**0.5**	**Yes**
Barium	5/9	34.6 - 173	10.4 - 10.8	FB003A	173	**1200**	**0.1**	**Yes**
Calcium	9/9	2880 - 25900	NA	FB003E	25900	NA	NA	NA
Chromium	9/9	4.5 - 18.2	NA	FB003A	18.2	**71**	**0.3**	**Yes**
Cobalt	1/9	11	10.4 - 12.9	FB002H	11	2000	0.006	No
Copper	8/9	4.5 - 26.2	4.3	FB001A	26.2	**100**	**0.3**	**Yes**
Iron	9/9	3490 - 16200	NA	FB001A	16200	**7000**	**2.3**	**Yes**
Lead	9/9	1.3 - 22.4	NA	FB001A	22.4	400	0.06	No
Magnesium	9/9	1150 - 8100	NA	FB003E	8100	NA	NA	NA
Manganese	9/9	87.2 - 1610	NA	FB003A	1610	**1400**	**1.2**	**Yes**

TABLE 2-10

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - SUB AREA F
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Nickel	7/9	9.3 - 26.8	8.6 - 8.7	FB002H	26.8	520	0.05	No
Potassium	5/9	106 - 457	104 - 1000	FB001A	457	NA	NA	NA
Sodium	1/9	167	104 - 129	FB003A	167	NA	NA	NA
Vanadium	4/9	16.9 - 20.7	10.4 - 10.8	FB002C	20.7	210	0.10	No
Zinc	9/9	8 - 66.7	NA	FB001A	66.7	8700	0.008	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

FB001A	FB003A
FB001E	FB003E
FB002A	FB004A
FB002C	FB004G
FB002H	

TABLE 2-11

SELECTION OF CHEMICALS OF POTENTIAL CONCERN
OPERABLE UNIT 2 - OTHER
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Maximum Detected Concentration	Tier I SRV	Maximum/ SRV	Retained as a COPC?
Volatile Organics (ug/kg)								
Trichloroethene	1/13	1	10 - 12	SB12-SCS-19-D	1	29000	0.00003	No
Semivolatile Organics (ug/kg)								
2-Chlorophenol	1/13	24	340 - 410	SB5-SCS-14	24	12600	0.002	No
4-Chloro-3-methylphenol	1/13	20	340 - 410	SB5-SCS-14	20	NA	NA	NA
BaP Equivalents	1/13	221.159 - 235.979	330 - 410	SB12-SCS-19-D	235.979	**2000**	**0.12**	**Yes**
Benzo(a)anthracene	1/13	22 - 36	330 - 410	SB12-SCS-19-D	36	NA	NA	NA
Benzo(a)pyrene	1/13	22 - 28	330 - 410	SB12-SCS-19-D	28	NA	NA	NA
Benzo(k)fluoranthene	1/13	32	330 - 410	SB12-SCS-19-D	32	NA	NA	NA
Chrysene	1/13	29 - 39	330 - 410	SB12-SCS-19-D	39	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1/13	22	330 - 410	SB12-SCS-19-D	22	NA	NA	NA
Pentachlorophenol	1/13	30	850 - 1000	SB5-SCS-14	30	71000	0.0004	No
Pyrene	2/13	28 - 65	330 - 410	SB12-SCS-19-D	65	890000	0.00007	No
Total cPAHs	1/13	73 - 157	330 - 410	SB12-SCS-19-D	157	NA	NA	NA
Total PAHs	2/13	28 - 222	330 - 410	SB12-SCS-19-D	222	NA	NA	NA
Inorganics (mg/kg)								
Antimony	2/13	0.31 - 0.55	0.3 - 0.34	SB12-SCS-19-D	0.55	14	0.04	No
Barium	13/13	3 - 261	NA	SA9-SCS-031	261	**1200**	**0.2**	**Yes**
Cadmium	8/13	0.04 - 0.13	0.04	SA9-SCS-030	0.13	35	0.004	No
Chromium	13/13	3.1 - 6.9	NA	SB12-SCS-19-D	6.9	71	0.10	No
Copper	13/13	1.6 - 8.3	NA	SB12-SCS-19-D	8.3	100	0.08	No
Cyanide	1/13	0.13 - 0.14	0.1 - 0.11	SB5-SCS-15	0.14	62	0.002	No
Lead	13/13	0.91 - 16.3	NA	SB12-SCS-19-D	16.3	400	0.04	No
Nickel	13/13	4 - 9.8	NA	SA9-SCS-030	9.8	520	0.02	No
Zinc	13/13	7.3 - 21.1	NA	SB12-SCS-19-D	21.1	8700	0.002	No

Notes:
Shading indicates that the maximum detected concentration exceeds 10 percent of the Tier I SRV.
Individual cPAH compounds included in BaP equivalent concentration.
SRV = Soil Reference Value.
NA = No SRV available.

Associated Samples:

SA7-SCS-09	SA9-SCS-030	SB12-SCS-19
SA7-SCS-10	SA9-SCS-031	SB12-SCS-19-AVG
SA8-SCS-11	SB11-SCS-16	SB12-SCS-19-D
SA8-SCS-12	SB11-SCS-17	SB5-SCS-14
SA8-SCS-13	SB12-SCS-18	SB5-SCS-15

TABLE 2-12

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA A3 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Retained for Further Evaluation?
Volatile Organics (ug/kg)					
1,1,1-Trichloroethane	18/45	0.8 - 1200	10 - 13	AT009B1-D	**Yes**
1,1-Dichloroethane	7/45	1 - 73	10 - 54	AT009B1	**Yes**
1,2-Dichloroethene (total)	25/45	1 - 710	10 - 14	AT009B1-D	**Yes**
Tetrachloroethene	11/45	0.8 - 25000	10 - 54	AT009B1-D	**Yes**
Toluene	1/45	27	1 - 57	AB039A	**Yes**
Trichloroethene	39/45	0.8 - 4100	10 - 13	AB254A	**Yes**
Xylenes, Total	1/43	230 - 520	4 - 54	AT009B1-D	**Yes**
Semivolatile Organics (ug/kg)					
Anthracene	2/7	330 - 370	340 - 2100	AB037A	No
BaP Equivalent	2/9	1278.65 - 1726.5	340 - 2100	AB037A	**Yes**
Benzo(a)anthracene	2/9	860 - 1300	340 - 2100	AB037A	No
Benzo(a)pyrene	2/9	720 - 1200	340 - 2100	AB037A	No
Benzo(b)fluoranthene	2/9	690 - 1200	340 - 2100	AB037A	No
Benzo(g,h,i)perylene	2/7	340 - 870	340 - 2100	AB037A	No
Benzo(k)fluoranthene	2/9	580 - 1200	340 - 2100	AB037A	No
Carbazole	1/9	240	340 - 2100	AB037A	No
Chrysene	2/9	850 - 1500	340 - 2100	AB037A	No
Dibenzofuran	1/7	110	340 - 2100	AB036A	No
Fluoranthene	4/7	110 - 3000	340 - 2100	AB037A	No
Fluorene	2/7	170 - 240	340 - 2100	AB036A	No
Indeno(1,2,3-cd)pyrene	2/9	370 - 830	340 - 2100	AB037A	No
Phenanthrene	3/7	180 - 1900	340 - 2100	AB036A	No
Phenol	1/9	1300	340 - 2100	AB036A	No
Pyrene	4/9	120 - 3000	340 - 2100	AB037A	No
Total CPAH	2/9	4070 - 7230	340 - 2100	AB037A	No
Total PAH	4/9	230 - 16430	340 - 2100	AB037A	No
Pesticides (ug/kg)					
4,4'-DDD	3/7	86 - 220	3.4 - 3.8	AB037A	No
4,4'-DDD	3/7	86 - 220	3.4 - 3.8	AT009B1-D	No
4,4'-DDE	6/7	8.5 - 450	3.5	AB037A	No
4,4'-DDT	5/7	6.3 - 430	3.4 - 3.5	AT009B1-D	No
Aldrin	1/7	3.1	1.8 - 22	AB036A	No
Dieldrin	1/7	4	3.4 - 42	AB036A	No
Endosulfan II	1/7	37 - 54	3.4 - 36	AT009B1-D	No
Gamma-Chlordane	1/7	3.4	1.8 - 22	AB036A	No
Heptachlor Epoxide	1/7	2.6	1.8 - 22	AB036A	No
Inorganics (mg/kg)					
Aluminum	7/7	2450 - 5050	NA	AB035A	**Yes**
Arsenic	7/7	1.5 - 4.5	NA	AB036A	**Yes**
Barium	9/9	5.7 - 188	NA	AB039A	**Yes**
Cadmium	3/9	0.07 - 2.7	1.1 - 1.2	AT009B1-D	**Yes**
Calcium	7/7	3710 - 21800	NA	AB036A	No
Chromium	9/9	2.3 - 16.8	NA	AB036A	**Yes**
Copper	9/9	2.1 - 204	NA	AB039A	**Yes**
Iron	7/7	7330 - 19200	NA	AT009B1-D	**Yes**
Lead	9/9	1.2 - 54.9	NA	AB036A	**Yes**
Magnesium	7/7	2040 - 11200	NA	AB036A	No

TABLE 2-12

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA A3 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Retained for Further Evaluation?
Manganese	7/7	214 - 2060	NA	AB039A	**Yes**
Mercury	1/9	0.19	0.03 - 0.12	AT009B1-D	**Yes**
Nickel	9/9	8.6 - 25.5	NA	AB036A	**Yes**
Potassium	6/7	216 - 305	1000	AT007A	No
Selenium	1/7	0.82	0.63 - 0.73	AB036A	No
Sodium	1/7	189	106 - 122	AB035A	No
Vanadium	5/7	13.6 - 23.1	10.6 - 10.8	AB035A	**Yes**
Zinc	9/9	8.1 - 80.8	NA	AB037A	No

Notes:
Shading indicates that the chemical exceeded 10 percent of Tier I soil reference value in the screening risk evaluation and was retained for evaluation in the refined risk evaluation.
Individual cPAH compounds included in BaP equivalent concentration.
NA = Not applicable.

Associated Samples:

AB035A	AB217A	AB246A
AB036A	AB218A	AB246B
AB037A	AB231A	AB247A
AB039A	AB233A	AB248A
AB209A	AB234A	AB251A
AB209B	AB234A-AVG	AB252A
AB210A	AB234A-D	AB253A
AB211A	AB235A	AB254A
AB211B	AB236A	AB254A-AVG
AB212A	AB237A	AB254A-D
AB212B	AB238A	AT007A
AB213A	AB239A	AT008A
AB213A-AVG	AB240A	AT009B1
AB213A-D	AB241A	AT009B1-AVG
AB213B	AB242A	AT009B1-D
AB214A	AB242B	SB28-SCS-04
AB215A	AB244A	SB28-SCS-05
AB216A	AB245A	

TABLE 2-13

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Retained for Further Evaluation?
Volatile Organics (ug/kg)					
1,1,1-Trichloroethane	4/50	0.8 - 2	10 - 14	AB206B	No
1,1,1-Trichloroethane	4/50	0.8 - 2	10 - 14	AB243B	No
1,1,1-Trichloroethane	4/50	0.8 - 2	10 - 14	AT004B	No
1,1,2,2-Tetrachloroethane	2/39	2	10 - 14	AB031A	No
1,1,2,2-Tetrachloroethane	2/39	2	10 - 14	AT004B	No
1,1,2-Trichloroethane	2/39	3 - 7	10 - 14	AT004B	No
1,1-Dichloroethane	2/50	0.4 - 2	10 - 14	AB243B	No
1,2-Dichloroethene (total)	22/50	1 - 14000	10 - 14	SA3-SCS-40-D	**Yes**
Acetone	1/39	1200	5 - 69	AB038A	No
Ethylbenzene	2/50	72 - 380	10 - 14	AB031A	No
Tetrachloroethene	10/50	0.6 - 2700	10 - 13	AT004B	No
Toluene	3/50	10 - 20	0.7 - 14	AT004B	No
Trichloroethene	37/50	1 - 96000	10 - 12	SA3-SCS-40-D	**Yes**
Xylenes, Total	2/39	550 - 2000	2 - 14	AT004B	**Yes**
Semivolatile Organics (ug/kg)					
2-Methylnaphthalene	3/20	170 - 3400	330 - 4100	AB031A	No
Acenaphthene	7/31	23 - 3400	330 - 4100	AB032A	No
Acenaphthylene	2/20	380 - 2600	330 - 4100	AB032A	No
Anthracene	10/20	130 - 15000	330 - 4100	AB032A	No
BaP Equivalent	19/31	188.34 - 60733	340 - 4100	AB032A	**Yes**
Benzo(a)anthracene	16/31	130 - 43000	340 - 4100	AB032A	No
Benzo(a)pyrene	15/31	120 - 41000	340 - 4100	AB032A	No
Benzo(b)fluoranthene	18/31	22 - 46000	340 - 4100	AB032A	No
Benzo(g,h,i)perylene	12/20	240 - 34000	350 - 4100	AB032A	No
Benzo(k)fluoranthene	15/31	100 - 29000	340 - 4100	AB032A	No
Bis(2-Ethylhexyl)phthalate	1/20	7200	330 - 3700	AT004B	No
Carbazole	12/31	25 - 4900	330 - 4100	AB032A	No
Chrysene	18/31	18 - 43000	340 - 4100	AB032A	No
Dibenzo(a,h)anthracene	6/31	20 - 7700	330 - 4100	AB032A	No
Dibenzofuran	4/20	55 - 5500	330 - 4100	AB032A	No
Fluoranthene	15/20	250 - 160000	350 - 4100	AB032A	**Yes**
Fluorene	7/20	110 - 8400	330 - 4100	AB032A	No
Indeno(1,2,3-cd)pyrene	14/31	84 - 28000	340 - 4100	AB032A	No
Naphthalene	1/20	950	330 - 4100	AB032A	**Yes**
Phenanthrene	14/20	130 - 95000	350 - 4100	AB032A	No
Pyrene	20/31	22 - 130000	340 - 4100	AB032A	**Yes**
Total CPAH	19/31	22 - 237700	340 - 4100	AB032A	No
Total PAH	20/31	44 - 678650	340 - 4100	AB032A	No
Pesticides (ug/kg)					
4,4'-DDD	12/20	11 - 2900	3.5 - 41	AT001A	No
4,4'-DDE	12/20	22 - 1900	3.5 - 37	AT001A	No
4,4'-DDT	13/20	18 - 1400	3.5 - 36	AT006A	No
Alpha-Chlordane	2/20	2.8 - 36	1.7 - 45	AT001A	No
Dieldrin	1/20	4	3.5 - 88	AB038A	No
Endosulfan Sulfate	3/20	4.8 - 15	3.3 - 88	AB028A	No
Endrin	2/20	8.7 - 14	3.3 - 88	AB034A	No
Endrin Aldehyde	1/20	7.1	3.3 - 88	AT005A	No
Gamma-Chlordane	1/20	3	1.7 - 45	AB026A	No
Heptachlor Epoxide	1/20	30	1.7 - 45	AT001A	No
delta-BHC	1/20	25	1.7 - 45	AT004B	No

TABLE 2-13

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Retained for Further Evaluation?
Inorganics (mg/kg)					
Aluminum	20/20	2270 - 6830	NA	AT003B	**Yes**
Antimony	1/31	2.3	0.3 - 2.6	AB026A	**Yes**
Arsenic	19/20	1.3 - 10.1	0.68	AB029A	**Yes**
Barium	31/31	3.9 - 306	NA	AB026A	**Yes**
Cadmium	9/31	0.04 - 0.39	0.04 - 1.3	SA3-SCS-40	No
Calcium	20/20	4290 - 28200	NA	AB033B	No
Chromium	31/31	2.5 - 22.6	NA	AB031A	**Yes**
Copper	30/31	1.3 - 1900	4.5	AB026A	**Yes**
Cyanide	4/31	0.16 - 4.6	0.1 - 3.2	AT006A	No
Iron	20/20	5010 - 38100	NA	AT003B	**Yes**
Lead	31/31	0.86 - 274	NA	AB028A	No
Magnesium	20/20	1750 - 11600	NA	AB034A	No
Manganese	20/20	201 - 2050	NA	AT002B	**Yes**
Mercury	1/31	0.12	0.02 - 0.13	AB034A	**Yes**
Nickel	28/31	3.5 - 32.3	8.2 - 9	AB026A	No
Potassium	13/20	138 - 582	113 - 473	AT002B-D	No
Selenium	1/20	1.3	0.61 - 0.77	AB026A	No
Sodium	2/20	112 - 113	104 - 128	AB038A	No
Vanadium	20/20	12.1 - 26.1	NA	AT002A	**Yes**
Zinc	31/31	5.5 - 489	NA	AT001A	No

Notes:
Shading indicates that the chemical exceeded 10 percent of Tier I soil reference value in the screening risk evaluation and was retained for evaluation in the refined risk evaluation.
Individual cPAH compounds included in BaP equivalent concentration.
NA = Not applicable.

Associated Samples:

AB026A
AB027A
AB028A
AB029A
AB030A
AB031A
AB032A
AB033B
AB034A
AB038A
AB203A
AB203B
AB204A
AB204A-AVG
AB204A-D
AB204B
AB205A
AB206A
AB206B
AB207A
AB208A
AB208A-AVG
AB208A-D
AB219A
AB220A
AB221A
AB224A
AB226B
AB227A
AB227A-AVG
AB227A-D
AB228A
AB229A
AB243A
AB243B
AT001A
AT002A
AT002B
AT002B-AVG
AT002B-D
AT003A
AT003B
AT004A
AT004B
AT005A
AT006A
AT006B
SA3-SCS-40
SA3-SCS-40-AVG
SA3-SCS-40-D
SA3-SCS-42
SA4-SCS-43
SA4-SCS-44
SA5-SCS-023
SA5-SCS-024
SA5-SCS-024-AVG
SA5-SCS-024-D
SA5-SCS-025
SA6-SCS-21
SA6-SCS-22
SB20-SCS-037
SB20-SCS-038

TABLE 2-14

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA E - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemical	Frequency of Detection	Range of Detection	Range of Non Detects	Location of Maximum	Retained for Further Evaluation?
Volatile Organics (ug/kg)					
1,2-Dichloroethene (total)	1/12	4	11 - 53	EB004A	No
Acetone	1/12	120	10 - 84	EB004A	No
Tetrachloroethene	2/12	2	11 - 53	EB203B	No
Tetrachloroethene	2/12	2	11 - 53	EB207A	No
Trichloroethene	7/12	0.7 - 31	11 - 53	EB203A	No
Semivolatile Organics (ug/kg)					
Acenaphthene	3/4	55 - 380	390	EB004A	No
Anthracene	3/4	130 - 860	390	EB004A	No
BaP Equivalent	3/4	775.93 - 4148.4	390	EB004A	**Yes**
Benzo(a)anthracene	3/4	460 - 3300	390	EB004A	No
Benzo(a)pyrene	3/4	460 - 2900	390	EB004A	No
Benzo(b)fluoranthene	3/4	510 - 3400	390	EB004A	No
Benzo(g,h,i)perylene	3/4	300 - 2000	390	EB004A	No
Benzo(k)fluoranthene	3/4	340 - 2000	390	EB004A	No
Carbazole	3/4	82 - 250	390	EB001A	No
Chrysene	3/4	530 - 3400	390	EB004A	No
Dibenzofuran	2/4	50 - 160	370 - 390	EB004A	No
Fluoranthene	3/4	1200 - 7600	390	EB004A	No
Fluorene	2/4	130 - 390	370 - 390	EB004A	No
Indeno(1,2,3-cd)pyrene	3/4	300 - 1800	390	EB004A	No
Phenanthrene	3/4	610 - 3100	390	EB004A	No
Pyrene	3/4	1000 - 6600	390	EB004A	No
Total CPAH	3/4	2600 - 16800	390	EB004A	No
Total PAH	3/4	5895 - 37340	390	EB004A	No
Pesticides (ug/kg)					
4,4'-DDD	2/4	42 - 110	3.9 - 35	EB002A	No
4,4'-DDE	3/4	69 - 700	3.9	EB001A	No
4,4'-DDT	2/4	500 - 930	3.9 - 37	EB001A	No
Inorganics (mg/kg)					
Aluminum	4/4	3000 - 4620	NA	EB003A	**Yes**
Arsenic	4/4	0.97 - 3.5	NA	EB004A	**Yes**
Barium	4/4	37.4 - 62.9	NA	EB003A	No
Cadmium	1/4	2.3	1 - 1.2	EB004A	No
Calcium	4/4	26300 - 41900	NA	EB001A	No
Chromium	4/4	8.9 - 28.3	NA	EB004A	**Yes**
Copper	4/4	13.6 - 176	NA	EB004A	**Yes**
Iron	4/4	8400 - 10700	NA	EB004A	**Yes**
Lead	4/4	5.4 - 292	NA	EB004A	No
Magnesium	4/4	5980 - 15000	NA	EB002A	No
Manganese	4/4	293 - 387	NA	EB003A	**Yes**
Nickel	4/4	12.4 - 26.7	NA	EB004A	No
Potassium	1/4	1090	1000	EB003A	No
Sodium	3/4	129 - 921	104	EB003A	No
Vanadium	4/4	13.8 - 21.2	NA	EB003A	**Yes**
Zinc	4/4	37.9 - 232	NA	EB004A	No

TABLE 2-14

SUMMARY OF SOIL ANALYTICAL RESULTS
SUB AREA E - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Notes:
Shading indicates that the chemical exceeded 10 percent of Tier I soil reference value in the screening risk evaluation and was retained for evaluation in the refined risk evaluation.
Individual cPAH compounds included in BaP equivalent concentration.
NA = Not applicable.

Associated Samples:

EB001A	EB206A	EB209A
EB002A	EB207A	EB209B
EB003A	EB208A	EB210A
EB004A	EB208A-AVG	EB210A-AVG
EB203A	EB208A-D	EB210A-D
EB203B		

TABLE 2-15

EXPOSURE POINT CONCENTRATIONS[1]
TYPICAL INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREAS A3, A4, & E - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Chemicals	Exposure Unit			
	Sub Area A3	Sub Area A4	Sub Area A4 Excluding Sample AB032	Sub Area E
Volatile Organics Compounds (mg/kg)				
1,1,1-Trichloroethane	0.012	NA	NA	NA
1,1-Dichloroethane	0.008	NA	NA	NA
1,2-Dichloroethene (total)	0.026	0.865	0.090	NA
2-Butanone	ND	NA	NA	NA
Ethylbenzene	ND	NA	NA	NA
Tetrachloroethene	0.025	NA	NA	NA
Toluene	0.009	NA	NA	NA
Trichloroethene	0.280	0.607	0.594	NA
Xylenes, Total	0.010	0.025	0.264	NA
Semivolatile Organics Compounds (mg/kg)				
BaP Equivalent	1.73 (2)	5.62	3.01	4.15 (2)
Fluoranthene	NA	44.9	14.2	NA
Naphthalene	ND	0.948	ND	NA
Pyrene	NA	22.6	9.53	NA
Inorganics (mg/kg)				
Aluminum	5050 (2)	4555	4620	4620 (2)
Antimony	ND	1.40	1.41	NA
Arsenic	4.5 (2)	5.32	5.40	3.5 (2)
Barium	188 (2)	190	198	NA
Cadmium	1.65 (2)	NA	NA	NA
Chromium	16.8 (2)	12.5	12.6	28.3 (2)
Copper	204 (2)	580	642	176 (2)
Iron	16200 (2)	17502	17946	10700 (2)
Lead	54.9 (2)	NA	NA	NA
Manganese	2060 (2)	1275	1343	387 (2)
Mercury	0.125 (2)	0.061	0.061	NA
Nickel	25.5 (20	NA	NA	NA
Vanadium	23.1 (2)	19.3	19.6	21.2 (2)

Notes:
Includes all samples collected from a depth of 0 to 5 feet.
1 - Exposure point concentrations are the 95 percent UCL unless otherwise noted.
2 - There was an insufficient number of samples to calculate an UCL therefore the maximum detected concentration was used as the exposure point concentration.
ND - Identified as a COPC in screening analysis but was not detected in surface soil.
NA - Not applicable, not a COPC for this exposure unit.

TABLE 2-16

EXPOSURE POINT CONCENTRATIONS[1]
MAJOR INFREQUENT CONSTRUCTION WORKERS
NIROP FRIDLEY, MINNESOTA

	Exposure Unit									
Chemicals	**Sub Area A1**	**Sub Area A2**	**Sub Area A3**	**Sub Area A4**	**Sub Area B1**	**Sub Area B2**	**Sub Area D**	**Sub Area E**	**Sub Area F**	**Other**
Volatile Organics Summary (mg/kg)										
1,1,1-Trichloroethane	--	--	2600	--	--	--	--	--	--	--
1,1-Dichloroethane	--	--	34	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	--	--	1.8	14	--	--	--	--	--	--
2-Butanone	--	--	3500	--	--	--	--	--	--	--
Ethylbenzene	--	--	140	--	--	--	--	--	--	--
Tetrachloroethene	--	--	1200	--	--	--	--	--	--	--
Toluene	--	--	190	--	--	--	--	--	--	--
Trichloroethene	--	4.1	120	96	--	--	--	--	--	--
Xylenes, Total	--	--	580	28	--	--	--	--	--	--
Semivolatile Organics Summary (mg/kg)										
Bap Equivalent	--	0.341	3.17	60.7	0.759	0.40	1.59	4.15	0.491	0.236
Fluoranthene	--	--	--	160	--	--	--	--	--	--
Naphthalene	--	--	2.7	1.1	--	--	--	--	--	--
Pyrene	--	--	--	130	--	--	--	--	--	--
Inorganics (mg/kg)										
Aluminum	4190	5270	6370	6830	4580	3960	5420	4620	5920	--
Antimony	--	--	105	2.3	2.3	--	--	--	--	--
Arsenic	3.4	8.3	6.6	11.4	9.4	3	6	3.5	4.8	--
Barium	--	227	327	306	197	--	129	--	173	261
Cadmium	--	--	5.3	--	--	--	4.3	--	--	--
Chromium	13.6	11.3	114	22.6	12.8	7.8	43.2	28.3	18.2	--
Copper	10.3	158	1290	1900	43.1	11.5	937	176	26.2	--
Iron	24300	18000	275000	38100	12300	9910	30100	14500	16200	--
Lead	--	143	453	274	--	--	373	292	--	--
Manganese	927	2230	20700	5950	1560	747	1960	387	1610	--
Mercury	--	--	0.19	0.12	--	--	--	--	--	--
Nickel	--	--	142	--	--	--	--	--	--	--
Vanadium	--	--	32.9	26.1	24.6	--	21.4	23.4	--	--

Notes:
1 - The exposure point concentration is the maximum detected concentration in surface and subsurface soil.
-- Chemical was not a COPC for this sub area.

TABLE 2-17

SUMMARY OF REFINED RISK ANALYSIS
TYPICAL INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREAS A3, A4, & E - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Exposure Scenario	Sub Area A3	Sub Area A4	Sub Area A4 Excluding Sample AB032	Sub Area E	Sub Area E Excluding Sample EB004
Typical Industrial Worker	HQ < 0.2 ICR = 6E-6	HQ < 0.2 ICR = 2E-5 (cPAHs)	HQ < 0.2 ICR = 1E-5	Not Assessed Screening analysis indicated that the risks were within acceptable levels.	Not Assessed Screening analysis indicated that the risks were within acceptable levels.
Minor Frequent Construction Worker	HQ < 0.2 ICR = 8E-6	HQ < 0.2 ICR = 2E-5 (cPAHs)	HQ < 0.2 ICR = 1E-5	HQ < 0.2 ICR = 2E-5 (cPAHs)	HQ < 0.2 ICR = 8E-6

Notes:
Shading indicates that the estimated risks exceed MPCA acceptable levels (ICRs > 1E-5, HQs > 0.2) for chronic exposures.
cPAH = Carcinogenic PAHs (BaP equivalent concentration).

TABLE 2-18

MAJOR CONTRIBUTORS TO CANCER RISK AND HAZARD INDICES
TYPICAL INDUSTRIAL WORKERS
NIROP FRIDLEY, MINNESOTA

Sub Area A3 - Subsurface Soil						
Sub Area A4 - Surface Soil						
Chemical	**Sample**	**Depth**	**Concentration**	**Units**	**ICR**	**HQ**
BaP Equivalents	AB032A	1 - 3	60,733	ug/kg	2E-04	NA

Notes:
ICR = Incremental cancer risk.
HQ = Hazard Quotient.

TABLE 2-19

MAJOR CONTRIBUTORS TO CANCER RISK AND HAZARD INDICES
MINOR FREQUENT CONSTRUCTION WORKERS
NIROP FRIDLEY, MINNESOTA

Sub Area A4 - Surface Soil						
Chemical	**Sample**	**Depth**	**Concentration**	**Units**	**ICR**	**HQ**
BaP Equivalents	AB032A	1 - 3	60,733	ug/kg	2E-04	NA

Sub Area E - Surface Soil						
Chemical	**Sample**	**Depth**	**Concentration**	**Units**	**ICR**	**HQ**
BaP Equivalents	EB004A	1 - 3	4,148	ug/kg	1E-05	NA

Notes:
ICR = Incremental cancer risk.
HQ = Hazard Quotient.

TABLE 2-20

SUMMARY OF REFINED RISK ANALYSIS
MAJOR INFREQUENT CONSTRUCTION WORKERS
NIROP FRIDLEY, MINNESOTA

Exposure Scenario	Estimated Risk									
	Sub Area A1	Sub Area A2	Sub Area A3	Sub Area A4	Area B1	Area B2	Area D	Area E	Area F	Other
Major Infrequent Construction Worker	HQ < 1	HQ < 1	HQ > 1 Antimony, Iron Manganese, 2-Butanone, PCE, 1,1,1-TCA, Toluene, Xylenes	HQ < 1	HQ < 1	HQ < 1	HQ < 1	HQ < 1	HQ < 1	HQ < 1
	ICR = 1E-7	ICR = 5E-7	ICR = 2E-5 (1,1-DCA, PCE, TCE)	ICR = 2E-5 (TCE, cPAHs)	ICR = 5E-7	ICR = 2E-7	ICR = 6E-7	ICR = 1E-6	ICR = 3E-7	ICR = 5E-8

Notes:
Screening evaluation is based on the maximum detected concentration of all soil samples collected in each sub area.
Shading indicates that the estimated risks exceed MPCA acceptable levels (ICRs > 1E-6, HQs > 1) for subchronic exposures.
ICR = Incremental cancer risks.
HQ = Hazard Quotient.
1,1-DCA = 1,1-Dichloroethane.
PCE = Tetrachloroethane.
TCE = Trichloroethene.
1,1,1-TCA = 1,1,1-Trichloroethane.
cPAHs = Carcinogenic PAHs (BaP equivalent concentration).

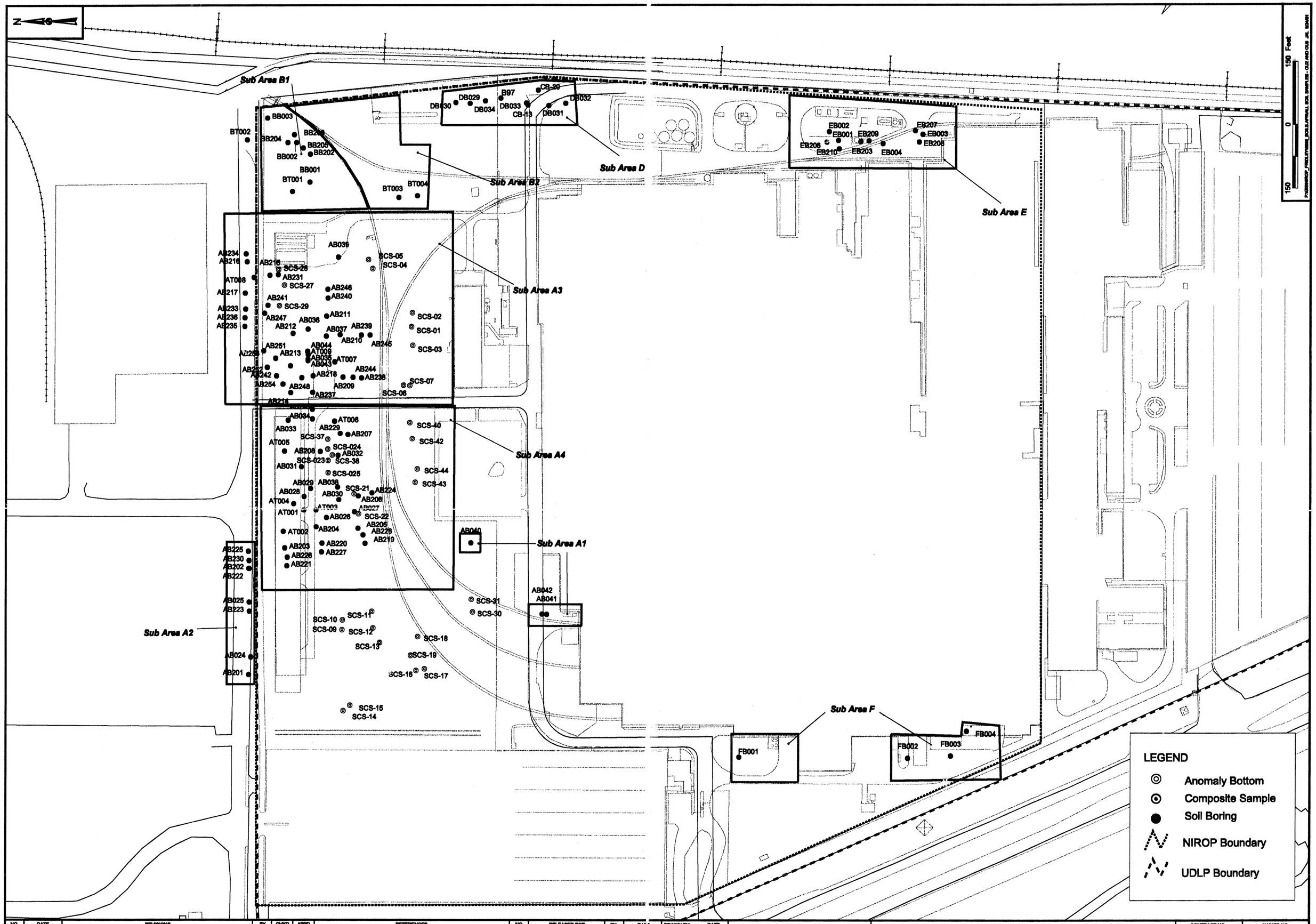
TABLE 2-21

MAJOR CONTRIBUTORS TO CANCER RISK AND HAZARD INDICES
MAJOR INFREQUENT CONSTRUCTION WORKER
NIROP FRIDLEY, MINNESOTA

Sub Area A3 - All Soil						
Chemical	**Sample**	**Depth**	**Concentration**	**Units**	**ICR**	**HQ**
1,1,1-Trichloroethane[1]	AT009D1	8 - 10	2,600,000	ug/kg	NA	6
1,1-Dichloroethane	AT009D1	8 - 10	34,000	ug/kg	1E-06	0.04
2-Butanone	AT009D1	8 - 10	3,500,000	ug/kg	NA	3
Tetrachloroethene[1, 2]	AT009D1	8 - 10	1,200,000	ug/kg	1E-05	0.8
Toluene	AT009D1	8 - 10	190,000	ug/kg	NA	0.8
Trichloroethene[1]	AT009D1	8 - 10	120,000	ug/kg	4E-06	NA
	AB043D	8 - 10	69,000	ug/kg	2E-06	NA
Xylenes[1]	AT009D1	8 - 10	580,000	ug/kg	NA	6
Antimony	AT008D-D[3]	8 - 10	105	mg/kg	NA	2
	AT008D	8 - 10	22.5	mg/kg	NA	0.4
Iron[1, 2]	AT007C	6 - 8	275,000	mg/kg	NA	9
Manganese[1, 2]	AT007C	6 - 8	20,700	mg/kg	NA	0.9

Sub Area A4 - All Soil						
Chemical	**Sample**	**Depth**	**Concentration**	**Units**	**ICR**	**HQ**
BaP Equivalents	AB032A	1 - 3	60,733	ug/kg	1E-05	NA
	AB030A	1 - 3	10,410	ug/kg	2E-06	NA
	AT001A	1 - 3	10,361	ug/kg	2E-06	NA
Trichloroethene	SA3-SCS-40-D[4]	3 - 5	96,000	ug/kg	3E-06	NA
	SA3-SCS-40	3 - 5	0.11	ug/kg	4E-09	NA
	AT004B	3 - 5	47,000	ug/kg	2E-06	NA

Notes:
ICR = Incremental cancer risk.
HQ = Hazard Quotient.
1 - Chemical would also be a concern if subsurface soil at this location would be accessed by an industrial worker.
2 - Chemical would also be a concern if subsurface soil at this location would be accessed by the minor frequent construction worker.
3 - Sample AT008D-D is a duplicate to sample AT008D.
4 - Sample SA3-SCS-40-D is a duplicate to sample SA3-SCS-40.



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	NO.	RELEASED FOR	BY	DATE

DRAWN BY: J. BELLONE — DATE: 3/15/01
CHECKED BY — DATE
COST/SCHEDULE-AREA
SCALE: AS NOTED

Tetra Tech NUS, Inc.

SOIL SAMPLE LOCATION MAP
OU2
NIROP FRIDLEY, MINNESOTA

CONTRACT NO. — OWNER NO.
APPROVED BY — DATE 10-10-01
APPROVED BY — DATE
DRAWING NO. FIGURE 2-1 — REV. 0

3.0 SUMMARY/CONCLUSIONS

The following item summarize the results of the HHRA for OU2.

- The results of the screening analysis indicated that HQs and/or ICRs for residential receptors exceeded MPCA and EPA risk acceptable levels at all sub areas with the exception of the "Other" sub area.

- HQs and ICRs for typical industrial workers exposed to surface soil and subsurface soil were within MPCA and EPA acceptable risk levels for all sub areas with the exception of subsurface soil at sub area A3 and surface soil at sub area A4. Tetrachloroethane, 1,1,1-trichloroethane, and xylenes in sample AT009D1 (8 to 10 feet bgs) and iron and manganese in sample AT007C (6 to 8 feet bgs) were the major contributors to the risk for subsurface soil at A3. The ICR for typical industrial workers exposed to surface soil at sub area A4 slightly exceeded the MPCA acceptable risk level but was within EPA's target risk range. Carcinogenic PAHs at boring AB032A (1 to 3 feet bgs) were the major contributor to the risk in surface soil at sub area A4.

- HQs and ICRs for minor frequent construction workers exposed to surface soil and subsurface soil were within MPCA and EPA acceptable risk levels for all sub areas with the exception of subsurface soil at sub area A3, surface soil at sub area A4, and surface soil at sub area E. Carcinogenic PAHs in sample AB043D (8 to 10 feet bgs); tetrachloroethene and 1,1,1-trichloroethane in sample AT009D1 (8 to 10 feet bgs); and manganese in sample AT007C (6 to 8 feet bgs) were the major contributors to the risk for subsurface soil at sub area A3. The ICRs for minor frequent construction workers exposed to surface soil at sub areas A4 and E slightly exceed the MPCA acceptable risk level, although the ICRs were within EPA's target risk range. Carcinogenic PAHs at sampling location AB032A (1 to 3 feet bgs) in sub area A4 and EB004 A (1 to 3 feet bgs) in sub area E were the major contributors to the ICR.

- HQs and/or ICRs for major infrequent construction workers exposed to surface soil and subsurface soil were within MPCA and EPA acceptable risk levels for all sub areas with the exception of sub areas A3 and A4. Antimony, 2-butanone, 1,1-dichloroethane, iron, tetrachloroethene, 1,1,1-trichloroethane, trichloroethene, and xylenes were the major contributors to the risk at sub area A3. Carcinogenic PAHs and trichloroethene were the major contributors to the risk at sub area A4.

- Based on the results of the risk assessment, sub areas A1, A2, B1, B2, D, F, and "Other" are not a concern under industrial/restricted commercial use.

- In sub area A3 contamination in the vicinity of sample locations AT009, AT007, and AB042 at depths of approximately 6 to 10 feet bgs were mainly responsible for exceedances of the acceptable risk levels. These sample locations are located in the vicinity of where the drum removal occurred during the OU2 field investigation and where a decontamination pad exists.

- In sub area A4 contamination in the vicinity of sample locations AB032 and AT001 at depths of less than 3 feet bgs and AT004 at depths of 3 to 5 feet were mainly responsible for exceedances of the acceptable risk levels.

- In sub area E contamination in the vicinity of sample location EB004 at a depth of 1 to 3 feet bgs was mainly responsible for exceedances of the acceptable risk levels.

- Based on the bulleted results above residual contamination in sub areas A1, A2, B1, B2, D, F and "Other" are not of concern if the land use is limited to industrial/restricted commercial use. In the remaining sub areas (i.e., A3, A4, and E) localized areas of contamination (i.e., hot spots) result in potential risk levels that exceed levels of concern.

- In sub area A3, VOC contamination in the vicinity of sample locations AT009 and AB043 at depths of 8-10 feet bgs and iron at AT007 at depths of 6-8 feet bgs are largely responsible for the risk exceedances. These sampling locations are located in and near the area where drum removal occurred and where a decontamination pad exists. Examination of these samples indicates a localized area with significantly elevated levels of contamination. For example, at AT009 the concentrations of 1,1,1-trichloroethane, 1,1-dichloroethane, 2-butanone, tetrachloroethene, toluene, trichloroethene, and xylenes correspond to ICR 15 times higher than the acceptable target risk level and hazard indices from approximately 3-14 times the target risk level. The concentrations of these contaminants at this location are also significantly (11-360 times) higher than the next highest concentration in sub area A3 suggesting a hot spot of contamination. In addition, the concentrations of 1,1,1-trichloroethane, tetrachloroethene, and xylenes exceed the default soil saturation limit suggesting that free product may be present. Removal of these sampling data points and recalculation of the 95 percent UCL mean exposure concentration produces risks within target risk levels.

- In sub area A4, cPAH contamination at AB032 at a depth of 1-3 feet bgs is largely responsible for the risk exceedance. Examination of this location indicates a localized area with significantly elevated levels. The concentration of cPAHs (as BaP equivalents) at this location corresponds to risk levels 10-20 times higher than the acceptable target risk level. The concentration is six times higher than the next highest concentration in sub area A4. Removal of this sampling data point and recalculation of the 95 percent UCL mean exposure concentration produces risks within target risk levels.

- In sub area E the number of sampling data points was insufficient to calculate a 95 percent UCL of the mean and therefore maximum concentrations were utilized as exposure concentrations in the refined risk assessment. Carcinogenic PAHs (as BaP equivalents) at sample location EB004 at a depth of 1-3 feet bgs is largely responsible for the risk exceedance. This concentration of cPAHs (as BaP equivalents) corresponds to approximately 1.5 times the target risk and is approximately two times higher than the next highest concentration in sub area E. Based on the limited data available EB004 does not appear to be a hot spot and the risk level associated with this specific location slightly exceeds the target risk.

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APPENDIX A

SUMMARY OF DETECTED CHEMICALS IN SOIL

TABLE 1
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A1
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A1 OU2 AB040 AB040A 1 - 3 06/15/92	A1 OU2 AB040 AB040D 8 - 10 06/15/92	A1 OU2 AB041 AB041A 1 - 3 06/08/92	A1 OU2 AB041 AB041C 6 - 8 06/08/92	A1 OU2 AB042 AB042A 1 - 3 06/09/92	A1 OU2 AB042 AB042G 16 - 18 06/09/92	A1 OU2 AB042 AB042G-D 16 - 18 06/09/92
Volatile Organics (ug/kg)								
1,2-DICHLOROETHENE (TOTAL)	8000	2	10 U	12 U	11 U	11 U	10 U	10 U
ACETONE	320000	11 U	4 U	2700	2600	1000	600	650
ETHYLBENZENE	200000	3	10 U	12 U	11 U	11 U	10 U	10 U
XYLENES, TOTAL	110000	5	10 U	12 U	11 U	11 U	10 U	10 U
Semivolatile Organics (ug/kg)								
BENZO(G,H,I)PERYLENE	NA			390 U	350	350 U	340 U	350 U
TOTAL PAHS	NA			390 U	350	350 U	340 U	350 U
Inorganics (mg/kg)								
ALUMINUM	26000			4190	2490	3590	1410	1460
ARSENIC	10			3.3	0.64 U	3.4	0.98 U	1.4
BARIUM	1200			113	21.9	84.4	10.4 U	10.3 U
CALCIUM	NA			16700	12600	17000	37300	30400
CHROMIUM	71			10.5	13.6	8.9	6.3	4.7
COPPER	100			6.7	4.3 U	10.3	4.6 U	5.1 U
IRON	7000			10600	6270	24300	5110	5670
LEAD	400			5.6	1.9	4.2	2.1	1.5
MAGNESIUM	NA			1600	3490	4140	10500	6830
MANGANESE	1400			927	162	882	421	339
NICKEL	520			9.5 U	8.6 U	12.1	12.9	14.7
POTASSIUM	NA			208	107 U	327 U	104 U	214 U
SODIUM	NA			141	107 U	165 U	104 U	103 U
VANADIUM	210			13.3	12.7	14	10.4 U	10.3 U
ZINC	8700			24.4	10.2	26	8	11.3
Miscellaneous Parameters (mg/kg)								
TOTAL ORGANIC CARBON	NA	4400	420	14000	470	6600	2600	2100

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 2
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A2
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A2	A2	A2	A2	A2	A2	A2	A2	A2	A2	A2
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB024	AB024	AB025	AB025	AB201	AB201	AB202	AB202	AB222	AB222	AB222
SAMPLE NUMBER:		AB024A	AB024G	AB025A	AB025B	AB201A	AB201H	AB202A	AB202B	AB222A	AB222A-D	AB222C
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	3 - 5	1 - 3	18 - 20	1 - 3	3 - 5	1 - 3	1 - 3	6 - 8
SAMPLE DATE:		06/09/92	06/09/92	06/09/92	06/09/92	07/08/92	07/08/92	07/08/92	07/08/92	07/09/92	07/09/92	07/09/92
Volatile Organics (ug/kg)												
1,2-DICHLOROETHENE (TOTAL)	8000	11 U	11 U	54 U	1500 U	11 U	10 U	10 U	2	11 U	11 U	10 U
ACETONE	320000	18 U	72 U	25 U	1500 U	12 U	12 U	7 U	6 U	6 U	15 U	410
TETRACHLOROETHENE	72000	11 U	11 U	54 U	1500 U	11 U	10 U	10 U	25	26	35	3
TRICHLOROETHENE	29000	11 U	11 U	920	4100	11 U	10 U	0.9	360	75	85	5
Semivolatile Organics (ug/kg)												
BENZO(A)ANTHRACENE	NA	140	350 U	350 U	400 U							
BENZO(A)PYRENE	NA	120	350 U	350 U	400 U							
BENZO(B)FLUORANTHENE	NA	130	350 U	350 U	400 U							
BENZO(K)FLUORANTHENE	NA	87	350 U	350 U	400 U							
CHRYSENE	NA	150	350 U	350 U	400 U							
FLUORANTHENE	1080000	290	350 U	350 U	400 U							
PHENANTHRENE	NA	180	350 U	350 U	400 U							
PYRENE	890000	290	350 U	350 U	400 U							
TOTAL CPAHS	NA	627	350 U	350 U	400 U							
TOTAL PAHS	NA	1387	350 U	350 U	400 U							
BAP EQUIVALENTS	2000	148.02	350 U	350 U	400 U							
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	3.6 U	3.5 U	4.8	4.4							
4,4'-DDE	40000	3.6 U	3.5 U	9.6	5.3							
4,4'-DDT	15000	4.5	3.5 U	28	14							
Inorganics (mg/kg)												
ALUMINUM	26000	5270	1470	3010	4990							
ARSENIC	10	4.7	1.4	1.9	8.3							
BARIUM	1200	87.5	10.4 U	43.6	227							
CALCIUM	NA	8180	25900	11700	67400							
CHROMIUM	71	11.3	4.2	7.5	8.8							
COPPER	100	158	4.5 U	11.1	12.8							
IRON	7000	12800	4160	7100	18000							
LEAD	400	143	1.8	5.1	5.8							
MAGNESIUM	NA	2400	7830	3950	2750							
MANGANESE	1400	873	230	397	2230							
NICKEL	520	12.4	24.2	10.7	12							
VANADIUM	210	18.6	10.9	12.9	19.7							
ZINC	8700	141	12	17.6	24.3							
Miscellaneous Parameters (mg/kg)												
TOTAL ORGANIC CARBON	NA	15000	1100	2000	16000	16000	5400	11000	16000	16000	3800	590

NA - Nc ..lable.
Shading indicates concentration exceeds the SRV.

TABLE 2
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A2
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A2 OU2 AB223 AB223A 1 - 3 07/09/92	A2 OU2 AB223 AB223C 6 - 8 07/09/92	A2 OU2 AB230 AB230A 1 - 3 07/10/92	A2 OU2 AB230 AB230B 3 - 5 07/10/92							
Volatile Organics (ug/kg)												
1,2-DICHLOROETHENE (TOTAL)	8000	11 U	12 U	11 U	11 U							
ACETONE	320000	36 U	170	6 U	6 U							
TETRACHLOROETHENE	72000	11 U	0.7	1	4							
TRICHLOROETHENE	29000	89	150	11 U	2							
Semivolatile Organics (ug/kg)												
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(K)FLUORANTHENE	NA											
CHRYSENE	NA											
FLUORANTHENE	1080000											
PHENANTHRENE	NA											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											
Inorganics (mg/kg)												
ALUMINUM	26000											
ARSENIC	10											
BARIUM	1200											
CALCIUM	NA											
CHROMIUM	71											
COPPER	100											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
NICKEL	520											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
TOTAL ORGANIC CARBON	NA	4100	8700	7000	660							

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:		A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	AB035	AB036	AB036	AB037	AB037	AB039	AB039	AB039	AB043	AB043	AB044
SAMPLE NUMBER:	Risk	AB035A	AB036A	AB036H	AB037A	AB037D	AB039A	AB039H	AB039H-D	AB043D	AB043H	AB044D
DEPTH (FEET):	Value	1 - 3	1 - 3	18 - 20	1 - 3	8 - 10	1 - 3	18 - 20	18 - 20	8 - 10	18 - 20	8 - 10
SAMPLE DATE:		06/10/92	06/15/92	06/15/92	06/10/92	06/10/92	06/10/92	06/10/92	06/10/92	07/20/92	07/20/92	07/20/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	2	1	0.4	11 U	10 U	11 U	11 U	11 U	7200	88	1500
1,1,2-TRICHLOROETHANE	9000	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	57 U	110 U	56 U
1,1-DICHLOROETHANE	34000	11 U	8	0.5	11 U	10 U	11 U	11 U	11 U	84	110 U	37
1,2-DICHLOROETHANE	4000	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	4	110 U	56 U
1,2-DICHLOROETHENE (TOTAL)	8000	13	210	9	11 U	4	11 U	11 U	11 U	1800	42	670
2-BUTANONE	1400000	11 U	11 U	11 U	11 U	10 U	11 U	11 U	3 U	57 U	83 U	58 U
2-HEXANONE	NA	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	57 U	110 U	56 U
4-METHYL-2-PENTANONE	NA	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	57 U	110 U	56 U
ACETONE	320000	5 U	11 U	11 U	11 U	6 U	11 U	42 U	64 U	57 U	12000	83 U
BENZENE	1500	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	57 U	110 U	56 U
ETHYLBENZENE	200000	11 U	11 U	11 U	11 U	10 U	11 U	11 U	11 U	1600	110 U	25
TETRACHLOROETHENE	72000	7	11 U	2	11 U	1	11 U	11 U	11 U	17000	2800	2800
TOLUENE	107000	11 U	1 U	1 U	1 U	10 U	27	11 U	11 U	1300	110 U	58
TRICHLOROETHENE	29000	36	8	15	0.8	9	2	0.6	11 U	69000	1400	11000
XYLENES, TOTAL	110000	11 U	4 U	11 U	11 U	10 U	11 U	11 U	11 U	6500	110 U	170
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000	360 U	120	360 U	160	340 U	380 U	350 U	350 U	1900 U	1400 U	1900 U
ANTHRACENE	7880000	360 U	330	360 U	370	340 U	380 U	350 U	350 U	660	1400 U	1900 U
BENZO(A)ANTHRACENE	NA	360 U	860	360 U	1300	340 U	380 U	350 U	350 U	2100	1400 U	1900 U
BENZO(A)PYRENE	NA	360 U	720	360 U	1200	340 U	380 U	350 U	350 U	1700	1400 U	1900 U
BENZO(B)FLUORANTHENE	NA	360 U	690	360 U	1200	340 U	380 U	350 U	350 U	1800	1400 U	1900 U
BENZO(G,H,I)PERYLENE	NA	360 U	340	360 U	870	340 U	380 U	350 U	350 U	1100	1400 U	1900 U
BENZO(K)FLUORANTHENE	NA	360 U	580	360 U	1200	340 U	380 U	350 U	350 U	1400	1400 U	1900 U
BIS(2-ETHYLHEXYL)PHTHALATE	570000	360 U	720 U	360 U	360 U	340 U	380 U	350 U	350 U	1700	1400 U	1300
CARBAZOLE	700000	360 U	720 U	360 U	240	340 U	380 U	350 U	350 U	1900 U	1400 U	1900 U
CHRYSENE	NA	360 U	850	360 U	1500	340 U	380 U	350 U	350 U	2100	1400 U	1900 U
DIBENZOFURAN	58000	360 U	110	360 U	360 U	340 U	380 U	350 U	350 U	1900 U	1400 U	1900 U
FLUORANTHENE	1080000	110	2000	360 U	3000	340 U	380 U	350 U	350 U	4400	1400 U	970
FLUORENE	850000	360 U	240	360 U	170	340 U	380 U	350 U	350 U	1900 U	1400 U	1900 U
INDENO(1,2,3-CD)PYRENE	NA	360 U	370	360 U	830	340 U	380 U	350 U	350 U	1100	1400 U	1900 U
NAPHTHALENE	10000	360 U	720 U	360 U	360 U	340 U	380 U	350 U	350 U	1900 U	1400 U	1900 U
PHENANTHRENE	NA	360 U	1900	360 U	1800	340 U	380 U	350 U	350 U	2700	1400 U	660
PHENOL	1100000	360 U	1300	360 U	360 U	340 U	380 U	350 U	350 U	1100	1400 U	1000
PYRENE	890000	120	1600	360 U	3000	340 U	380 U	350 U	350 U	5100	1400 U	1300
TOTAL CPAHS	NA	360 U	4070	360 U	7230	340 U	380 U	350 U	350 U	10200	1400 U	1900 U
TOTAL PAHS	NA	230	10360	360 U	16430	340 U	380 U	350 U	350 U	24160	1400 U	2930
BAP EQUIVALENTS	2000	360 U	1278.65	360 U	1726.5	340 U	380 U	350 U	350 U	3166.1	1400 U	1900 U
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	3.6 U	130	3.6 U	220	3.4 U	3.8 U	3.5 U	3.5 U	190	3.5 U	170
4,4'-DDE	40000	21	120	3.6 U	450	3.4 U	8.5	3.5 U	3.5 U	180	3.5 U	140
4,4'-DDT	15000	32	130	3.6 U	400	3.4 U	6.3	3.5 U	3.5 U	270	3.5 U	200

NA - N[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB035	AB036	AB036	AB037	AB037	AB039	AB039	AB039	AB043	AB043	AB044
SAMPLE NUMBER:		AB035A	AB036A	AB036H	AB037A	AB037D	AB039A	AB039H	AB039H-D	AB043D	AB043H	AB044D
DEPTH (FEET):		1 - 3	1 - 3	18 - 20	1 - 3	8 - 10	1 - 3	18 - 20	18 - 20	8 - 10	18 - 20	8 - 10
SAMPLE DATE:		06/10/92	06/15/92	06/15/92	06/10/92	06/10/92	06/10/92	06/10/92	06/10/92	07/20/92	07/20/92	07/20/92
ALDRIN	1000	1.9 U	3.1	1.8 U	18 U	1.8 U	2 U	1.8 U	1.8 U	19 U	1.8 U	19 U
DELTA-BHC	NA	1.9 U	1.8 U	1.8 U	18 U	1.8 U	2 U	1.8 U	1.8 U	19 U	1.8 U	19 U
DIELDRIN	800	3.6 U	4	3.6 U	36 U	3.4 U	3.8 U	3.5 U	3.5 U	37 U	3.5 U	37 U
ENDOSULFAN II	NA	3.6 U	3.6 U	3.6 U	36 U	3.4 U	3.8 U	3.5 U	3.5 U	37 U	3.5 U	37 U
GAMMA-CHLORDANE	NA	1.9 U	3.4	1.8 U	18 U	1.8 U	2 U	1.8 U	1.8 U	19 U	1.8 U	19 U
HEPTACHLOR EPOXIDE	400	1.9 U	2.6	1.8 U	18 U	1.8 U	2 U	1.8 U	1.8 U	19 U	1.8 U	19 U
Inorganics (mg/kg)												
ALUMINUM	26000	5050	2450	1360	3900	1450	4050	1050	1010	3740	1040	3570
ANTIMONY	14	2.1 U	2.2 U	2.1 U	2.1 U	2 U	2.3 U	2.2 U	2.2 U	2.3 U	2.1 U	2.2 U
ARSENIC	10	2	4.5	1.3	4.2	0.61 U	4.2	0.94	1.2	3.3	1.2	3.4
BARIUM	1200	41.3	36.7	10.6 U	73.6	10.2 U	188	10.8 U	10.9 U	82.5	10.5 U	77
CADMIUM	35	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	5.3	1 U	2.7
CALCIUM	NA	8590	21800	24500	18700	22900	21400	21000	22100	39200	17800	17400
CHROMIUM	71	16.4	16.8	3.4	11.7	5.8	11.3	4.1	3.8	17	2.8	20.7
COBALT	2000	10.6 U	10.8 U	10.6 U	10.6 U	10.2 U	11.4 U	10.8 U	10.9 U	11.3 U	10.5 U	11.1 U
COPPER	100	20.7	155	4.2 U	43.9	4.1	204	4.3 U	4.4 U	239	4.2 U	314
CYANIDE	62	2.7 U	2.7 U	2.6 U	2.6 U	2.6 U	2.8 U	2.7 U	2.7 U	2.8 U	2.6 U	5.3
IRON	7000	11100	8710	4080	11000	3820	16200	3580	3120	11000	2990	13300
LEAD	400	12.4	54.9	2	50.7	1.4	15.6	2.2	2.1	59.5	1.8	73.8
MAGNESIUM	NA	4540	11200	6140	9770	5360	8860	4280	5870	20600	4350	6540
MANGANESE	1400	470	447	392	493	431	2060	326	335	474	222	631
MERCURY	0.7	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.1 U	0.11 U
NICKEL	520	14.1	25.5	9.9	9.1	8.2 U	12.7	13	9.5	49.8	8.4 U	40.5
POTASSIUM	NA	216	230	113	270	102 U	227	108 U	109 U	1000 U	1000 U	1000 U
SELENIUM	170	0.64 U	0.82	0.63 U	0.63 U	0.61 U	0.68 U	0.65 U	0.65 U	0.68 U	0.63 U	0.67 U
SILVER	170	2.1 U	2.2 U	2.1 U	2.1 U	2 U	2.3 U	2.2 U	2.2 U	11.8	2.1 U	6.1
SODIUM	NA	189	108 U	106 U	106 U	102 U	114 U	108 U	109 U	195	105 U	122
VANADIUM	210	23.1	10.8 U	10.6 U	15.9	10.2 U	17.1	10.8 U	10.9 U	20.2	10.5 U	22.8
ZINC	8700	35.5	56	9.5	80.8	9.2	58.2	11.3	9.1	329	6.6	314
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	1800	12000	1600	16000	180	1300	730	100	9800	370	12000
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB044	AB209	AB209	AB210	AB210	AB211	AB211	AB212	AB212	AB213	AB213
SAMPLE NUMBER:		AB044H	AB209A	AB209B	AB210A	AB210D	AB211A	AB211B	AB212A	AB212B	AB213A	AB213A-D
DEPTH (FEET):		18 - 20	1 - 3	3 - 5	1 - 3	8 - 10	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3
SAMPLE DATE:		07/20/92	07/23/92	07/23/92	07/23/92	07/23/92	07/23/92	07/23/92	07/24/92	07/24/92	07/23/92	07/23/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	63	11 U	3	11 U	10 U	8	11 U	11 U	11 U	2	5
1,1,2-TRICHLOROETHANE	9000	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
1,1-DICHLOROETHANE	34000	22	11 U	12 U	2	10 U	2	11 U	11 U	11 U	15 U	12 U
1,2-DICHLOROETHANE	4000	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
1,2-DICHLOROETHENE (TOTAL)	8000	730	11 U	6	48	2	16	1	2	13	2	6
2-BUTANONE	1400000	54 U	11 U	10 U	15 U	9 U	9 U	11 U	10 U	12 U	11 U	10 U
2-HEXANONE	NA	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
4-METHYL-2-PENTANONE	NA	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
ACETONE	320000	430 U	9 U	7 U	64 U	13 U	9 U	10 U	9 U	12 U	12 U	10 U
BENZENE	1500	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
ETHYLBENZENE	200000	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
TETRACHLOROETHENE	72000	590	11 U	3	11 U	10 U	11 U	11 U	11 U	2	2	4
TOLUENE	107000	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
TRICHLOROETHENE	29000	2300	0.8	29	1	3	120	1	2	21	35	90
XYLENES, TOTAL	110000	54 U	11 U	12 U	11 U	10 U	11 U	11 U	11 U	11 U	15 U	12 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000	350 U										
ANTHRACENE	7880000	350 U										
BENZO(A)ANTHRACENE	NA	350 U										
BENZO(A)PYRENE	NA	350 U										
BENZO(B)FLUORANTHENE	NA	350 U										
BENZO(G,H,I)PERYLENE	NA	350 U										
BENZO(K)FLUORANTHENE	NA	350 U										
BIS(2-ETHYLHEXYL)PHTHALATE	570000	350 U										
CARBAZOLE	700000	350 U										
CHRYSENE	NA	350 U										
DIBENZOFURAN	58000	350 U										
FLUORANTHENE	1080000	350 U										
FLUORENE	850000	350 U										
INDENO(1,2,3-CD)PYRENE	NA	350 U										
NAPHTHALENE	10000	350 U										
PHENANTHRENE	NA	350 U										
PHENOL	1100000	350 U										
PYRENE	890000	350 U										
TOTAL CPAHS	NA	350 U										
TOTAL PAHS	NA	350 U										
BAP EQUIVALENTS	2000	350 U										
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	3.5 U										
4,4'-DDE	40000	3.5 U										
4,4'-DD[illegible]	15000	3.5 U										

NA - N[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB044	AB209	AB209	AB210	AB210	AB211	AB211	AB212	AB212	AB213	AB213
SAMPLE NUMBER:		AB044H	AB209A	AB209B	AB210A	AB210D	AB211A	AB211B	AB212A	AB212B	AB213A	AB213A-D
DEPTH (FEET):		18 - 20	1 - 3	3 - 5	1 - 3	8 - 10	1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	1 - 3
SAMPLE DATE:		07/20/92	07/23/92	07/23/92	07/23/92	07/23/92	07/23/92	07/23/92	07/24/92	07/24/92	07/23/92	07/23/92
ALDRIN	1000	1.8 U										
DELTA-BHC	NA	1.8 U										
DIELDRIN	800	3.5 U										
ENDOSULFAN II	NA	3.5 U										
GAMMA-CHLORDANE	NA	1.8 U										
HEPTACHLOR EPOXIDE	400	1.8 U										
Inorganics (mg/kg)												
ALUMINUM	26000	1010										
ANTIMONY	14	2.1 U										
ARSENIC	10	3.2										
BARIUM	1200	10.5 U										
CADMIUM	35	1.1 U										
CALCIUM	NA	19600										
CHROMIUM	71	3.6										
COBALT	2000	10.5 U										
COPPER	100	4.2 U										
CYANIDE	62	2.6 U										
IRON	7000	3220										
LEAD	400	2.2										
MAGNESIUM	NA	4920										
MANGANESE	1400	439										
MERCURY	0.7	0.11 U										
NICKEL	520	13.1										
POTASSIUM	NA	1000 U										
SELENIUM	170	0.63 U										
SILVER	170	2.1 U										
SODIUM	NA	105 U										
VANADIUM	210	10.5 U										
ZINC	8700	10.5										
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	830	16000	11000	6300	140	4700	5600	1500	16000	4400	14000
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB213	AB214	AB214	AB215	AB215	AB216	AB216	AB217	AB217	AB218	AB218
SAMPLE NUMBER:		AB213B	AB214A	AB214C	AB215A	AB215H	AB216A	AB216D	AB217A	AB217D	AB218A	AB218H
DEPTH (FEET):		3 - 5	1 - 3	6 - 8	1 - 3	18 - 20	1 - 3	8 - 10	1 - 3	8 - 10	1 - 3	18 - 20
SAMPLE DATE:		07/23/92	07/28/92	07/28/92	07/09/92	07/09/92	07/13/92	07/13/92	07/13/92	07/13/92	07/24/92	07/24/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	4	0.8	87	11 U	11 U	11 U	11 U	11 U	56 U	3	0.9
1,1,2-TRICHLOROETHANE	9000	11 U	11 U	3	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
1,1-DICHLOROETHANE	34000	11 U	11 U	8	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
1,2-DICHLOROETHANE	4000	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	9	7	240	11 U	11 U	11 U	11 U	3	16	3	8
2-BUTANONE	1400000	11 U	10 U	16 U	11 U	11 U	10 U	11 U	13 U	52 U	10 U	13 U
2-HEXANONE	NA	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
4-METHYL-2-PENTANONE	NA	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
ACETONE	320000	7 U	6 U	8 U	6 U	7 U	11 U	8 U	7 U	180 U	7 U	31 U
BENZENE	1500	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
ETHYLBENZENE	200000	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
TETRACHLOROETHENE	72000	13	11 U	120	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11
TOLUENE	107000	11 U	11 U	16 U	11 U	4 U	11 U	11 U	11 U	12 U	11 U	11 U
TRICHLOROETHENE	29000	130	100	7700	12	5	30	92	91	700	24	31
XYLENES, TOTAL	110000	11 U	11 U	16 U	11 U	11 U	11 U	11 U	11 U	56 U	11 U	11 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PHENOL	1100000											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DD[illegible]	15000											

NA - No[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB213 AB213B 3 - 5 07/23/92	A3 OU2 AB214 AB214A 1 - 3 07/28/92	A3 OU2 AB214 AB214C 6 - 8 07/28/92	A3 OU2 AB215 AB215A 1 - 3 07/09/92	A3 OU2 AB215 AB215H 18 - 20 07/09/92	A3 OU2 AB216 AB216A 1 - 3 07/13/92	A3 OU2 AB216 AB216D 8 - 10 07/13/92	A3 OU2 AB217 AB217A 1 - 3 07/13/92	A3 OU2 AB217 AB217D 8 - 10 07/13/92	A3 OU2 AB218 AB218A 1 - 3 07/24/92	A3 OU2 AB218 AB218H 18 - 20 07/24/92
ALDRIN	1000											
DELTA-BHC	NA											
DIELDRIN	800											
ENDOSULFAN II	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COBALT	2000											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SILVER	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	6800	12000	16000	3600	2500	12000	360	8600	9100	4600	260
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB231	AB231	AB233	AB233	AB234	AB234	AB234	AB235	AB235	AB236	AB236
SAMPLE NUMBER:		AB231A	AB231H	AB233A	AB233H	AB234A	AB234A-D	AB234D	AB235A	AB235H	AB236A	AB236H
DEPTH (FEET):		1 - 3	18 - 20	1 - 3	18 - 20	1 - 3	1 - 3	8 - 10	1 - 3	18 - 20	1 - 3	18 - 20
SAMPLE DATE:		07/14/92	07/14/92	07/14/92	07/14/92	07/15/92	07/15/92	07/15/92	07/15/92	07/15/92	07/15/92	07/15/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	2	11 U	11 U
1,1,2-TRICHLOROETHANE	9000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
1,1-DICHLOROETHANE	34000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
1,2-DICHLOROETHANE	4000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	1	11 U	11 U
2-BUTANONE	1400000	7 U	13 U	11 U	10 U	15 U	10 U	12 U	10 U	10 U	12 U	11 U
2-HEXANONE	NA	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	NA	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
ACETONE	320000	5 U	15 U	5 U	27 U	10 U	7 U	88 U	7 U	11 U	9 U	17 U
BENZENE	1500	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
ETHYLBENZENE	200000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
TETRACHLOROETHENE	72000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
TOLUENE	107000	11 U	1 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
TRICHLOROETHENE	29000	18	7	33	10	3	4	3	10	71	23	14
XYLENES, TOTAL	110000	11 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PHENOL	1100000											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DD[illegible]	15000											

NA - No[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB231 AB231A 1 - 3 07/14/92	A3 OU2 AB231 AB231H 18 - 20 07/14/92	A3 OU2 AB233 AB233A 1 - 3 07/14/92	A3 OU2 AB233 AB233H 18 - 20 07/14/92	A3 OU2 AB234 AB234A 1 - 3 07/15/92	A3 OU2 AB234 AB234A-D 1 - 3 07/15/92	A3 OU2 AB234 AB234D 8 - 10 07/15/92	A3 OU2 AB235 AB235A 1 - 3 07/15/92	A3 OU2 AB235 AB235H 18 - 20 07/15/92	A3 OU2 AB236 AB236A 1 - 3 07/15/92	A3 OU2 AB236 AB236H 18 - 20 07/15/92
ALDRIN	1000											
DELTA-BHC	NA											
DIELDRIN	800											
ENDOSULFAN II	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COBALT	2000											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SILVER	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	10000	4800	7400	1600	8200	12000	3100	7700	2400	7400	2100
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB237	AB237	AB238	AB238	AB238	AB239	AB239	AB240	AB240	AB241	AB241
SAMPLE NUMBER:		AB237A	AB237C	AB238A	AB238H	AB238H-D	AB239A	AB239G	AB240A	AB240H	AB241A	AB241C
DEPTH (FEET):		1 - 3	6 - 8	1 - 3	18 - 20	18 - 20	1 - 3	16 - 18	1 - 3	18 - 20	1 - 3	6 - 8
SAMPLE DATE:		07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92	07/27/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	11 U	11 U	11 U	12 U	11 U	1	11 U	11 U	4	10 U
1,1,2-TRICHLOROETHANE	9000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
1,1-DICHLOROETHANE	34000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	1	10 U
1,2-DICHLOROETHANE	4000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
1,2-DICHLOROETHENE (TOTAL)	8000	5	7	11 U	11 U	12 U	5	3	11 U	1	14	10 U
2-BUTANONE	1400000	11 U	10 U	9 U	10 U	7 U	11 U	12 U	10 U	13 U	9 U	9 U
2-HEXANONE	NA	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
4-METHYL-2-PENTANONE	NA	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
ACETONE	320000	9 U	8 U	6 U	17 U	16 U	11 U	16 U	8 U	20 U	7 U	7 U
BENZENE	1500	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
ETHYLBENZENE	200000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
TETRACHLOROETHENE	72000	11 U	3	11 U	11 U	12 U	11 U	2	11 U	11 U	11 U	10 U
TOLUENE	107000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
TRICHLOROETHENE	29000	16	18	11 U	2	4	6	19	3	10	73	10 U
XYLENES, TOTAL	110000	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U	11 U	11 U	10 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PHENOL	1100000											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											

NA - N[illegible]lable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB237 AB237A 1 - 3 07/27/92	A3 OU2 AB237 AB237C 6 - 8 07/27/92	A3 OU2 AB238 AB238A 1 - 3 07/27/92	A3 OU2 AB238 AB238H 18 - 20 07/27/92	A3 OU2 AB238 AB238H-D 18 - 20 07/27/92	A3 OU2 AB239 AB239A 1 - 3 07/27/92	A3 OU2 AB239 AB239G 16 - 18 07/27/92	A3 OU2 AB240 AB240A 1 - 3 07/27/92	A3 OU2 AB240 AB240H 18 - 20 07/27/92	A3 OU2 AB241 AB241A 1 - 3 07/27/92	A3 OU2 AB241 AB241C 6 - 8 07/27/92
ALDRIN	1000											
DELTA-BHC	NA											
DIELDRIN	800											
ENDOSULFAN II	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COBALT	2000											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SILVER	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	2500	510	2900	3100	1800	16000	1300	6200	1700	5200	980
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB242	AB242	AB244	AB244	AB244	AB245	AB245	AB246	AB246	AB247	AB247
SAMPLE NUMBER:		AB242A	AB242B	AB244A	AB244H	AB244H-D	AB245A	AB245G	AB246A	AB246B	AB247A	AB247C
DEPTH (FEET):		1 - 3	3 - 5	1 - 3	18 - 20	18 - 20	1 - 3	16 - 18	1 - 3	3 - 5	1 - 3	6 - 8
SAMPLE DATE:		07/28/92	07/28/92	07/28/92	07/28/92	07/28/92	07/29/92	07/29/92	07/29/92	07/29/92	07/29/92	07/29/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	3	15	11 U	12 U	12 U	13 U	11 U	11 U	1	5	11 U
1,1,2-TRICHLOROETHANE	9000	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
1,1-DICHLOROETHANE	34000	11 U	1	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
1,2-DICHLOROETHANE	4000	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	12	17	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
2-BUTANONE	1400000	10 U	10 U	10 U	11 U	12 U	10 U	8 U	11 U	12 U	9 U	9 U
2-HEXANONE	NA	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
4-METHYL-2-PENTANONE	NA	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
ACETONE	320000	11 U	6 U	12 U	12 U	8 U	8 U	10 U	8 U	10 U	7 U	18 U
BENZENE	1500	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
ETHYLBENZENE	200000	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
TETRACHLOROETHENE	72000	5	17	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
TOLUENE	107000	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
TRICHLOROETHENE	29000	140	340	11 U	4	3	13 U	1	6	31	210	20
XYLENES, TOTAL	110000	11 U	11 U	11 U	12 U	12 U	13 U	11 U	11 U	14 U	11 U	11 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PHENOL	1100000											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											

NA - N[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB242 AB242A 1 - 3 07/28/92	A3 OU2 AB242 AB242B 3 - 5 07/28/92	A3 OU2 AB244 AB244A 1 - 3 07/28/92	A3 OU2 AB244 AB244H 18 - 20 07/28/92	A3 OU2 AB244 AB244H-D 18 - 20 07/28/92	A3 OU2 AB245 AB245A 1 - 3 07/29/92	A3 OU2 AB245 AB245G 16 - 18 07/29/92	A3 OU2 AB246 AB246A 1 - 3 07/29/92	A3 OU2 AB246 AB246B 3 - 5 07/29/92	A3 OU2 AB247 AB247A 1 - 3 07/29/92	A3 OU2 AB247 AB247C 6 - 8 07/29/92
ALDRIN	1000											
DELTA-BHC	NA											
DIELDRIN	800											
ENDOSULFAN II	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COBALT	2000											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SILVER	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	12000	3200	14000	970	4000	16000	1600	6200	16000	12000	8600
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB248	AB248	AB248	AB251	AB251	AB252	AB252	AB253	AB253	AB254	AB254
SAMPLE NUMBER:		AB248A	AB248C	AB248C-D	AB251A	AB251C	AB252A	AB252H	AB253A	AB253H	AB254A	AB254A-D
DEPTH (FEET):		1 - 3	6 - 8	6 - 8	1 - 3	6 - 8	1 - 3	18 - 20	1 - 3	18 - 20	1 - 3	1 - 3
SAMPLE DATE:		07/30/92	07/30/92	07/30/92	07/29/92	07/29/92	07/30/92	07/30/92	07/29/92	07/29/92	07/30/92	07/30/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	2	73	51	11 U	79	1	11 U	11 U	71 U	25	6
1,1,2-TRICHLOROETHANE	9000	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
1,1-DICHLOROETHANE	34000	11 U	8	9	11 U	52	11 U	11 U	11 U	56	54 U	54 U
1,2-DICHLOROETHANE	4000	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
1,2-DICHLOROETHENE (TOTAL)	8000	13	150	120	1	640	2	11 U	11 U	260	190	150
2-BUTANONE	1400000	12 U	54 U	33 U	9 U	47 U	16 U	7 U	9 U	74 U	39 U	54 U
2-HEXANONE	NA	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
4-METHYL-2-PENTANONE	NA	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
ACETONE	320000	7 U	36 U	42 U	7 U	44 U	28 U	9 U	7 U	140 U	24 U	35 U
BENZENE	1500	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
ETHYLBENZENE	200000	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
TETRACHLOROETHENE	72000	6	160	89	11 U	140	0.8	11 U	11 U	62	13	54 U
TOLUENE	107000	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
TRICHLOROETHENE	29000	92	1200	700	5	4000	67	3	11 U	1800	4100	660
XYLENES, TOTAL	110000	11 U	65 U	35 U	11 U	62 U	11 U	11 U	11 U	71 U	54 U	54 U
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PHENOL	1100000											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											

NA - No. .lable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB248 AB248A 1 - 3 07/30/92	A3 OU2 AB248 AB248C 6 - 8 07/30/92	A3 OU2 AB248 AB248C-D 6 - 8 07/30/92	A3 OU2 AB251 AB251A 1 - 3 07/29/92	A3 OU2 AB251 AB251C 6 - 8 07/29/92	A3 OU2 AB252 AB252A 1 - 3 07/30/92	A3 OU2 AB252 AB252H 18 - 20 07/30/92	A3 OU2 AB253 AB253A 1 - 3 07/29/92	A3 OU2 AB253 AB253H 18 - 20 07/29/92	A3 OU2 AB254 AB254A 1 - 3 07/30/92	A3 OU2 AB254 AB254A-D 1 - 3 07/30/92
ALDRIN	1000											
DELTA-BHC	NA											
DIELDRIN	800											
ENDOSULFAN II	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COBALT	2000											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SILVER	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	6300	16000	16000	8400	1100	3700	900	11000	3100	14000	14000
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB254	SCS-01	SCS-01	SCS-02	SCS-03	SCS-27	SCS-28	SCS-29
SAMPLE NUMBER:		AB254C	SA1-SCS-01	SA1-SCS-01-D	SA1-SCS-02	SA1-SCS-03	SA2-SCS-027	SA2-SCS-028	SA2-SCS-029
DEPTH (FEET):		6 - 8	10	10	10	10	12	12	12
SAMPLE DATE:		07/30/92	05/08/96	05/08/96	05/08/96	05/08/96	05/09/96	05/09/96	05/09/96
Volatile Organics (ug/kg)									
1,1,1-TRICHLOROETHANE	140000	10	10 U	10 U	11 U	11 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	9000	26 U							
1,1-DICHLOROETHANE	34000	2	10 U	10 U	11 U	11 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	4000	26 U							
1,2-DICHLOROETHENE (TOTAL)	8000	47	10 U	10 U	11 U	11 U	10 U	10 U	10 U
2-BUTANONE	1400000	27 U							
2-HEXANONE	NA	26 U							
4-METHYL-2-PENTANONE	NA	26 U							
ACETONE	320000	59 U							
BENZENE	1500	26 U							
ETHYLBENZENE	200000	26 U	10 U	10 U	11 U	11 U	10 U	10 U	10 U
TETRACHLOROETHENE	72000	9	10 U	10 U	11 U	11 U	10 U	10 U	10 U
TOLUENE	107000	26 U	10 U	10 U	11 U	11 U	10 U	10 U	10 U
TRICHLOROETHENE	29000	370	10 U	10 U	11 U	11 U	10 U	3	10
XYLENES, TOTAL	110000	26 U							
Semivolatile Organics (ug/kg)									
ACENAPHTHENE	1200000		340 U	340 U	350 U	370 U	340 U	340 U	340 U
ANTHRACENE	7880000								
BENZO(A)ANTHRACENE	NA		340 U	340 U	350 U	370 U	340 U	340 U	340 U
BENZO(A)PYRENE	NA		340 U	340 U	350 U	370 U	340 U	340 U	340 U
BENZO(B)FLUORANTHENE	NA		24	340 U	350 U	29	340 U	340 U	340 U
BENZO(G,H,I)PERYLENE	NA								
BENZO(K)FLUORANTHENE	NA		340 U	340 U	350 U	370 U	340 U	340 U	340 U
BIS(2-ETHYLHEXYL)PHTHALATE	570000								
CARBAZOLE	700000		340 U	340 U	350 U	370 U	340 U	340 U	340 U
CHRYSENE	NA		340 U	340 U	350 U	370 U	340 U	340 U	340 U
DIBENZOFURAN	58000								
FLUORANTHENE	1080000								
FLUORENE	850000								
INDENO(1,2,3-CD)PYRENE	NA		340 U	340 U	350 U	370 U	340 U	340 U	340 U
NAPHTHALENE	10000								
PHENANTHRENE	NA								
PHENOL	1100000		340 U	340 U	350 U	370 U	340 U	340 U	340 U
PYRENE	890000		27	340 U	350 U	370 U	340 U	340 U	340 U
TOTAL CPAHS	NA		24	340 U	350 U	29	340 U	340 U	340 U
TOTAL PAHS	NA		51	340 U	350 U	29	340 U	340 U	340 U
BAP EQUIVALENTS	2000		378.27	340 U	350 U	411.935	340 U	340 U	340 U
Pesticides/PCBs (ug/kg)									
4,4'-DDD	56000								
4,4'-DDE	40000								
4,4'-DDT	15000								

NA - No [illegible]able.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AB254 AB254C 6 - 8 07/30/92	A3 OU2 SCS-01 SA1-SCS-01 10 05/08/96	A3 OU2 SCS-01 SA1-SCS-01-D 10 05/08/96	A3 OU2 SCS-02 SA1-SCS-02 10 05/08/96	A3 OU2 SCS-03 SA1-SCS-03 10 05/08/96	A3 OU2 SCS-27 SA2-SCS-027 12 05/09/96	A3 OU2 SCS-28 SA2-SCS-028 12 05/09/96	A3 OU2 SCS-29 SA2-SCS-029 12 05/09/96
ALDRIN	1000								
DELTA-BHC	NA								
DIELDRIN	800								
ENDOSULFAN II	NA								
GAMMA-CHLORDANE	NA								
HEPTACHLOR EPOXIDE	400								
Inorganics (mg/kg)									
ALUMINUM	26000								
ANTIMONY	14		0.3 U	0.3 U	0.32 U	0.4 U	0.3 U	0.31 U	0.3 U
ARSENIC	10								
BARIUM	1200		8.4	6.1	8.4	65.9	3.9	11.2	5.2
CADMIUM	35		0.08	0.04	0.06	0.31	0.08	0.1	0.04 U
CALCIUM	NA								
CHROMIUM	71		9.1	4.8	5.2	11.6	5	6.2	4.3
COBALT	2000								
COPPER	100		4.1	2.5	2.8	17	3.7	7.4	2.5
CYANIDE	62		0.1 U	0.1 U	0.11 U	0.13 U	0.1 U	0.1 U	0.1 U
IRON	7000								
LEAD	400		1.2	1.1	11.8	23.2	1.6	2.4	1.2
MAGNESIUM	NA								
MANGANESE	1400								
MERCURY	0.7		0.03 U	0.03 U	0.04 U	0.04 U	0.03 U	0.03 U	0.03 U
NICKEL	520		10	5.9	6	16.6	9.1	11.4	5.8
POTASSIUM	NA								
SELENIUM	170								
SILVER	170		0.19 U	0.19 U	0.2 U	0.25 U	0.19 U	0.2 U	0.19 U
SODIUM	NA								
VANADIUM	210								
ZINC	8700		12	8.4	9.4	37.6	7.5	14.2	8.4
Miscellaneous Parameters (mg/kg)									
SULFATE	NA		475	854	2090	1100	1820	1010	216
TOTAL ORGANIC CARBON	NA	2700							
TOTAL ORGANIC HALIDES	NA		10.3 U	10.2 U	10.8 U	11.3 U	10.3 U	10.4 U	10.4 U

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:		A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	SCS-04	SCS-05	SCS-06	SCS-07	AT007	AT007	AT008	AT008	AT008	AT009
SAMPLE NUMBER:	Risk	SB28-SCS-04	SB28-SCS-05	SB30-SCS-06	SB30-SCS-07	AT007A	AT007C	AT008A	AT008D	AT008D-D	AT009B1
DEPTH (FEET):	Value	12	2	2	10	1 - 3	6 - 8	1 - 3	8 - 10	8 - 10	3 - 5
SAMPLE DATE:		05/08/96	05/08/96	05/08/96	05/08/96	06/17/92	06/17/92	06/17/92	06/17/92	06/17/92	06/23/92
Volatile Organics (ug/kg)											
1,1,1-TRICHLOROETHANE	140000	10 U	10 U	10 U	10 U	1	4	12 U	13 U	12 U	500
1,1,2-TRICHLOROETHANE	9000					11 U	22 U	12 U	13 U	12 U	57 U
1,1-DICHLOROETHANE	34000	10 U	10 U	10 U	10 U	3	15	12 U	13 U	12 U	73
1,2-DICHLOROETHANE	4000					11 U	22 U	12 U	13 U	12 U	57 U
1,2-DICHLOROETHENE (TOTAL)	8000	10 U	10 U	10 U	10 U	24	140	2	1000	890	590
2-BUTANONE	1400000					11 U	22 U	12 U	13 U	12 U	57 U
2-HEXANONE	NA					11 U	22 U	12 U	2	12 U	57 U
4-METHYL-2-PENTANONE	NA					11 U	22 U	12 U	1	12 U	57 U
ACETONE	320000					8 U	22 U	10 U	210	85 U	29 U
BENZENE	1500					11 U	14	12 U	1	12 U	57 U
ETHYLBENZENE	200000	10 U	10 U	10 U	10 U	11 U	22 U	12 U	13 U	12 U	57 U
TETRACHLOROETHENE	72000	10 U	10 U	10 U	10 U	11 U	21	12 U	13 U	12 U	11000
TOLUENE	107000	10 U	10 U	10 U	10 U	11 U	3 U	12 U	13 U	12 U	57 U
TRICHLOROETHENE	29000	10 U	10 U	10 U	10 U	27	280	9	11000	7500	1500
XYLENES, TOTAL	110000					11 U	22 U	12 U	13 U	12 U	230
Semivolatile Organics (ug/kg)											
ACENAPHTHENE	1200000	340 U	340 U	340 U	340 U	350 U	13000 U	340 U	450 U	8600 U	1500 U
ANTHRACENE	7880000					350 U	13000 U	340 U	450 U	8600 U	1500 U
BENZO(A)ANTHRACENE	NA	340 U	340 U	340 U	39	350 U	13000 U	340 U	450 U	8600 U	1500 U
BENZO(A)PYRENE	NA	340 U	340 U	340 U	36	350 U	13000 U	340 U	450 U	8600 U	1500 U
BENZO(B)FLUORANTHENE	NA	340 U	340 U	340 U	47	350 U	13000 U	340 U	450 U	8600 U	1500 U
BENZO(G,H,I)PERYLENE	NA					350 U	13000 U	340 U	450 U	8600 U	1500 U
BENZO(K)FLUORANTHENE	NA	340 U	340 U	340 U	45	350 U	13000 U	340 U	450 U	8600 U	1500 U
BIS(2-ETHYLHEXYL)PHTHALATE	570000					350 U	13000 U	340 U	450 U	8600 U	1500 U
CARBAZOLE	700000	340 U	340 U	340 U	340 U	350 U	13000 U	340 U	450 U	8600 U	1500 U
CHRYSENE	NA	340 U	340 U	340 U	47	350 U	13000 U	340 U	450 U	8600 U	1500 U
DIBENZOFURAN	58000					350 U	13000 U	340 U	450 U	8600 U	1500 U
FLUORANTHENE	1080000					350 U	13000 U	340 U	450 U	8600 U	380
FLUORENE	850000					350 U	13000 U	340 U	450 U	8600 U	1500 U
INDENO(1,2,3-CD)PYRENE	NA	340 U	340 U	340 U	18	350 U	13000 U	340 U	450 U	8600 U	1500 U
NAPHTHALENE	10000					350 U	13000 U	340 U	450 U	8600 U	1500 U
PHENANTHRENE	NA					350 U	13000 U	340 U	450 U	8600 U	180
PHENOL	1100000	340 U	340 U	340 U	340 U	350 U	13000 U	340 U	450 U	8600 U	1500 U
PYRENE	890000	340 U	340 U	340 U	82	350 U	13000 U	340 U	450 U	8600 U	320
TOTAL CPAHS	NA	340 U	340 U	340 U	232	350 U	13000 U	340 U	450 U	8600 U	1500 U
TOTAL PAHS	NA	340 U	340 U	340 U	314	350 U	13000 U	340 U	450 U	8600 U	880
BAP EQUIVALENTS	2000	340 U	340 U	340 U	216.897	350 U	13000 U	340 U	450 U	8600 U	1500 U
Pesticides/PCBs (ug/kg)											
4,4'-DDD	56000					3.5 U	6.5 U	3.4 U	89 U	86 U	86
4,4'-DDE	40000					3.5 U	6.5 U	31	89 U	86 U	110
4,4'-DDT	15000					3.5 U	6.5 U	3.4 U	89 U	86 U	230

NA - Nc ılable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3	A3	A3	A3	A3
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		SCS-04	SCS-05	SCS-06	SCS-07	AT007	AT007	AT008	AT008	AT008	AT009
SAMPLE NUMBER:		SB28-SCS-04	SB28-SCS-05	SB30-SCS-06	SB30-SCS-07	AT007A	AT007C	AT008A	AT008D	AT008D-D	AT009B1
DEPTH (FEET):		12	2	2	10	1 - 3	6 - 8	1 - 3	8 - 10	8 - 10	3 - 5
SAMPLE DATE:		05/08/96	05/08/96	05/08/96	05/08/96	06/17/92	06/17/92	06/17/92	06/17/92	06/17/92	06/23/92
ALDRIN	1000					1.8 U	3.3 U	1.8 U	46 U	44 U	19 U
DELTA-BHC	NA					1.8 U	3.3 U	1.8 U	46 U	44 U	19 U
DIELDRIN	800					3.5 U	6.5 U	3.4 U	89 U	86 U	36 U
ENDOSULFAN II	NA					3.5 U	6.5 U	3.4 U	89 U	86 U	37
GAMMA-CHLORDANE	NA					1.8 U	3.3 U	1.8 U	46 U	44 U	19 U
HEPTACHLOR EPOXIDE	400					1.8 U	3.3 U	1.8 U	46 U	44 U	19 U
Inorganics (mg/kg)											
ALUMINUM	26000					4000	6370	2910	2590	2080	4760
ANTIMONY	14	0.31 U	0.31 U	0.3 U	0.32 U	2.1 U	3.9 U	2.1 U	22.5	105	2.4 U
ARSENIC	10					3	6.6	1.5	5.4	4	2.9
BARIUM	1200	5.7	7.1	4.2	6.4	54.5	327	22.3	22	22.7	58.6
CADMIUM	35	0.07	0.07	0.04 U	0.04 U	1.1 U	2 U	1.1 U	1.2 U	1.2 U	1.2 U
CALCIUM	NA					3710	61800	16300	23000	41200	16700
CHROMIUM	71	2.3	8	4.6	3.8	7.7	11.9	7.1	49.6	114	16.5
COBALT	2000					10.6 U	34.5	10.6 U	12.2 U	12.3	11.8 U
COPPER	100	2.1	11.4	2	2.6	8.8	21.3	7.1	676	1290	35.4
CYANIDE	62	0.1 U	0.1 U	0.1 U	0.11 U	2.7 U	5.4	2.6 U	3.1 U	3.1 U	2.9 U
IRON	7000					8680	275000	7330	20000	43500	12100
LEAD	400	1.6	1.2	0.99	2.1	10.5	4.2	3.6	453	58.8	27.6
MAGNESIUM	NA					2040	3980	8470	3070	1730	7390
MANGANESE	1400					525	20700	214	339	547	536
MERCURY	0.7	0.03 U	0.03 U	0.04	0.04 U	0.11 U	0.2 U	0.11 U	0.14	0.12 U	0.12 U
NICKEL	520	12.2	10.2	5.6	5.1	11.1	16.2	8.6	70.2	142	10.9
POTASSIUM	NA					305	497	243	226	123 U	1000 U
SELENIUM	170					0.64 U	2	0.63 U	0.73 U	0.74 U	0.71 U
SILVER	170	0.2 U	0.19 U	0.19 U	0.21 U	2.1 U	4.4	2.1 U	2.4 U	2.5 U	2.4 U
SODIUM	NA					106 U	197 U	106 U	122 U	123 U	118 U
VANADIUM	210					13.6	32.9	10.6 U	23.4	20.4	19.5
ZINC	8700	8.1	12.3	6.9	8.1	27.2	105	14.1	152	153	50.5
Miscellaneous Parameters (mg/kg)											
SULFATE	NA	291	194	669	690						
TOTAL ORGANIC CARBON	NA					3500	1500	2400	16000	16000	14000
TOTAL ORGANIC HALIDES	NA	12.5	10.2 U	10.2 U	10.6 U						

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A3	A3	A3	A3	A3	A3					
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2					
LOCATION:		AT009	AT009	AT009	AT009	AT009	AT009					
SAMPLE NUMBER:		AT009B1-D	AT009D1	AT009D2	AT009D3	AT009E1	AT009E2					
DEPTH (FEET):		3 - 5	8 - 10	8 - 10	8 - 10	10 - 12	10 - 12					
SAMPLE DATE:		06/23/92	06/24/92	06/24/92	06/24/92	06/25/92	06/25/92					
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	1200	2600000	400	0.8	0.8	3					
1,1,2-TRICHLOROETHANE	9000	57 U	67000 U	1300 U	11 U	10 U	52 U					
1,1-DICHLOROETHANE	34000	41	34000	1300 U	11 U	10 U	52 U					
1,2-DICHLOROETHANE	4000	57 U	67000 U	1300 U	11 U	10 U	52 U					
1,2-DICHLOROETHENE (TOTAL)	8000	710	67000 U	230	9	6	31					
2-BUTANONE	1400000	57 U	3500000	1300 U	3 U	10 U	52 U					
2-HEXANONE	NA	57 U	67000 U	1300 U	11 U	10 U	52 U					
4-METHYL-2-PENTANONE	NA	57 U	67000 U	1300 U	11 U	10 U	52 U					
ACETONE	320000	20 U	67000 U	1300 U	4 U	2 U	52 U					
BENZENE	1500	57 U	67000 U	1300 U	11 U	10 U	52 U					
ETHYLBENZENE	200000	57 U	140000	1300 U	11 U	10 U	52 U					
TETRACHLOROETHENE	72000	25000	1200000	28000	2	3	2					
TOLUENE	107000	57 U	190000	1300 U	11 U	6 U	52 U					
TRICHLOROETHENE	29000	2700	120000	8800	5	7	3					
XYLENES, TOTAL	110000	520	580000	440	11 U	10 U	17					
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
ANTHRACENE	7880000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BENZO(A)ANTHRACENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BENZO(A)PYRENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BENZO(B)FLUORANTHENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BENZO(G,H,I)PERYLENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BENZO(K)FLUORANTHENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
BIS(2-ETHYLHEXYL)PHTHALATE	570000	2100 U	20000	3500 U	360 U	350 U	350 U					
CARBAZOLE	700000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
CHRYSENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
DIBENZOFURAN	58000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
FLUORANTHENE	1080000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
FLUORENE	850000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
INDENO(1,2,3-CD)PYRENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
NAPHTHALENE	10000	2100 U	2700	3500 U	360 U	350 U	350 U					
PHENANTHRENE	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
PHENOL	1100000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
PYRENE	890000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
TOTAL CPAHS	NA	2100 U	7200 U	3500 U	360 U	350 U	350 U					
TOTAL PAHS	NA	2100 U	2700	3500 U	360 U	350 U	350 U					
BAP EQUIVALENTS	2000	2100 U	7200 U	3500 U	360 U	350 U	350 U					
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	220	120	21	3.6 U	3.5 U	3.5 U					
4,4'-DDE	40000	300	36 U	11	3.6 U	3.5 U	3.5 U					
4,4'-DDT	15000	430	36 U	[illegible]	3.6 U	3.5 U	3.5 U					

NA - Nc [illegible] ıable.
Shading indicates concentration exceeds the SRV.

TABLE 3
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A3
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A3 OU2 AT009 AT009B1-D 3 - 5 06/23/92	A3 OU2 AT009 AT009D1 8 - 10 06/24/92	A3 OU2 AT009 AT009D2 8 - 10 06/24/92	A3 OU2 AT009 AT009D3 8 - 10 06/24/92	A3 OU2 AT009 AT009E1 10 - 12 06/25/92	A3 OU2 AT009 AT009E2 10 - 12 06/25/92					
ALDRIN	1000	22 U	18 U	1.8 U	1.9 U	1.8 U	1.8 U					
DELTA-BHC	NA	22 U	18 U	2.6	1.9 U	1.8 U	1.8 U					
DIELDRIN	800	42 U	43	3.5 U	3.6 U	3.5 U	3.5 U					
ENDOSULFAN II	NA	54	53	3.5 U	3.6 U	3.5 U	3.5 U					
GAMMA-CHLORDANE	NA	22 U	18 U	1.8 U	1.9 U	1.8 U	1.8 U					
HEPTACHLOR EPOXIDE	400	22 U	18 U	1.8 U	1.9 U	1.8 U	1.8 U					
Inorganics (mg/kg)												
ALUMINUM	26000	4610	1120	1120	1270	1060	1270					
ANTIMONY	14	2.4 U	2.1 U	2.1 U	2.1 U	2 U	2 U					
ARSENIC	10	3.1	1.6	1.7	3.4	0.91	1.6					
BARIUM	1200	64.8	10.4 U	10.3 U	10.5 U	10.2 U	10.2 U					
CADMIUM	35	2.7	1 U	1 U	1 U	1 U	1 U					
CALCIUM	NA	10300	17100	17600	28900	25600	19100					
CHROMIUM	71	16.3	4.6	4.1	5.5	4	3.9					
COBALT	2000	12.2 U	10.4 U	10.3 U	10.5 U	10.2 U	10.2 U					
COPPER	100	56.6	8.7	4.1 U	4.2 U	4.1 U	4.1 U					
CYANIDE	62	3.1 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U					
IRON	7000	19200	3520	3330	4730	3460	4120					
LEAD	400	37	2	1.5	1.4	1.5	1.7					
MAGNESIUM	NA	4860	4110	4070	6950	6190	5370					
MANGANESE	1400	659	376	155	241	283	339					
MERCURY	0.7	0.19	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U					
NICKEL	520	10.6	8.3 U	8.2 U	8.4 U	8.2 U	8.2 U					
POTASSIUM	NA	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U					
SELENIUM	170	0.73 U	0.62 U	0.62 U	0.63 U	0.61 U	0.61 U					
SILVER	170	2.4 U	2.1 U	2.1 U	2.1 U	2 U	2 U					
SODIUM	NA	122 U	104 U	103 U	105 U	102 U	102 U					
VANADIUM	210	20.2	10.4 U	10.3 U	10.5 U	10.2 U	10.2 U					
ZINC	8700	72.7	23.1	9.8	7.5	6.2	7.9					
Miscellaneous Parameters (mg/kg)												
SULFATE	NA											
TOTAL ORGANIC CARBON	NA	9800	4700	4000	3500	4500	2500					
TOTAL ORGANIC HALIDES	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB026	AB026	AB027	AB027	AB028	AB028	AB029	AB029	AB030	AB030	AB030
SAMPLE NUMBER:		AB026A	AB026G	AB027A	AB027H	AB028A	AB028G	AB029A	AB029H	AB030A	AB030G	AB030G-D
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	18 - 20	1 - 3	16 - 18	1 - 3	18 - 20	1 - 3	16 - 18	16 - 18
SAMPLE DATE:		6/10/92	6/10/92	6/9/92	6/9/92	6/8/92	6/8/92	6/10/92	6/10/92	6/9/92	6/9/92	6/9/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	10 U	10 U	12 U	11 U	8	11 U	11 U	11 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	3500	11 U	10 U	10 U	12 U	11 U	62 U	11 U	11 U	11 U	10 U	10 U
1,1,2-TRICHLOROETHANE	9000	11 U	10 U	10 U	12 U	11 U	62 U	11 U	11 U	11 U	10 U	10 U
1,1-DICHLOROETHANE	34000	11 U	10 U	10 U	12 U	11 U	62 U	11 U	11 U	11 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	8000	25	6	10 U	12 U	11 U	920	14	110	4	10 U	10 U
ACETONE	320000	10 U	50 U	7 U	190	6 U	87 U	8 U	32 U	8 U	30 U	58 U
ETHYLBENZENE	200000	11 U	10 U	10 U	12 U	11 U	62 U	11 U	11 U	11 U	10 U	10 U
TETRACHLOROETHENE	72000	11 U	2	10 U	12 U	11 U	610	11 U	6	11 U	10 U	10 U
TOLUENE	107000	3 U	10 U	10 U	12 U	11 U	62 U	3 U	11 U	2 U	10 U	10 U
TRICHLOROETHENE	29000	15	45	50	5	18	6100	190	89	36	2	4
XYLENES, TOTAL	110000	11 U	10 U	10 U	12 U	11 U	62 U	11 U	11 U	11 U	10 U	10 U
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA	730 U	340 U	1800 U	390 U	370 U	370 U	730 U	350 U	1800 U	350 U	350 U
ACENAPHTHENE	1200000	450	340 U	1800 U	390 U	200	370 U	300	350 U	1800 U	350 U	350 U
ACENAPHTHYLENE	NA	730 U	340 U	1800 U	390 U	370 U	370 U	730 U	350 U	380	350 U	350 U
ANTHRACENE	7880000	830	340 U	1800 U	390 U	260	370 U	700	350 U	1100	350 U	350 U
BENZO(A)ANTHRACENE	NA	2300	340 U	2200	390 U	590	370 U	2400	350 U	6900	150	400
BENZO(A)PYRENE	NA	2100	340 U	2300	390 U	560	370 U	2400	350 U	7400	170	410
BENZO(B)FLUORANTHENE	NA	2200	340 U	2600	390 U	620	370 U	2600	350 U	7200	180	460
BENZO(G,H,I)PERYLENE	NA	1400	340 U	1900	390 U	430	370 U	2000	700	5800	210	330
BENZO(K)FLUORANTHENE	NA	1700	340 U	2000	390 U	460	370 U	1900	350 U	7200	140	360
BIS(2-ETHYLHEXYL)PHTHALATE	570000	730 U	340 U	1800 U	390 U	370 U	370 U	730 U	350 U	1800 U	350 U	350 U
CARBAZOLE	700000	840	340 U	1800 U	390 U	250	370 U	930	350 U	790	350 U	350 U
CHRYSENE	NA	2500	340 U	2500	390 U	650	370 U	2800	350 U	7800	170	440
DIBENZO(A,H)ANTHRACENE	NA	520	340 U	1800 U	390 U	370 U	370 U	650	350 U	1000	350 U	350 U
DIBENZOFURAN	58000	220	340 U	1800 U	390 U	110	370 U	730 U	350 U	1800 U	350 U	350 U
FLUORANTHENE	1080000	5900	340 U	5600	390 U	1500	370 U	6600	350 U	15000	390	1100
FLUORENE	850000	450	340 U	1800 U	390 U	190	370 U	280	350 U	430	350 U	350 U
INDENO(1,2,3-CD)PYRENE	NA	1200	340 U	1700	390 U	400	370 U	1800	350 U	5200	130	290
NAPHTHALENE	10000	730 U	340 U	1800 U	390 U	370 U	370 U	730 U	350 U	1800 U	350 U	350 U
PHENANTHRENE	NA	4400	340 U	2300	390 U	1400	370 U	4800	350 U	7400	160	440
PYRENE	890000	5200	340 U	5900	390 U	1600	370 U	8100	110	18000	360	930
TOTAL CPAHS	NA	12520	340 U	13300	390 U	3280	370 U	14550	350 U	42700	940	2360
TOTAL PAHS	NA	30700	340 U	29000	390 U	8670	370 U	37050	810	90380	2060	5160
BAP EQUIVALENTS	2000	3209.5	340 U	3872.5	390 U	911.25	370 U	3751.8	350 U	10409.8	392.57	704.04
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	230	3.4 U	37 U	3.9 U	3.7 U	3.7 U	220	3.5 U	150	3.5 U	4.3
4,4'-DDE	40000	200	3.4 U	37 U	3.9 U	3.7 U	3.7 U	390	3.5 U	92	3.5 U	3.5 U
4,4'-DDT	15000	190	3.4 U	160	3.9 U	3.7 U	3.7 U	280	3.5 U	220	3.5 U	9.2
ALPHA-CHLORDANE	13000	2.8	1.7 U	19 U	2 U	1.9 U	1.9 U	19 U	1.8 U	18 U	1.8 U	1.8 U
DELTA [illegible]	NA	1.9 U	1.7 U	19 [illegible]	2 U	1.9 U	1.9 U	19 U	1.8 U	18 U	1.8 U	1.8 U

NA - N[illegible]lable.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB026	AB026	AB027	AB027	AB028	AB028	AB029	AB029	AB030	AB030	AB030
SAMPLE NUMBER:		AB026A	AB026G	AB027A	AB027H	AB028A	AB028G	AB029A	AB029H	AB030A	AB030G	AB030G-D
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	18 - 20	1 - 3	16 - 18	1 - 3	18 - 20	1 - 3	16 - 18	16 - 18
SAMPLE DATE:		6/10/92	6/10/92	6/9/92	6/9/92	6/8/92	6/8/92	6/10/92	6/10/92	6/9/92	6/9/92	6/9/92
DIELDRIN	800	3.6 U	3.4 U	37 U	3.9 U	3.7 U	3.7 U	37 U	3.5 U	35 U	3.5 U	3.5 U
ENDOSULFAN SULFATE	NA	4.8	3.4 U	37 U	3.9 U	15	3.7 U	37 U	3.5 U	35 U	3.5 U	3.5 U
ENDRIN	8000	3.6 U	3.4 U	37 U	3.9 U	8.7	3.7 U	37 U	3.5 U	35 U	3.5 U	3.5 U
ENDRIN ALDEHYDE	NA	3.6 U	3.4 U	37 U	3.9 U	3.7 U	3.7 U	37 U	3.5 U	35 U	3.5 U	3.5 U
GAMMA-CHLORDANE	NA	3	1.7 U	19 U	2 U	1.9 U	1.9 U	19 U	1.8 U	18 U	1.8 U	1.8 U
HEPTACHLOR EPOXIDE	400	1.9 U	1.7 U	19 U	2 U	1.9 U	1.9 U	19 U	1.8 U	18 U	1.8 U	1.8 U
METHOXYCHLOR	11000	19 U	17 U	190 U	20 U	19 U	19 U	190 U	18 U	180 U	18 U	18 U
Inorganics (mg/kg)												
ALUMINUM	26000	3800	1290	2270	1130	3830	3080	4700	1950	3410	1340	1410
ANTIMONY	14	2.3	2.1 U	2.1 U	2.4 U	2.2 U	2.6 U	2.3 U	2.1 U	2.2 U	2.1 U	2.1 U
ARSENIC	10	7.8	1.2	3	1.2	5.6	3	10.1	1.5	7.9	1.3	1 U
BARIUM	1200	306	10.4 U	37.8	12 U	172	28.6	134	10.7 U	87.8	10.6 U	10.6 U
CADMIUM	35	1.1 U	1 U	1 U	1.2 U	1.1 U	1.3 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
CALCIUM	NA	11600	27500	20000	22200	5710	26100	21500	22600	24600	23100	25800
CHROMIUM	71	19.8	3.1	7.4	4.7	13.4	12.2	19.2	11.5	19.6	5.1	6.5
COPPER	100	1900	4.3 U	15.5	4.8 U	279	5.2 U	138	5.3 U	642	37.3	18.2
CYANIDE	62	2.7 U	2.6 U	2.6 U	3 U	2.8 U	3.3 U	2.8 U	2.7 U	2.7 U	2.6 U	2.7 U
IRON	7000	12800	3570	9380	3080	19200	9970	17800	5310	14600	3880	4390
LEAD	400	149	1	10.4	2.3	274	4.1	63.6	1.6	59.5	3.2	2.1
MAGNESIUM	NA	4170	9280	6030	4780	2420	6850	3500	6580	9470	6660	6360
MANGANESE	1400	1790	165	424	257	992	465	1060	388	746	353	346
MERCURY	0.7	0.11 U	0.1 U	0.1 U	0.12 U	0.11 U	0.13 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
NICKEL	520	32.3	8.3 U	8.4 U	15.5	16.8	11	24	16.6	24.2	11.1	12
POTASSIUM	NA	473 U	104 U	221 U	174	308	246	451 U	135 U	353 U	238 U	136 U
SELENIUM	170	1.3	0.63 U	0.63 U	0.72 U	0.67 U	0.78 U	0.68 U	0.64 U	0.66 U	0.64 U	0.64 U
SODIUM	NA	109 U	104 U	104 U	120 U	111 U	131 U	113 U	107 U	109 U	106 U	106 U
VANADIUM	210	20.5	10.4 U	15.1	12 U	17.8	18.1	18.3	10.7 U	15.2	10.6 U	10.6 U
ZINC	8700	215	7.1	21.7	9.3	130	21.3	124	11.4	163	18.3	10.8
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		16000	1100	16000	290	16000	8600	16000	1300	16000	380	1700
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB031	AB031	AB032	AB032	AB033	AB033	AB034	AB034	AB038	AB038	AB203
SAMPLE NUMBER:		AB031A	AB031G	AB032A	AB032D	AB033B	AB033H	AB034A	AB034D	AB038A	AB038G	AB203A
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	8 - 10	3 - 5	18 - 20	1 - 3	8 - 10	1 - 3	16 - 18	1 - 3
SAMPLE DATE:		6/15/92	6/15/92	6/9/92	6/9/92	6/8/92	6/8/92	6/8/92	6/8/92	6/10/92	6/10/92	7/8/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	11 U	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	3500	2	11 U	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
1,1,2-TRICHLOROETHANE	9000	3	11 U	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
1,1-DICHLOROETHANE	34000	11 U	11 U	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	470	85	2	10 U	200	12 U	11 U	11 U	10 U	11 U	11 U
ACETONE	320000	5 U	51 U	8 U	46 U	54 U	1000	9 U	3 U	1200	62 U	8 U
ETHYLBENZENE	200000	380	3400	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
TETRACHLOROETHENE	72000	11 U	56	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
TOLUENE	107000	10	45	11 U	10 U	11 U	12 U	4 U	1 U	1 U	11 U	11 U
TRICHLOROETHENE	29000	9	2	150	2	300	2	24	5	4	9	11 U
XYLENES, TOTAL	110000	550	28000	11 U	10 U	11 U	12 U	11 U	11 U	10 U	11 U	11 U
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA	3400	570	870	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
ACENAPHTHENE	1200000	3700 U	1700 U	3400	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
ACENAPHTHYLENE	NA	3700 U	1700 U	2600	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
ANTHRACENE	7880000	3700 U	1700 U	15000	340 U	380 U	340 U	200	350 U	330 U	340 U	
BENZO(A)ANTHRACENE	NA	3700 U	1700 U	43000	340 U	380 U	340 U	950	350 U	150	340 U	
BENZO(A)PYRENE	NA	3700 U	1700 U	41000	120	380 U	340 U	1100	73	190	340 U	
BENZO(B)FLUORANTHENE	NA	3700 U	1700 U	46000	340 U	380 U	340 U	1200	350 U	340	340 U	
BENZO(G,H,I)PERYLENE	NA	3700 U	1700 U	34000	420	380 U	340 U	980	320	240	340 U	
BENZO(K)FLUORANTHENE	NA	3700 U	1700 U	29000	340 U	380 U	340 U	980	350 U	230	340 U	
BIS(2-ETHYLHEXYL)PHTHALATE	570000	3700 U	2200	3500 U	340 U	380 U	140	360 U	350 U	330 U	340 U	
CARBAZOLE	700000	3700 U	1700 U	4900	340 U	380 U	340 U	130	350 U	330 U	340 U	
CHRYSENE	NA	3700 U	1700 U	43000	340 U	380 U	340 U	1200	350 U	260	340 U	
DIBENZO(A,H)ANTHRACENE	NA	3700 U	1700 U	7700	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
DIBENZOFURAN	58000	3700 U	1700 U	5500	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
FLUORANTHENE	1080000	960	1700 U	160000	240	380 U	340 U	2400	350 U	500	340 U	
FLUORENE	850000	530	1700 U	8400	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
INDENO(1,2,3-CD)PYRENE	NA	3700 U	1700 U	28000	340 U	380 U	340 U	800	350 U	200	340 U	
NAPHTHALENE	10000	3700 U	1100	950	340 U	380 U	340 U	360 U	350 U	330 U	340 U	
PHENANTHRENE	NA	1700	1700 U	95000	140	380 U	340 U	810	350 U	180	340 U	
PYRENE	890000	1000	1700 U	130000	260	380 U	340 U	2300	80	440	340 U	
TOTAL CPAHS	NA	3700 U	1700 U	237700	120	380 U	340 U	6230	73	1370	340 U	
TOTAL PAHS	NA	3660	1100	678650	1180	380 U	340 U	12920	473	2730	340 U	
BAP EQUIVALENTS	2000	3700 U	1700 U	60733	342.87	380 U	340 U	1586	302.425	426.56	340 U	
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	130	3.7	120	3.4 U	3.8 U	3.4 U	160	3.5 U	11	3.4 U	
4,4'-DDE	40000	120	3.4 U	310	3.4 U	3.8 U	3.4 U	3.6 U	3.5 U	22	3.4 U	
4,4'-DDT	15000	67	6.1	460	3.4 U	3.8 U	3.4 U	400	4.2	45	3.4 U	
ALPHA-CHLORDANE	13000	19 U	1.8 U	45 U	1.8 U	2 U	1.8 U	1.9 U	1.8 U	1.7 U	1.8 U	
DELTA-BHC	NA	19 U	1.8 U	45 U	1.8 U	2 U	1.8 U	1.9 U	1.8 U	1.7 U	1.8 U	

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB031	AB031	AB032	AB032	AB033	AB033	AB034	AB034	AB038	AB038	AB203
SAMPLE NUMBER:		AB031A	AB031G	AB032A	AB032D	AB033B	AB033H	AB034A	AB034D	AB038A	AB038G	AB203A
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	8 - 10	3 - 5	18 - 20	1 - 3	8 - 10	1 - 3	16 - 18	1 - 3
SAMPLE DATE:		6/15/92	6/15/92	6/9/92	6/9/92	6/8/92	6/8/92	6/8/92	6/8/92	6/10/92	6/10/92	7/8/92
DIELDRIN	800	37 U	3.4 U	88 U	3.4 U	3.8 U	3.4 U	3.6 U	3.5 U	4	3.4 U	
ENDOSULFAN SULFATE	NA	37 U	3.4 U	88 U	3.4 U	3.8 U	3.4 U	9.8	3.5 U	3.3 U	3.4 U	
ENDRIN	8000	37 U	3.4 U	88 U	3.4 U	3.8 U	3.4 U	14	3.5 U	3.3 U	3.4 U	
ENDRIN ALDEHYDE	NA	37 U	5.9	88 U	3.4 U	3.8 U	3.4 U	3.6 U	3.5 U	3.3 U	3.4 U	
GAMMA-CHLORDANE	NA	19 U	1.8 U	45 U	1.8 U	2 U	1.8 U	1.9 U	1.8 U	1.7 U	1.8 U	
HEPTACHLOR EPOXIDE	400	19 U	1.8 U	45 U	1.8 U	2 U	1.8 U	1.9 U	1.8 U	1.7 U	1.8 U	
METHOXYCHLOR	11000	190 U	19	450 U	18 U	20 U	18 U	19 U	18 U	17 U	18 U	
Inorganics (mg/kg)												
ALUMINUM	26000	3870	2310	3480	2130	3780	1160	4220	3160	2470	1340	
ANTIMONY	14	2.2 U	2.1 U	2.1 U	2.1 U	2.3 U	2.1 U	2.2 U	2.1 U	2 U	2.1 U	
ARSENIC	10	2.6	11.4	3.8	1.7	4.8	1.8	4.7	2.2	1.3	0.86	
BARIUM	1200	73.9	10.4 U	65.4	10.5 U	154	10.5 U	67.4	17.5	20.1	10.5 U	
CADMIUM	35	1.1 U	1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	
CALCIUM	NA	17400	31600	19900	17100	28200	20700	21300	34900	12300	25600	
CHROMIUM	71	22.6	4.4	8.1	9.4	11.7	5.4	13	13.8	8.7	5.2	
COPPER	100	53.7	4.1 U	49.8	4.4 U	369	4.2 U	32.5	10.6	36.6	4.2 U	
CYANIDE	62	2.8 U	2.6 U	2.6 U	2.6 U	2.9 U	2.6 U	4.3	2.6 U	2.6 U	2.6 U	
IRON	7000	10600	11500	11000	6700	17000	3790	12900	10800	7500	3470	
LEAD	400	78.5	1.7	70	1.5	80.1	2	32.7	2.7	10.6	1.8	
MAGNESIUM	NA	6780	10000	7160	4600	2710	5650	11600	13900	6360	5180	
MANGANESE	1400	456	356	468	271	1510	307	511	913	201	300	
MERCURY	0.7	0.11 U	0.1 U	0.11 U	0.1 U	0.11 U	0.11 U	0.12	0.11 U	0.1 U	0.1 U	
NICKEL	520	11.6	8.3 U	12.8	11.1	15.8	11.1	11.5	13.2	8.2 U	9.5	
POTASSIUM	NA	452	140	374 U	207 U	360	121	225	143	138	173	
SELENIUM	170	0.66 U	0.62 U	0.63 U	0.63 U	0.69 U	0.63 U	0.65 U	0.63 U	0.61 U	0.63 U	
SODIUM	NA	110 U	162	113 U	105 U	115 U	105 U	112	122	113	105 U	
VANADIUM	210	17.9	10.4 U	15.3	12.4	17.6	10.5 U	18.5	19.2	12.1	10.5 U	
ZINC	8700	62.6	9.3	69.6	10.8	73.1	9	62.2	16.6	32.3	13.7	
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		11000	7900	16000	3500	11000	2200	7400	2800	6800	1600	2300
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB203	AB204	AB204	AB204	AB205	AB205	AB206	AB206	AB207	AB207	AB208
SAMPLE NUMBER:		AB203B	AB204A	AB204A-D	AB204B	AB205A	AB205G	AB206A	AB206B	AB207A	AB207H	AB208A
DEPTH (FEET):		3 - 5	1 - 3	1 - 3	3 - 5	1 - 3	16 - 18	1 - 3	3 - 5	1 - 3	18 - 20	1 - 3
SAMPLE DATE:		7/8/92	7/8/92	7/8/92	7/8/92	7/8/92	7/8/92	7/8/92	7/8/92	7/9/92	7/9/92	7/13/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	14 U	11 U	11 U	12 U	11 U	1	12 U	2	11 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	3500	14 U	11 U	11 U	12 U	11 U	11 U	12 U	13 U	11 U	11 U	11 U
1,1,2-TRICHLOROETHANE	9000	14 U	11 U	11 U	12 U	11 U	11 U	12 U	13 U	11 U	11 U	11 U
1,1-DICHLOROETHANE	34000	14 U	11 U	11 U	12 U	11 U	11 U	12 U	13 U	11 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	14 U	110	85	7	11 U	9	12 U	13 U	11 U	11 U	14
ACETONE	320000	7 U	64 U	11 U	56 U	14 U	11 U	9 U	6 U	11 U	15 U	5 U
ETHYLBENZENE	200000	14 U	11 U	11 U	12 U	11 U	11 U	12 U	13 U	11 U	11 U	11 U
TETRACHLOROETHENE	72000	7	1	0.7	12 U	1	8	12 U	9	11 U	11 U	11 U
TOLUENE	107000	14 U	11 U	0.9 U	12 U	11 U	11 U	12 U	9 U	11 U	11 U	11 U
TRICHLOROETHENE	29000	20	26	18	4	31	230	2	330	15	3	70
XYLENES, TOTAL	110000	14 U	11 U	11 U	12 U	11 U	11 U	12 U	13 U	11 U	11 U	11 U
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA											
ACENAPHTHENE	1200000											
ACENAPHTHYLENE	NA											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZO(A,H)ANTHRACENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											
ALPHA-CHLORDANE	13000											
DELTA-BHC	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 AB203 AB203B 3 - 5 7/8/92	A4 OU2 AB204 AB204A 1 - 3 7/8/92	A4 OU2 AB204 AB204A-D 1 - 3 7/8/92	A4 OU2 AB204 AB204B 3 - 5 7/8/92	A4 OU2 AB205 AB205A 1 - 3 7/8/92	A4 OU2 AB205 AB205G 16 - 18 7/8/92	A4 OU2 AB206 AB206A 1 - 3 7/8/92	A4 OU2 AB206 AB206B 3 - 5 7/8/92	A4 OU2 AB207 AB207A 1 - 3 7/9/92	A4 OU2 AB207 AB207H 18 - 20 7/9/92	A4 OU2 AB208 AB208A 1 - 3 7/13/92
DIELDRIN	800											
ENDOSULFAN SULFATE	NA											
ENDRIN	8000											
ENDRIN ALDEHYDE	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
METHOXYCHLOR	11000											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	**10**											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COPPER	**100**											
CYANIDE	62											
IRON	**7000**											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	**1400**											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		3400	16000	16000	500	7000	16000	10000	16000	16000	990	16000
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB208	AB208	AB219	AB219	AB220	AB220	AB221	AB221	AB224	AB224	AB226
SAMPLE NUMBER:		AB208A-D	AB208H	AB219A	AB219F	AB220A	AB220G	AB221A	AB221G	AB224A	AB224H	AB226B
DEPTH (FEET):		1 - 3	18 - 20	1 - 3	13 - 15	1 - 3	16 - 18	1 - 3	16 - 18	1 - 3	18 - 20	3 - 5
SAMPLE DATE:		7/13/92	7/13/92	7/9/92	7/9/92	7/9/92	7/9/92	7/9/92	7/9/92	7/13/92	7/13/92	7/10/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
1,1,2,2-TETRACHLOROETHANE	3500	11 U	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
1,1,2-TRICHLOROETHANE	9000	11 U	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
1,1-DICHLOROETHANE	34000	0.4	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
1,2-DICHLOROETHENE (TOTAL)	8000	14	16	11 U	11 U	2	10 U	12 U	10 U	11 U	11 U	13 U
ACETONE	320000	8 U	17 U	19 U	12 U	14 U	5 U	7 U	6 U	7 U	7 U	30 U
ETHYLBENZENE	200000	11 U	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
TETRACHLOROETHENE	72000	11 U	2	11 U	11 U	1	10 U	12 U	10 U	11 U	11 U	13 U
TOLUENE	107000	1 U	10 U	11 U	11 U	3 U	0.6 U	12 U	10 U	11 U	11 U	13 U
TRICHLOROETHENE	29000	73	52	11 U	11 U	28	3	12 U	0.8	11 U	0.9 U	2
XYLENES, TOTAL	110000	11 U	10 U	11 U	11 U	11 U	10 U	12 U	10 U	11 U	11 U	13 U
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA											
ACENAPHTHENE	1200000											
ACENAPHTHYLENE	NA											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
BIS(2-ETHYLHEXYL)PHTHALATE	570000											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZO(A,H)ANTHRACENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
NAPHTHALENE	10000											
PHENANTHRENE	NA											
PYRENE	890000											
TOTAL CPAHS	NA											
TOTAL PAHS	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											
ALPHA-CHLORDANE	13000											
DELTA-BHC	NA											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 AB208 AB208A-D 1 - 3 7/13/92	A4 OU2 AB208 AB208H 18 - 20 7/13/92	A4 OU2 AB219 AB219A 1 - 3 7/9/92	A4 OU2 AB219 AB219F 13 - 15 7/9/92	A4 OU2 AB220 AB220A 1 - 3 7/9/92	A4 OU2 AB220 AB220G 16 - 18 7/9/92	A4 OU2 AB221 AB221A 1 - 3 7/9/92	A4 OU2 AB221 AB221G 16 - 18 7/9/92	A4 OU2 AB224 AB224A 1 - 3 7/13/92	A4 OU2 AB224 AB224H 18 - 20 7/13/92	A4 OU2 AB226 AB226B 3 - 5 7/10/92
DIELDRIN	800											
ENDOSULFAN SULFATE	NA											
ENDRIN	8000											
ENDRIN ALDEHYDE	NA											
GAMMA-CHLORDANE	NA											
HEPTACHLOR EPOXIDE	400											
METHOXYCHLOR	11000											
Inorganics (mg/kg)												
ALUMINUM	26000											
ANTIMONY	14											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COPPER	100											
CYANIDE	62											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											
MERCURY	0.7											
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		7000	1400	2800	1300	16000	9900	4800	1700	3400	1300	2100
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		AB226	AB227	AB227	AB227	AB228	AB228	AB229	AB229	AB243	AB243	AT001
SAMPLE NUMBER:		AB226G	AB227A	AB227A-D	AB227G	AB228A	AB228F	AB229A	AB229H	AB243A	AB243B	AT001A
DEPTH (FEET):		16 - 18	1 - 3	1 - 3	16 - 18	1 - 3	13 - 15	1 - 3	18 - 20	1 - 3	3 - 5	1 - 3
SAMPLE DATE:		7/10/92	7/13/92	7/13/92	7/13/92	7/10/92	7/10/92	7/10/92	7/10/92	7/28/92	7/28/92	6/12/92
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	2	11 U
1,1,2,2-TETRACHLOROETHANE	3500	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	12 U	11 U
1,1,2-TRICHLOROETHANE	9000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	12 U	11 U
1,1-DICHLOROETHANE	34000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	2	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	21	230	11
ACETONE	320000	6 U	7 U	6 U	35 U	11 U	12 U	6 U	7 U	69 U	10 U	10 U
ETHYLBENZENE	200000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	12 U	11 U
TETRACHLOROETHENE	72000	10 U	11 U	0.6	10 U	11 U	10 U	13 U	12 U	11 U	2	11 U
TOLUENE	107000	10 U	11 U	11 U	2 U	0.7 U	10 U	13 U	12 U	11 U	12 U	11 U
TRICHLOROETHENE	29000	10 U	12	18	0.9 U	5	3	110	3	11 U	80	31
XYLENES, TOTAL	110000	10 U	11 U	11 U	10 U	11 U	10 U	13 U	12 U	11 U	12 U	11 U
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA											3600 U
ACENAPHTHENE	1200000											3600 U
ACENAPHTHYLENE	NA											3600 U
ANTHRACENE	7880000											1300
BENZO(A)ANTHRACENE	NA											5700
BENZO(A)PYRENE	NA											6600
BENZO(B)FLUORANTHENE	NA											8200
BENZO(G,H,I)PERYLENE	NA											5100
BENZO(K)FLUORANTHENE	NA											5400
BIS(2-ETHYLHEXYL)PHTHALATE	570000											3600 U
CARBAZOLE	700000											1300
CHRYSENE	NA											7300
DIBENZO(A,H)ANTHRACENE	NA											3600 U
DIBENZOFURAN	58000											3600 U
FLUORANTHENE	1080000											20000
FLUORENE	850000											3600 U
INDENO(1,2,3-CD)PYRENE	NA											5100
NAPHTHALENE	10000											3600 U
PHENANTHRENE	NA											8600
PYRENE	890000											14000
TOTAL CPAHS	NA											38300
TOTAL PAHS	NA											87300
BAP EQUIVALENTS	2000											10361.3
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											2900
4,4'-DDE	40000											1900
4,4'-DDT	15000											36 U
ALPHA-CHLORDANE	13000											36
DELTA-BHC	NA											19 U

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 AB226 AB226G 16 - 18 7/10/92	A4 OU2 AB227 AB227A 1 - 3 7/13/92	A4 OU2 AB227 AB227A-D 1 - 3 7/13/92	A4 OU2 AB227 AB227G 16 - 18 7/13/92	A4 OU2 AB228 AB228A 1 - 3 7/10/92	A4 OU2 AB228 AB228F 13 - 15 7/10/92	A4 OU2 AB229 AB229A 1 - 3 7/10/92	A4 OU2 AB229 AB229H 18 - 20 7/10/92	A4 OU2 AB243 AB243A 1 - 3 7/28/92	A4 OU2 AB243 AB243B 3 - 5 7/28/92	A4 OU2 AT001 AT001A 1 - 3 6/12/92
DIELDRIN	800											36 U
ENDOSULFAN SULFATE	NA											36 U
ENDRIN	8000											36 U
ENDRIN ALDEHYDE	NA											36 U
GAMMA-CHLORDANE	NA											19 U
HEPTACHLOR EPOXIDE	400											30
METHOXYCHLOR	11000											190 U
Inorganics (mg/kg)												
ALUMINUM	26000											3490
ANTIMONY	14											2.2 U
ARSENIC	10											4.5
BARIUM	1200											90.2
CADMIUM	35											1.1 U
CALCIUM	NA											14700
CHROMIUM	71											15.9
COPPER	100											103
CYANIDE	62											2.7 U
IRON	7000											11700
LEAD	400											231
MAGNESIUM	NA											6910
MANGANESE	1400											589
MERCURY	0.7											0.11 U
NICKEL	520											13.1
POTASSIUM	NA											339
SELENIUM	170											0.66 U
SODIUM	NA											109 U
VANADIUM	210											19
ZINC	8700											489
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		4600	16000	16000	560	2000	450	16000	1600	16000	11000	16000
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:		A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	SCS-40	SCS-40	SCS-42	SCS-43	SCS-44	SCS-023	SCS-024	SCS-024
SAMPLE NUMBER:	Risk	SA3-SCS-40	SA3-SCS-40-D	SA3-SCS-42	SA4-SCS-43	SA4-SCS-44	SA5-SCS-023	SA5-SCS-024	SA5-SCS-024-D
DEPTH (FEET):	Value	3 - 5	3 - 5	3 - 5	3 - 5	3 - 5	5	5	5
SAMPLE DATE:		5/15/98	5/15/98	5/15/98	5/17/96	5/17/96	5/9/96	5/9/96	5/9/96
Volatile Organics (ug/kg)									
1,1,1-TRICHLOROETHANE	140000	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	3500								
1,1,2-TRICHLOROETHANE	9000								
1,1-DICHLOROETHANE	34000	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE (TOTAL)	8000	9	14000	10 U	11 U	10 U	2	13	10 U
ACETONE	320000								
ETHYLBENZENE	200000	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	72000	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U
TOLUENE	107000	10 U	10 U	10 U	11 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	29000	110	96000	4	11 U	10 U	2	8	10 U
XYLENES, TOTAL	110000								
Semivolatile Organics (ug/kg)									
2-METHYLNAPHTHALENE	NA								
ACENAPHTHENE	1200000	360 U	380 U	340 U	23	340 U	340 U	340 U	340 U
ACENAPHTHYLENE	NA								
ANTHRACENE	7880000								
BENZO(A)ANTHRACENE	NA	360 U	380 U	340 U	140	340 U	340 U	340 U	340 U
BENZO(A)PYRENE	NA	360 U	380 U	340 U	120	340 U	340 U	340 U	340 U
BENZO(B)FLUORANTHENE	NA	360 U	22	340 U	240	25	340 U	340 U	340 U
BENZO(G,H,I)PERYLENE	NA								
BENZO(K)FLUORANTHENE	NA	360 U	380 U	340 U	350 U	340 U	340 U	340 U	340 U
BIS(2-ETHYLHEXYL)PHTHALATE	570000								
CARBAZOLE	700000	360 U	380 U	340 U	25	340 U	340 U	340 U	340 U
CHRYSENE	NA	360 U	380 U	340 U	190	18	340 U	340 U	340 U
DIBENZO(A,H)ANTHRACENE	NA	360 U	380 U	340 U	20	340 U	340 U	340 U	340 U
DIBENZOFURAN	58000								
FLUORANTHENE	1080000								
FLUORENE	850000								
INDENO(1,2,3-CD)PYRENE	NA	360 U	380 U	340 U	84	340 U	340 U	340 U	340 U
NAPHTHALENE	10000								
PHENANTHRENE	NA								
PYRENE	890000	360 U	22	340 U	330	23	340 U	340 U	340 U
TOTAL CPAHS	NA	360 U	22	340 U	794	43	340 U	340 U	340 U
TOTAL PAHS	NA	360 U	44	340 U	1147	66	340 U	340 U	340 U
BAP EQUIVALENTS	2000	360 U	422.29	340 U	188.34	378.218	340 U	340 U	340 U
Pesticides/PCBs (ug/kg)									
4,4'-DDD	56000								
4,4'-DDE	40000								
4,4'-DDT	15000								
ALPHA-CHLORDANE	13000								
DELTA-BHC	NA								

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 SCS-40 SA3-SCS-40 3 - 5 5/15/98	A4 OU2 SCS-40 SA3-SCS-40-D 3 - 5 5/15/98	A4 OU2 SCS-42 SA3-SCS-42 3 - 5 5/15/98	A4 OU2 SCS-43 SA4-SCS-43 3 - 5 5/17/96	A4 OU2 SCS-44 SA4-SCS-44 3 - 5 5/17/96	A4 OU2 SCS-023 SA5-SCS-023 5 5/9/96	A4 OU2 SCS-024 SA5-SCS-024 5 5/9/96	A4 OU2 SCS-024 SA5-SCS-024-D 5 5/9/96
DIELDRIN	800								
ENDOSULFAN SULFATE	NA								
ENDRIN	8000								
ENDRIN ALDEHYDE	NA								
GAMMA-CHLORDANE	NA								
HEPTACHLOR EPOXIDE	400								
METHOXYCHLOR	11000								
Inorganics (mg/kg)									
ALUMINUM	26000								
ANTIMONY	14	0.33 U	0.34 U	0.31 U	0.32 U	0.31 U	0.3 U	0.3 U	0.31 U
ARSENIC	**10**								
BARIUM	1200	10.8	15.1	5.7	12.7	3.9	7.4	5.7	7.4
CADMIUM	35	0.39	0.08	0.1	0.04 U	0.04 U	0.07	0.06	0.06
CALCIUM	NA								
CHROMIUM	71	4.5	6.3	3.1	3.9	2.5	8	8.9	11.2
COPPER	**100**	3.5	6.9	2.9	2.3	1.7	4.8	4.1	4.8
CYANIDE	62	0.16	0.11 U	0.18	0.11 U	0.1 U	0.1 U	0.1 U	0.1 U
IRON	**7000**								
LEAD	400	4.3	3	1.5	1.7	0.86	2.1	1.5	1.5
MAGNESIUM	NA								
MANGANESE	**1400**								
MERCURY	0.7	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.03 U	0.03 U	0.03 U
NICKEL	520	6	6.5	5.8	3.7	4.5	10	8.7	10.9
POTASSIUM	NA								
SELENIUM	170								
SODIUM	NA								
VANADIUM	210								
ZINC	8700	14.6	14.4	9.9	7	5.5	11.3	9.1	11.9
Miscellaneous Parameters (mg/kg)									
SULFATE		497	592	407	790	181000	518	844	629
TOTAL ORGANIC CARBON									
TOTAL ORGANIC HALIDES		11 U	11.4 U	10.2 U	10.7 U	10.2 U	10.3 U	10.4 U	10.3 U

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:		A4	A4	A4	A4	A4	A4	A4	A4	A4
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	SCS-025	SCS-21	SCS-22	SCS-37	SCS-38	AT001	AT002	AT002	AT002
SAMPLE NUMBER:	Risk	SA5-SCS-025	SA6-SCS-21	SA6-SCS-22	SB20-SCS-037	SB20-SCS-038	AT001C	AT002A	AT002B	AT002B-D
DEPTH (FEET):	Value	5	5	5	5	5	6 - 8	1 - 3	3 - 5	3 - 5
SAMPLE DATE:		5/9/96	5/9/96	5/9/96	5/13/96	5/13/96	6/12/92	6/12/92	6/12/92	6/12/92
Volatile Organics (ug/kg)										
1,1,1-TRICHLOROETHANE	140000	11 U	10 U	12 U	10 U	10 U	10 U	11 U	11 U	11 U
1,1,2,2-TETRACHLOROETHANE	3500						10 U	11 U	11 U	11 U
1,1,2-TRICHLOROETHANE	9000						10 U	11 U	11 U	11 U
1,1-DICHLOROETHANE	34000	11 U	10 U	12 U	10 U	10 U	10 U	11 U	11 U	11 U
1,2-DICHLOROETHENE (TOTAL)	8000	3	3	12 U	10 U	10 U	10 U	11 U	11 U	11 U
ACETONE	320000						8 U	7 U	9 U	7 U
ETHYLBENZENE	200000	11 U	10 U	12 U	10 U	10 U	10 U	11 U	11 U	11 U
TETRACHLOROETHENE	72000	11 U	10 U	12 U	10 U	10 U	10 U	11 U	2	2
TOLUENE	107000	11 U	10 U	12 U	10 U	10 U	10 U	11 U	11 U	11 U
TRICHLOROETHENE	29000	11 U	2	12 U	10 U	10 U	3	10	35	31
XYLENES, TOTAL	110000						10 U	11 U	11 U	11 U
Semivolatile Organics (ug/kg)										
2-METHYLNAPHTHALENE	NA						340 U	350 U	350 U	400 U
ACENAPHTHENE	1200000	350 U	340 U	65	340 U	340 U	340 U	350 U	350 U	400 U
ACENAPHTHYLENE	NA						340 U	350 U	350 U	400 U
ANTHRACENE	7880000						340 U	350 U	350 U	400 U
BENZO(A)ANTHRACENE	NA	350 U	340 U	920	340 U	340 U	340 U	210	350 U	400 U
BENZO(A)PYRENE	NA	350 U	340 U	980	340 U	340 U	340 U	170	350 U	400 U
BENZO(B)FLUORANTHENE	NA	350 U	340 U	940	340 U	340 U	340 U	210	350 U	400 U
BENZO(G,H,I)PERYLENE	NA						340 U	350 U	350 U	400 U
BENZO(K)FLUORANTHENE	NA	350 U	340 U	800	340 U	340 U	340 U	210	350 U	400 U
BIS(2-ETHYLHEXYL)PHTHALATE	570000						340 U	350 U	350 U	400 U
CARBAZOLE	700000	350 U	340 U	110	340 U	340 U	340 U	350 U	350 U	400 U
CHRYSENE	NA	22	340 U	1000	340 U	340 U	340 U	250	350 U	400 U
DIBENZO(A,H)ANTHRACENE	NA	350 U	340 U	260	340 U	340 U	340 U	350 U	350 U	400 U
DIBENZOFURAN	58000						340 U	350 U	350 U	400 U
FLUORANTHENE	1080000						340 U	420	350 U	400 U
FLUORENE	850000						340 U	350 U	350 U	400 U
INDENO(1,2,3-CD)PYRENE	NA	350 U	340 U	880	340 U	340 U	340 U	350 U	350 U	400 U
NAPHTHALENE	10000						340 U	350 U	350 U	400 U
PHENANTHRENE	NA						340 U	350 U	350 U	400 U
PYRENE	890000	30	340 U	2100	340 U	340 U	340 U	350	350 U	400 U
TOTAL CPAHS	NA	22	340 U	5780	340 U	340 U	340 U	1050	350 U	400 U
TOTAL PAHS	NA	52	340 U	7945	340 U	340 U	340 U	1820	350 U	400 U
BAP EQUIVALENTS	2000	404.272	340 U	1523	340 U	340 U	340 U	406.85	350 U	400 U
Pesticides/PCBs (ug/kg)										
4,4'-DDD	56000						3.4 U	3.5 U	3.5 U	4 U
4,4'-DDE	40000						3.4 U	3.5 U	3.5 U	4 U
4,4'-DDT	15000						3.4 U	3.5 U	3.5 U	4 U
ALPHA-CHLORDANE	13000						1.7 U	1.8 U	1.8 U	2 U
DELTA-BHC	NA						1.7 U	1.8 U	1.8 U	2 U

NA - N[illegible]lable.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 SCS-025 SA5-SCS-025 5 5/9/96	A4 OU2 SCS-21 SA6-SCS-21 5 5/9/96	A4 OU2 SCS-22 SA6-SCS-22 5 5/9/96	A4 OU2 SCS-37 SB20-SCS-037 5 5/13/96	A4 OU2 SCS-38 SB20-SCS-038 5 5/13/96	A4 OU2 AT001 AT001C 6 - 8 6/12/92	A4 OU2 AT002 AT002A 1 - 3 6/12/92	A4 OU2 AT002 AT002B 3 - 5 6/12/92	A4 OU2 AT002 AT002B-D 3 - 5 6/12/92
DIELDRIN	800						3.4 U	3.5 U	3.5 U	4 U
ENDOSULFAN SULFATE	NA						3.4 U	3.5 U	3.5 U	4 U
ENDRIN	8000						3.4 U	3.5 U	3.5 U	4 U
ENDRIN ALDEHYDE	NA						3.4 U	3.5 U	3.5 U	4 U
GAMMA-CHLORDANE	NA						1.7 U	1.8 U	1.8 U	2 U
HEPTACHLOR EPOXIDE	400						1.7 U	1.8 U	1.8 U	2 U
METHOXYCHLOR	11000						17 U	18 U	18 U	20 U
Inorganics (mg/kg)										
ALUMINUM	26000						1520	6260	4350	5050
ANTIMONY	14	0.32 U	0.31 U	0.37 U	0.31 U	0.31 U	2.1 U	2.2 U	2.2 U	2.2 U
ARSENIC	10						0.62 U	2.9	6.5	5.9
BARIUM	1200	5.4	6.9	26.2	4	10.4	10.3 U	146	228	165
CADMIUM	35	0.07	0.04	0.22	0.05	0.04	1 U	1.1 U	1.1 U	1.1 U
CALCIUM	NA						23200	5630	10300	4290
CHROMIUM	71	7.3	4.2	8.2	3	3.5	5.7	13.7	12.2	10.4
COPPER	100	3.9	2.4	292	1.3	8.1	4.1 U	23.2	9.3	10.9
CYANIDE	62	0.11 U	0.1 U	0.16	0.1 U	0.1 U	2.6 U	2.8 U	2.8 U	2.8 U
IRON	7000						4370	16900	13000	13900
LEAD	400	1.7	1.3	20.4	1.1	1.5	1.6	9.4	6.8	7.5
MAGNESIUM	NA						4730	4180	5530	3290
MANGANESE	1400						185	1600	2050	1370
MERCURY	0.7	0.04 U	0.03 U	0.04 U	0.02 U	0.02 U	0.1 U	0.11 U	0.11 U	0.11 U
NICKEL	520	7.6	5.6	14.7	3.5	9.9	8.2 U	18	14.2	13.9
POTASSIUM	NA						146	379	322	582
SELENIUM	170						0.62 U	0.67 U	0.67 U	0.67 U
SODIUM	NA						103 U	111 U	111 U	111 U
VANADIUM	210						10.3 U	26.1	21.3	21.1
ZINC	8700	10.6	12.2	53.2	6	11.7	8.5	33	24.7	24.3
Miscellaneous Parameters (mg/kg)										
SULFATE		676	4.14	15.5	59.3	247				
TOTAL ORGANIC CARBON							870	13000	12000	10000
TOTAL ORGANIC HALIDES		10.7 U	10.2 U	12.3 U	12.5	10.4 U				

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	A4	A4	A4	A4	A4	A4	A4	A4	A4		
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2		
LOCATION:		AT003	AT003	AT004	AT004	AT005	AT005	AT005	AT006	AT006		
SAMPLE NUMBER:		AT003A	AT003B	AT004A	AT004B	AT005A	AT005C	AT005C-D	AT006A	AT006B		
DEPTH (FEET):		1 - 3	3 - 5	1 - 3	3 - 5	1 - 3	6 - 8	6 - 8	1 - 3	3 - 5		
SAMPLE DATE:		6/16/92	6/16/92	6/16/92	6/16/92	6/16/92	6/16/92	6/16/92	6/17/92	6/17/92		
Volatile Organics (ug/kg)												
1,1,1-TRICHLOROETHANE	140000	11 U	0.8	11 U	2	11 U	12 U	12 U	11 U	11 U		
1,1,2,2-TETRACHLOROETHANE	3500	11 U	14 U	11 U	2	11 U	12 U	12 U	11 U	11 U		
1,1,2-TRICHLOROETHANE	9000	11 U	14 U	11 U	7	11 U	12 U	12 U	11 U	11 U		
1,1-DICHLOROETHANE	34000	11 U	14 U	11 U	13 U	11 U	12 U	12 U	11 U	11 U		
1,2-DICHLOROETHENE (TOTAL)	8000	22	25	140	570	1	1	2	11 U	11 U		
ACETONE	320000	11 U	14 U	11 U	22 U	11 U	12 U	12 U	11 U	8 U		
ETHYLBENZENE	200000	11 U	14 U	11 U	72	11 U	12 U	12 U	11 U	11 U		
TETRACHLOROETHENE	72000	11 U	28	11 U	2700	11 U	12 U	0.9	11 U	11 U		
TOLUENE	107000	3 U	8 U	1 U	20	16	17	2 U	11 U	5 U		
TRICHLOROETHENE	29000	38	290	1	47000	10	8	11	5	11 U		
XYLENES, TOTAL	110000	11 U	14 U	2 U	2000	11 U	12 U	12 U	11 U	11 U		
Semivolatile Organics (ug/kg)												
2-METHYLNAPHTHALENE	NA	750 U	460 U	170	4100 U	370 U	390 U	400 U	730 U	400 U		
ACENAPHTHENE	1200000	750 U	460 U	79	4100 U	370 U	390 U	400 U	730 U	400 U		
ACENAPHTHYLENE	NA	750 U	460 U	370 U	4100 U	370 U	390 U	400 U	730 U	400 U		
ANTHRACENE	7880000	200	460 U	130	4100 U	370 U	390 U	400 U	360	400 U		
BENZO(A)ANTHRACENE	NA	890	460 U	530	4100 U	130	390 U	400 U	1100	400 U		
BENZO(A)PYRENE	NA	810	460 U	480	4100 U	370 U	390 U	400 U	1100	400 U		
BENZO(B)FLUORANTHENE	NA	1000	460 U	600	4100 U	150	390 U	400 U	1200	400 U		
BENZO(G,H,I)PERYLENE	NA	360	460 U	270	4100 U	370 U	390 U	400 U	730	400 U		
BENZO(K)FLUORANTHENE	NA	800	460 U	340	4100 U	100	390 U	400 U	810	400 U		
BIS(2-ETHYLHEXYL)PHTHALATE	570000	750 U	460 U	370 U	7200	370 U	390 U	400 U	730 U	400 U		
CARBAZOLE	700000	160	460 U	87	4100 U	370 U	390 U	400 U	200	400 U		
CHRYSENE	NA	960	460 U	600	4100 U	130	390 U	400 U	1300	400 U		
DIBENZO(A,H)ANTHRACENE	NA	750 U	460 U	370 U	4100 U	370 U	390 U	400 U	730 U	400 U		
DIBENZOFURAN	58000	750 U	460 U	55	4100 U	370 U	390 U	400 U	730 U	400 U		
FLUORANTHENE	1080000	2100	460 U	1300	4100 U	250	390 U	400 U	2800	400 U		
FLUORENE	850000	750 U	460 U	110	4100 U	370 U	390 U	400 U	730 U	400 U		
INDENO(1,2,3-CD)PYRENE	NA	240	460 U	290	4100 U	370 U	390 U	400 U	600	400 U		
NAPHTHALENE	10000	750 U	460 U	370 U	4100 U	370 U	390 U	400 U	730 U	400 U		
PHENANTHRENE	NA	1200	460 U	850	4100 U	130	390 U	400 U	1500	400 U		
PYRENE	890000	2000	460 U	1100	4100 U	220	390 U	400 U	2400	400 U		
TOTAL CPAHS	NA	4700	460 U	2840	4100 U	510	390 U	400 U	6110	400 U		
TOTAL PAHS	NA	10560	460 U	6569	4100 U	1110	390 U	400 U	13900	400 U		
BAP EQUIVALENTS	2000	1406.96	460 U	811	4100 U	417.63	390 U	400 U	1764.4	400 U		
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	24	4.6 U	240	41 U	17	3.9 U	4 U	300	4 U		
4,4'-DDE	40000	52	4.6 U	310	74	31	3.9 U	4 U	660	4 U		
4,4'-DDT	15000	18	4.6 U	67	93	63	3.9 U	4 U	1400	4 U		
ALPHA-CHLORDANE	13000	1.9 U	2.4 U	19 U	21 U	1.9 U	2 U	2 U	19 U	2 U		
DELTA-BHC	NA	1.9 U	2.4 U	19 U	25	1.9 U	2 U	2 U	19 U	2 U		

NA - Nc .able.
Shading indicates concentration exceeds the SRV.

TABLE 4
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA A4
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	A4 OU2 AT003 AT003A 1 - 3 6/16/92	A4 OU2 AT003 AT003B 3 - 5 6/16/92	A4 OU2 AT004 AT004A 1 - 3 6/16/92	A4 OU2 AT004 AT004B 3 - 5 6/16/92	A4 OU2 AT005 AT005A 1 - 3 6/16/92	A4 OU2 AT005 AT005C 6 - 8 6/16/92	A4 OU2 AT005 AT005C-D 6 - 8 6/16/92	A4 OU2 AT006 AT006A 1 - 3 6/17/92	A4 OU2 AT006 AT006B 3 - 5 6/17/92		
DIELDRIN	800	3.7 U	4.6 U	37 U	41 U	3.7 U	3.9 U	4 U	37 U	4 U		
ENDOSULFAN SULFATE	NA	3.7 U	4.6 U	37 U	41 U	3.7 U	3.9 U	4 U	37 U	4 U		
ENDRIN	8000	3.7 U	4.6 U	37 U	41 U	3.7 U	3.9 U	4 U	37 U	4 U		
ENDRIN ALDEHYDE	NA	3.7 U	4.6 U	37 U	41 U	7.1	3.9 U	4 U	37 U	4 U		
GAMMA-CHLORDANE	NA	1.9 U	2.4 U	19 U	21 U	1.9 U	2 U	2 U	19 U	2 U		
HEPTACHLOR EPOXIDE	400	1.9 U	2.4 U	19 U	21 U	1.9 U	2 U	2 U	19 U	2 U		
METHOXYCHLOR	11000	19 U	24 U	190 U	210 U	19 U	20 U	20 U	190 U	20 U		
Inorganics (mg/kg)												
ALUMINUM	26000	4110	6830	4360	4380	4840	3050	2590	3760	2690		
ANTIMONY	14	2.2 U	2.6 U	2.2 U	2.3 U	2.2 U	2.4 U	2.4 U	2.2 U	2.3 U		
ARSENIC	10	4.1	2.9	3.6	4.6	4.3	0.72 U	0.71 U	3.7	0.68 U		
BARIUM	1200	85.7	109	97.3	119	126	29.4	38.3	70.4	31.3		
CADMIUM	35	1.1 U	1.3 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U	1.1 U	1.1 U		
CALCIUM	NA	4340	10500	14800	16300	11800	27700	28700	10300	6010		
CHROMIUM	71	10.8	13.3	18.9	14.1	13.4	9.3	9	12.6	8.2		
COPPER	100	31.5	13.6	90.4	25.5	24.2	5.2	6.1	153	4.5 U		
CYANIDE	62	2.8 U	3.2 U	2.8 U	2.9 U	2.8 U	3 U	3 U	4.6	2.8 U		
IRON	7000	10500	38100	14200	22900	10600	11500	18600	13900	5010		
LEAD	400	123	9.7	54.7	36.2	33.4	3.4	3.1	54.9	3.6		
MAGNESIUM	NA	1750	2070	5050	3740	5880	7580	7760	3840	3040		
MANGANESE	1400	859	222	635	1340	1390	1870	5950	525	213		
MERCURY	0.7	0.11 U	0.13 U	0.11 U	0.12 U	0.11 U	0.12 U	0.12 U	0.11 U	0.11 U		
NICKEL	520	11.1	18.7	18.5	13.6	19	9.6 U	12.5	12.7	9 U		
POTASSIUM	NA	202	128 U	414	280	334	120 U	118 U	413	113 U		
SELENIUM	170	0.67 U	0.77 U	0.66 U	0.7 U	0.66 U	0.72 U	0.71 U	0.65 U	0.68 U		
SODIUM	NA	111 U	128 U	110 U	117 U	110 U	120 U	118 U	109 U	113 U		
VANADIUM	210	16.8	20.3	20.3	21.7	17.6	22.8	23	13.9	13.8		
ZINC	8700	62.3	30.6	87.4	49.3	39.6	14.9	14.5	298	15.3		
Miscellaneous Parameters (mg/kg)												
SULFATE												
TOTAL ORGANIC CARBON		16000	12000	13000	16000	3700	1600	2400	13000	1900		
TOTAL ORGANIC HALIDES												

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 5
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA B1
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		BB001	BB001	BB001	BB002	BB002	BB002	BB003	BB003	BB202	BB204	BB204
SAMPLE NUMBER:		BB001A	BB001B	BB001C	BB002B	BB002G	BB002G-D	BB003A	BB003D	BB202B	BB204A	BB204G
DEPTH (FEET):		1 - 3	3 - 5	6 - 8	3 - 5	16 - 18	16 - 18	1 - 3	8 - 10	3 - 5	1 - 3	16 - 18
SAMPLE DATE:		6/15/92	6/15/92	7/7/92	6/15/92	6/15/92	6/15/92	6/16/92	6/16/92	7/16/92	7/16/92	7/16/92
Volatile Organics (ug/kg)		1										
1,1-DICHLOROETHANE	34000	11 U	11 U	170 U	2	10 U	10 U	11 U	12 U	12 U	11 U	10 U
1,2-DICHLOROETHENE (TOTAL)	8000	11 U	11 U	120	160	10 U	10 U	11 U	12 U	12 U	11 U	10 U
ACETONE	320000	11 U	37 U	2600	12 U	10 U	10 U	11 U	100 U	11 U	9 U	1500
TETRACHLOROETHENE	72000	11 U	11 U	170 U	12 U	10 U	10 U	11 U	12 U	12 U	11 U	14
TRICHLOROETHENE	29000	11 U	11 U	170 U	4	10 U	10 U	11 U	12 U	12 U	11 U	27
Semivolatile Organics (ug/kg)												
ANTHRACENE	7880000	340 U	370 U	970 U	89	350 U	370 U	380 U	450 U			
BENZO(A)ANTHRACENE	NA	140	370 U	970 U	300	350 U	370 U	380 U	450 U			
BENZO(A)PYRENE	NA	120	370 U	970 U	270	350 U	370 U	380 U	450 U			
BENZO(B)FLUORANTHENE	NA	140	370 U	970 U	340	350 U	370 U	380 U	450 U			
BENZO(G,H,I)PERYLENE	NA	340 U	370 U	970 U	380 U	350 U	370 U	380 U	450 U			
BENZO(K)FLUORANTHENE	NA	98	370 U	970 U	240	350 U	370 U	380 U	450 U			
CARBAZOLE	700000	340 U	370 U	970 U	380 U	350 U	370 U	380 U	450 U			
CHRYSENE	NA	180	370 U	970 U	380	350 U	370 U	380 U	450 U			
FLUORANTHENE	1080000	340	370 U	200	770	350 U	370 U	110	450 U			
FLUORENE	850000	340 U	370 U	970 U	380 U	350 U	370 U	380 U	450 U			
INDENO(1,2,3-CD)PYRENE	NA	340 U	370 U	970 U	380 U	350 U	370 U	380 U	450 U			
PHENANTHRENE	NA	170	370 U	970 U	440	350 U	370 U	380 U	450 U			
PYRENE	890000	310	370 U	190	640	350 U	370 U	110	450 U			
TOTAL CPAH	NA	678	370 U	970 U	1530	350 U	370 U	380 U	450 U			
TOTAL PAH	NA	1498	370 U	390	3469	350 U	370 U	220	450 U			
BAP EQUIVALENTS	2000	336.16	370 U	970 U	545.78	350 U	370 U	380 U	450 U			
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000	26	3.7 U	9.7 U	180	3.5 U	3.7 U	3.8 U	4.5 U			
4,4'-DDE	40000	37	3.7 U	9.7 U	160	3.5 U	3.7 U	3.8 U	4.5 U			
4,4'-DDT	15000	11	3.7 U	9.7 U	160	3.5 U	3.7 U	8.2	4.5 U			
ALPHA-CHLORDANE	13000	1.8 U	1.9 U	5 U	2 U	1.8 U	1.9 U	2 U	2.3 U			
ENDOSULFAN SULFATE	NA	3.4 U	3.7 U	9.7 U	7.7	3.5 U	3.7 U	3.8 U	4.5 U			
ENDRIN	8000	3.4 U	3.7 U	9.7 U	4.7	3.5 U	3.7 U	3.8 U	4.5 U			
ENDRIN ALDEHYDE	NA	3.4 U	3.7 U	9.7 U	5.9	3.5 U	3.7 U	5.8	4.5 U			
Inorganics (mg/kg)												
ALUMINUM	26000	2810	1890	1790	4370	1900	1160	4580	3440			
ANTIMONY	14	2.2 U	2.5 U	7 U	2.3 U	2.2 U	2.1 U	2.3 U	2.7 U			
ARSENIC	10	3	1.2	9.4	2.9	0.66 U	0.64 U	2.6	4.4			
BARIUM	1200	74.8	22.5	38.4	75.6	11 U	10.7 U	74.9	30.3			
CALCIUM	NA	2930	682	25500	18500	10300	10700	4410	3030			
CHROMIUM	71	6	4	7 U	12.8	4.7	3.3	8.8	11			
COPPER	100	16.6	5.1 U	14 U	43.1	8.4	4.3 U	19.2	7.6			
IRON	7000	7090	4280	3730	10700	3650	2700	12300	9980			
LEAD	400	14.8	2.6	2.1 U	37	3.5	3.3	14.4	4.3			
MAGNESIUM	NA	1500	720	1840	7230	3830	3620	2370	1540			

NA - Nc ıable.
Shading indicates concentration exceeds the SRV.

TABLE 5
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA B1
NIROP FRIDLEY, MINNESOTA

SITE:		B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	BB001	BB001	BB001	BB002	BB002	BB002	BB003	BB003	BB202	BB204	BB204
SAMPLE NUMBER:	Risk	BB001A	BB001B	BB001C	BB002B	BB002G	BB002G-D	BB003A	BB003D	BB202B	BB204A	BB204G
DEPTH (FEET):	Value	1 - 3	3 - 5	6 - 8	3 - 5	16 - 18	16 - 18	1 - 3	8 - 10	3 - 5	1 - 3	16 - 18
SAMPLE DATE:		6/15/92	6/15/92	7/7/92	6/15/92	6/15/92	6/15/92	6/16/92	6/16/92	7/16/92	7/16/92	7/16/92
MANGANESE	1400	977	275	152	1350	91.8	55.6	670	156			
NICKEL	520	9.9	10.2 U	28.1 U	10.4	13.8	9.2	12.2	10.8 U			
POTASSIUM	NA	193	127 U	1000 U	465	110 U	107 U	389	269			
SELENIUM	170	0.65 U	0.76 U	2.1 U	0.7 U	0.66 U	0.64 U	0.68 U	0.81 U			
SODIUM	NA	108 U	127 U	536	116 U	110 U	107 U	113 U	135 U			
VANADIUM	210	10.8	12.7 U	35.1 U	20.4	11 U	10.7 U	18.4	24.6			
ZINC	8700	25.1	6.6	14 U	49.6	12.4	9.1	32.9	14.4			
Miscellaneous Parameters (mg/kg)												
TOTAL ORGANIC CARBON	NA	2500	240	16000	11000	660	310	3800	6300	15000	2800	480

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 5
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA B1
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	B1	B1	B1	B1	B1	B1	B1	B1	B1		
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2		
LOCATION:		BB205	BB205	BB206	BB206	BB206	BT001	BT001	BT002	BT002		
SAMPLE NUMBER:		BB205A	BB205G	BB206A	BB206A-D	BB206G	BT001A	BT001B	BT002A	BT002B		
DEPTH (FEET):		1 - 3	16 - 18	1 - 3	1 - 3	16 - 18	1 - 3	3 - 5	1 - 3	3 - 5		
SAMPLE DATE:		7/16/92	7/16/92	7/17/92	7/17/92	7/17/92	6/18/92	6/18/92	6/17/92	6/17/92		
Volatile Organics (ug/kg)												
1,1-DICHLOROETHANE	34000	12 U	11 U	14 U	11 U	11 U	11 U	11 U	12 U	15 U		
1,2-DICHLOROETHENE (TOTAL)	8000	12 U	11 U	14 U	11 U	11 U	11 U	11 U	12 U	15 U		
ACETONE	320000	12 U	130	210	240	170	5 U	11 U	9 U	20 U		
TETRACHLOROETHENE	72000	12 U	11 U	14 U	11 U	11 U	11 U	11 U	12 U	15 U		
TRICHLOROETHENE	29000	12 U	11 U	14 U	11 U	11 U	11 U	11 U	12 U	15 U		
Semivolatile Organics (ug/kg)												
ANTHRACENE	7880000						150	360 U	390 U	480 U		
BENZO(A)ANTHRACENE	NA						450	360 U	390 U	480 U		
BENZO(A)PYRENE	NA						450	360 U	390 U	480 U		
BENZO(B)FLUORANTHENE	NA						490	360 U	390 U	480 U		
BENZO(G,H,I)PERYLENE	NA						290	360 U	390 U	480 U		
BENZO(K)FLUORANTHENE	NA						380	360 U	390 U	480 U		
CARBAZOLE	700000						77	360 U	390 U	480 U		
CHRYSENE	NA						500	360 U	390 U	480 U		
FLUORANTHENE	1080000						990	360 U	390 U	480 U		
FLUORENE	850000						51	360 U	390 U	480 U		
INDENO(1,2,3-CD)PYRENE	NA						310	360 U	390 U	480 U		
PHENANTHRENE	NA						580	360 U	390 U	480 U		
PYRENE	890000						810	360 U	390 U	480 U		
TOTAL CPAH	NA						2580	360 U	390 U	480 U		
TOTAL PAH	NA						5400	360 U	390 U	480 U		
BAP EQUIVALENTS	2000						759.3	360 U	390 U	480 U		
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000						63	3.6 U	3.9 U	4.8 U		
4,4'-DDE	40000						52	3.6 U	3.9 U	4.8 U		
4,4'-DDT	15000						78	3.6 U	3.9 U	4.8 U		
ALPHA-CHLORDANE	13000						4.8	1.9 U	2 U	2.5 U		
ENDOSULFAN SULFATE	NA						3.6 U	3.6 U	3.9 U	4.8 U		
ENDRIN	8000						5.1	3.6 U	3.9 U	4.8 U		
ENDRIN ALDEHYDE	NA						3.6 U	3.6 U	3.9 U	4.8 U		
Inorganics (mg/kg)												
ALUMINUM	26000						2430	3400	3380	4170		
ANTIMONY	14						2.3	2.2 U	2.3 U	3.1 U		
ARSENIC	10						2.1	2.7	2.5	5.8		
BARIUM	1200						44.1	70.2	61.4	197		
CALCIUM	NA						15200	2730	6150	11800		
CHROMIUM	71						6.6	6.2	6.5	8.5		
COPPER	100						19.1	8.5	11.6	9		
IRON	7000						6020	8260	7490	9820		
LEAD	400						19.4	6.8	5.3	8.6		
MAGNESIUM	NA						5380	1290	2440	2400		

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 5
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA B1
NIROP FRIDLEY, MINNESOTA

SITE:		B1	B1	B1	B1	B1	B1	B1	B1	B1		
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2		
LOCATION:	Soil	BB205	BB205	BB206	BB206	BB206	BT001	BT001	BT002	BT002		
SAMPLE NUMBER:	Risk	BB205A	BB205G	BB206A	BB206A-D	BB206G	BT001A	BT001B	BT002A	BT002B		
DEPTH (FEET):	Value	1 - 3	16 - 18	1 - 3	1 - 3	16 - 18	1 - 3	3 - 5	1 - 3	3 - 5		
SAMPLE DATE:		7/16/92	7/16/92	7/17/92	7/17/92	7/17/92	6/18/92	6/18/92	6/17/92	6/17/92		
MANGANESE	1400						302	691	616	1560		
NICKEL	520						8.6 U	8.8 U	9.1	17.2		
POTASSIUM	NA						247	110 U	157	264		
SELENIUM	170						0.64 U	0.66 U	0.68 U	1.3		
SODIUM	NA						107 U	110 U	114 U	153 U		
VANADIUM	210						10.7 U	11.4	12.3	15.3 U		
ZINC	8700						42.7	22.8	21.7	25.1		
Miscellaneous Parameters (mg/kg)												
TOTAL ORGANIC CARBON	NA	16000	290	9200	6500	720	9900	6900	16000	2900		

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 6
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA B2
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	B2 OU2 BT003 BT003A 1 - 3 6/18/92	B2 OU2 BT003 BT003D 8 - 10 6/18/92	B2 OU2 BT004 BT004A 1 - 3 6/18/92	B2 OU2 BT004 BT004D 8 - 10 6/18/92	B2 OU2 BT004 BT004D-D 8 - 10 6/18/92							
Semivolatile Organics (ug/kg)													
BENZO(A)ANTHRACENE	NA			64	360 U	390 U							
BENZO(B)FLUORANTHENE	NA			130	360 U	390 U							
CHRYSENE	NA			68	360 U	390 U							
FLUORANTHENE	1080000			86	360 U	390 U							
PYRENE	890000			96	360 U	390 U							
TOTAL CPAH	NA			262	360 U	390 U							
TOTAL PAH	NA			444	360 U	390 U							
BAP EQUIVALENTS	2000			399.268	360 U	390 U							
Pesticides/PCBs (ug/kg)													
4,4'-DDD	56000			11	3.6 U	3.9 U							
4,4'-DDE	40000			18	3.6 U	3.9 U							
4,4'-DDT	15000			3.7	3.6 U	3.9 U							
Inorganics (mg/kg)													
ALUMINUM	26000			3960	1110	1440							
ARSENIC	10			2.4	1.8	3							
BARIUM	1200			93.9	11 U	11.5 U							
CALCIUM	NA			7220	1160	1420							
CHROMIUM	71			7.8	2.7	3.9							
COPPER	100			11.5	4.4 U	4.6 U							
IRON	7000			9910	3330	3940							
LEAD	400			12	2	2.1							
MAGNESIUM	NA			2870	703	823							
MANGANESE	1400			747	29.7	49.3							
NICKEL	520			14.1	8.8 U	9.2 U							
POTASSIUM	NA			246	110 U	1000 U							
VANADIUM	210			13.8	11 U	11.5 U							
ZINC	8700			31.8	30.5	49.9							
Miscellaneous Parameters (mg/kg)													
TOTAL ORGANIC CARBON	NA	11000	220	2800	1300	1800							

NA - N[illegible]lable.
Shading indicates concentration exceeds the SRV.

TABLE 7
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA D
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	D	D	D	D	D	D	D	D	D	D	D	D
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		DB029	DB029	DB029	DB030	DB030	DB031	DB031	DB032	DB032	DB033	DB033	DB034
SAMPLE NUMBER:		DB029A	DB029E	DB029E-D	DB030A	DB030E	DB031A	DB031F	DB032A	DB032C	DB033A	DB033E	DB034A
DEPTH (FEET):		1 - 3	10 - 12	10 - 12	1 - 3	10 - 12	1 - 3	13 - 15	1 - 3	6 - 8	1 - 3	10 - 12	1 - 3
SAMPLE DATE:		6/11/92	6/11/92	6/11/92	6/12/92	6/12/92	6/11/92	6/11/92	6/11/92	6/11/92	7/7/92	7/7/92	7/7/92
Volatile Organics (ug/kg)													
1,1,1-TRICHLOROETHANE	140000	0.8	10 U	10 U	11 U	10 U	11 U	53 U	11 U	11 U	12 U	13 U	11 U
ACETONE	320000	11 U	130	160	7 U	140	22 U	82 U	4 U	11 U	15 U	470	6 U
TETRACHLOROETHENE	72000	2	10 U	10 U	11 U	10 U	11 U	9	11 U	11 U	1	11	2
TRICHLOROETHENE	29000	9	10 U	10 U	11 U	10 U	11 U	53 U	11 U	11 U	12 U	46	7
Semivolatile Organics (ug/kg)													
ANTHRACENE	7880000	85	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
BENZO(A)ANTHRACENE	NA	520	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
BENZO(A)PYRENE	NA	980	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
BENZO(B)FLUORANTHENE	NA	1600	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
BENZO(G,H,I)PERYLENE	NA	990	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
BENZO(K)FLUORANTHENE	NA	760	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
CARBAZOLE	700000	84	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
CHRYSENE	NA	860	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
DIBENZO(A,H)ANTHRACENE	NA	310	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
FLUORANTHENE	1080000	680	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	170	370 U	370 U
INDENO(1,2,3-CD)PYRENE	NA	840	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
PHENANTHRENE	NA	220	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
PYRENE	890000	960	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	140	370 U	370 U
TOTAL CPAH	NA	5870	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
TOTAL PAH	NA	8805	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	310	370 U	370 U
BAP EQUIVALENTS	2000	1594.46	340 U	340 U	370 U	340 U	370 U	3600 U	370 U	350 U	380 U	370 U	370 U
Pesticides/PCBs (ug/kg)													
4,4'-DDD	56000	29	7.4	3.4 U	3.7 U	3.4 U	70	3.6 U	3.7 U	3.5 U	21	3.7 U	3.7 U
4,4'-DDE	40000	17	26	3.4 U	3.7 U	3.4 U	140	3.6 U	3.7 U	3.5 U	130	3.7 U	26
4,4'-DDT	15000	84	19	3.4 U	6.3	3.4 U	81	3.6 U	3.7 U	3.5 U	200	3.7 U	20
DIELDRIN	800	16	3.4 U	3.4 U	3.7 U	3.4 U	3.7 U	3.6 U	3.7 U	3.5 U	3.8 U	3.7 U	3.7 U
ENDRIN	8000	15	3.4 U	3.4 U	3.7 U	3.4 U	3.7 U	3.6 U	3.7 U	3.5 U	3.8 U	3.7 U	3.7 U
Inorganics (mg/kg)													
ALUMINUM	26000	3850	1850	1570	5090	1670	4600	1770	5420	2470	3160	3080	3560
ARSENIC	10	1.2	1	1	2.7	0.88	2.4	0.94	6	1.5	3.5	1.8	2.6
BARIUM	1200	124	10.3 U	10.4 U	71.4	10.3 U	74	16.6	93.2	20.7	129	56.3	43.8
CADMIUM	35	4.3	1 U	1 U	1.1 U	1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U
CALCIUM	NA	11000	4400	3420	9120	3420	3060	6650	13400	15000	23900	5080	4840
CHROMIUM	71	43.2	4.8	5	10.6	3	11.8	7	13.9	6.6	8.8	7.7	7.1
COBALT	2000	11	10.3 U	10.4 U	10.8 U	10.3 U	11 U	10.5 U	11 U	10.7 U	11.6 U	11.2 U	11.2 U
COPPER	100	937	7.3	7.3	19.2	5.6	59.4	22.7	46.4	9.9	33.9	14.5	8
IRON	7000	30100	4490	3890	10200	4050	11000	5550	16200	6610	14900	8960	5870
LEAD	400	373	1.4	1.1	11	1	17.5	4.1	19.5	2.2	10.2	4.2	6.4
MAGNESIUM	NA	4050	1950	1690	2830	1430	1600	2500	6250	5410	1960	1720	1300
MANGANESE	1400	1960	94.8	98.8	345	66.5	367	156	604	167	1830	562	168
NICKEL	520	40.7	8.3 U	8.3 U	11.9	8.3 U	10.5	8.4 U	15.4	8.5 U	9.5	8.9 U	8.9 U

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 7
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA D
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	D	D	D	D	D	D	D	D	D	D	D	D
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		DB029	DB029	DB029	DB030	DB030	DB031	DB031	DB032	DB032	DB033	DB033	DB034
SAMPLE NUMBER:		DB029A	DB029E	DB029E-D	DB030A	DB030E	DB031A	DB031F	DB032A	DB032C	DB033A	DB033E	DB034A
DEPTH (FEET):		1 - 3	10 - 12	10 - 12	1 - 3	10 - 12	1 - 3	13 - 15	1 - 3	6 - 8	1 - 3	10 - 12	1 - 3
SAMPLE DATE:		6/11/92	6/11/92	6/11/92	6/12/92	6/12/92	6/11/92	6/11/92	6/11/92	6/11/92	7/7/92	7/7/92	7/7/92
POTASSIUM	NA	509	152	104	281	103 U	315	227	443	282	1000 U	1000 U	1000 U
SODIUM	NA	251	107	104 U	108 U	103 U	110 U	105 U	110 U	111	116 U	112 U	112 U
VANADIUM	210	21.2	12.3	13.2	20.8	10.7	21.3	13.6	21.4	16	13.9	13.6	11.6
ZINC	8700	325	9.3	10.3	40.2	7.3	28.5	12.9	86.3	17	30	21.1	17.8
Miscellaneous Parameters (mg/kg)													
TOTAL ORGANIC CARBON	NA	16000	150	150	16000	220	16000	1200	2000	1800	16000	13000	16000

NA - N[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 7
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA D
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	D	D	D	D	D	D	D		
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2		
LOCATION:		DB034	B97	B97	CB-13	CB-13	CB-20	CB-20		
SAMPLE NUMBER:		DB034C	B97(12-16)	B97(16-20)	CB13-97(00-04)	CB13-97(04-08)	CB20-97(00-04)	CB20-97(04-08)		
DEPTH (FEET):		6 - 8	12 - 16	16 - 20	0 - 4	4 - 8	0 - 4	4 - 8		
SAMPLE DATE:		7/7/92	6/13/97	6/13/97	6/13/97	6/13/97	6/13/97	6/13/97		
Volatile Organics (ug/kg)										
1,1,1-TRICHLOROETHANE	140000	2	20 U	20 U	20 U	20 U	20 U	20 U		
ACETONE	320000	1400	60 U	60 U	60 U	60 U	60 U	60 U		
TETRACHLOROETHENE	72000	10	25 U	25 U	25 U	43 J	25 U	25 U		
TRICHLOROETHENE	29000	63	20 U	20 U	20 U	140	20 U	20 U		
Semivolatile Organics (ug/kg)										
ANTHRACENE	7880000	380 U								
BENZO(A)ANTHRACENE	NA	380 U								
BENZO(A)PYRENE	NA	380 U								
BENZO(B)FLUORANTHENE	NA	380 U								
BENZO(G,H,I)PERYLENE	NA	380 U								
BENZO(K)FLUORANTHENE	NA	380 U								
CARBAZOLE	700000	380 U								
CHRYSENE	NA	380 U								
DIBENZO(A,H)ANTHRACENE	NA	380 U								
FLUORANTHENE	1080000	380 U								
INDENO(1,2,3-CD)PYRENE	NA	380 U								
PHENANTHRENE	NA	380 U								
PYRENE	890000	380 U								
TOTAL CPAH	NA	380 U								
TOTAL PAH	NA	380 U	25 U	25 U	25 U	25 U	25 U	25 U		
BAP EQUIVALENTS	2000	380 U								
Pesticides/PCBs (ug/kg)										
4,4'-DDD	56000	3.8 U								
4,4'-DDE	40000	4.8								
4,4'-DDT	15000	5.4								
DIELDRIN	800	3.8 U								
ENDRIN	8000	3.8 U								
Inorganics (mg/kg)										
ALUMINUM	26000	4940								
ARSENIC	10	2.8								
BARIUM	1200	73.6								
CADMIUM	35	1.2 U								
CALCIUM	NA	5480								
CHROMIUM	71	9.2								
COBALT	2000	11.5 U								
COPPER	100	13.3								
IRON	7000	11100								
LEAD	400	10.3								
MAGNESIUM	NA	2610								
MANGANESE	1400	631								
NICKEL	520	13.8								

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 7
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA D
NIROP FRIDLEY, MINNESOTA

SITE:		D	D	D	D	D	D	D		
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2		
LOCATION:	Soil	DB034	B97	B97	CB-13	CB-13	CB-20	CB-20		
SAMPLE NUMBER:	Risk	DB034C	B97(12-16)	B97(16-20)	CB13-97(00-04)	CB13-97(04-08)	CB20-97(00-04)	CB20-97(04-08)		
DEPTH (FEET):	Value	6 - 8	12 - 16	16 - 20	0 - 4	4 - 8	0 - 4	4 - 8		
SAMPLE DATE:		7/7/92	6/13/97	6/13/97	6/13/97	6/13/97	6/13/97	6/13/97		
POTASSIUM	NA	1000 U								
SODIUM	NA	115 U								
VANADIUM	210	16.6								
ZINC	8700	26.3								
Miscellaneous Parameters (mg/kg)										
TOTAL ORGANIC CARBON	NA	16000								

NA - N[illegible]ilable.
Shading indicates concentration exceeds the SRV.

TABLE 8
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA E
NIROP FRIDLEY, MINNESOTA

SITE:	Residential Soil Risk Value	E	E	E	E	E	E	E	E	E	E	E	E
OPERABLE UNIT:		OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:		EB001	EB001	EB002	EB002	EB003	EB003	EB004	EB004	EB203	EB203	EB206	EB206
SAMPLE NUMBER:		EB001A	EB001E	EB002A	EB002D	EB003A	EB003F	EB004A	EB004D	EB203A	EB203B	EB206A	EB206E
DEPTH (FEET):		1 - 3	10 - 12	1 - 3	8 - 10	1 - 3	13 - 15	1 - 3	8 - 10	1 - 3	3 - 5	1 - 3	10 - 12
SAMPLE DATE:		6/16/92	6/16/92	6/16/92	6/16/92	6/18/92	6/18/92	6/18/92	6/18/92	7/21/92	7/21/92	7/17/92	7/17/92
Volatile Organics (ug/kg)													
1,2-DICHLOROETHENE (TOTAL)	8000	53 U	28 U	11 U	10 U	11 U	11 U	4	11 U	11 U	11 U	11 U	10 U
ACETONE	320000	23 U	28 U	11 U	10 U	19 U	42 U	120	120	13 U	14 U	11 U	48 U
TETRACHLOROETHENE	72000	53 U	28 U	11 U	10 U	11 U	0.7	11 U	3	11 U	2	11 U	10 U
TRICHLOROETHENE	29000	53 U	3	11 U	2	11 U	2	3	0.6	31	27	8	10 U
Semivolatile Organics (ug/kg)													
ACENAPHTHENE	1200000	140	380 U	55	340 U	390 U	340 U	380	350 U				
ANTHRACENE	7880000	320	380 U	130	340 U	390 U	340 U	860	120				
BENZO(A)ANTHRACENE	NA	1300	380 U	460	340 U	390 U	340 U	3300	100				
BENZO(A)PYRENE	NA	1200	380 U	460	340 U	390 U	340 U	2900	140				
BENZO(B)FLUORANTHENE	NA	1500	380 U	510	340 U	390 U	340 U	3400	170				
BENZO(G,H,I)PERYLENE	NA	870	380 U	300	340 U	390 U	340 U	2000	400				
BENZO(K)FLUORANTHENE	NA	900	380 U	340	340 U	390 U	340 U	2000	83				
CARBAZOLE	700000	250	380 U	82	340 U	390 U	340 U	200	350 U				
CHRYSENE	NA	1500	380 U	530	340 U	390 U	340 U	3400	140				
DIBENZOFURAN	58000	50	380 U	370 U	340 U	390 U	340 U	160	350 U				
FLUORANTHENE	1080000	3700	380 U	1200	340 U	390 U	340 U	7600	260				
FLUORENE	850000	130	380 U	370 U	340 U	390 U	340 U	390	350 U				
INDENO(1,2,3-CD)PYRENE	NA	790	380 U	300	340 U	390 U	340 U	1800	350 U				
PHENANTHRENE	NA	1800	380 U	610	340 U	390 U	340 U	3100	150				
PYRENE	890000	3200	380 U	1000	340 U	390 U	340 U	6600	300				
TOTAL CPAH	NA	7190	380 U	2600	340 U	390 U	340 U	16800	633				
TOTAL PAH	NA	17220	380 U	5895	340 U	390 U	340 U	37340	1863				
BAP EQUIVALENTS	2000	1744.5	380 U	775.93	340 U	390 U	340 U	4148.4	360.47				
Pesticides/PCBs (ug/kg)													
4,4'-DDD	56000	35 U	3.8 U	110	3.4 U	3.9 U	3.4 U	42	3.5 U				
4,4'-DDE	40000	700	3.8 U	420	3.4 U	3.9 U	3.4 U	69	3.5 U				
4,4'-DDT	15000	930	3.8 U	500	3.4 U	3.9 U	3.4 U	37 U	3.5 U				
ENDRIN	8000	35 U	3.8 U	37 U	3.4 U	3.9 U	3.4 U	37 U	5.3				
GAMMA-CHLORDANE	NA	18 U	2 U	19 U	1.8 U	2 U	1.8 U	19 U	1.8				
Inorganics (mg/kg)													
ALUMINUM	26000	3000	2310	4470	1530	4620	3960	3860	1710				
ARSENIC	10	2.6	1.8	2.2	0.62 U	0.97	0.93	3.5	0.83				
BARIUM	1200	37.4	19	49.3	10.3 U	62.9	24.3	61.6	10.6 U				
CADMIUM	35	1 U	1.1 U	1.1 U	1 U	1.2 U	1.1 U	2.3	1.1 U				
CALCIUM	NA	41900	12200	36900	4500	40100	14100	26300	5150				
CHROMIUM	71	11.4	6.7	11.4	2.3	8.9	10.2	28.3	6.2				
COPPER	100	128	10.2	61.4	6	13.6	14.8	176	6.4				
IRON	7000	9040	5910	9150	3810	8400	14500	10700	4200				
LEAD	400	53.1	3	15.5	1.2	5.4	1.8	292	7.4				
MAGNESIUM	NA	5980	5270	15000	1440	13500	7840	9550	2350				
MANGANESE	1400	361	172	308	91.2	387	162	293	82.3				

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 8
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA E
NIROP FRIDLEY, MINNESOTA

SITE:		E	E	E	E	E	E	E	E	E	E	E	E
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2
LOCATION:	Soil	EB001	EB001	EB002	EB002	EB003	EB003	EB004	EB004	EB203	EB203	EB206	EB206
SAMPLE NUMBER:	Risk	EB001A	EB001E	EB002A	EB002D	EB003A	EB003F	EB004A	EB004D	EB203A	EB203B	EB206A	EB206E
DEPTH (FEET):	Value	1 - 3	10 - 12	1 - 3	8 - 10	1 - 3	13 - 15	1 - 3	8 - 10	1 - 3	3 - 5	1 - 3	10 - 12
SAMPLE DATE:		6/16/92	6/16/92	6/16/92	6/16/92	6/18/92	6/18/92	6/18/92	6/18/92	7/21/92	7/21/92	7/17/92	7/17/92
NICKEL	520	13.6	8.5 U	14.9	8.2 U	12.4	13.6	26.7	8.5 U				
POTASSIUM	NA	1000 U	1000 U	1000 U	1000 U	1090	383	1000 U	1000 U				
SELENIUM	170	0.63 U	0.63 U	0.67 U	0.62 U	0.7 U	0.73	0.67 U	0.64 U				
SODIUM	NA	104 U	106 U	129	103 U	921	161	150	106 U				
VANADIUM	210	13.8	14.5	18.9	11.1	21.2	23.4	18.2	10.6 U				
ZINC	8700	79.3	13.5	58.2	8.6	37.9	20.7	232	11				
Miscellaneous Parameters (mg/kg)													
TOTAL ORGANIC CARBON	NA	2100	340	4500	240	3700	170	11000	1600	8400	1100	9200	16000

NA - N[illegible]lable.
Shading indicates concentration exceeds the SRV.

TABLE 8
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA E
NIROP FRIDLEY, MINNESOTA

SITE:		E	E	E	E	E	E	E	E	E	E	
OPERABLE UNIT:	Residential	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	OU2	
LOCATION:	Soil	EB207	EB207	EB208	EB208	EB208	EB209	EB209	EB210	EB210	EB210	
SAMPLE NUMBER:	Risk	EB207A	EB207F	EB208A	EB208A-D	EB208F	EB209A	EB209B	EB210A	EB210A-D	EB210E	
DEPTH (FEET):	Value	1 - 3	13 - 15	1 - 3	1 - 3	13 - 15	1 - 3	3 - 5	1 - 3	1 - 3	10 - 12	
SAMPLE DATE:		7/21/92	7/21/92	7/21/92	7/21/92	7/21/92	7/22/92	7/22/92	7/22/92	7/22/92	7/22/92	
Volatile Organics (ug/kg)												
1,2-DICHLOROETHENE (TOTAL)	8000	12 U	10 U	12 U	11 U	33	11 U	11 U	11 U	11 U	10 U	
ACETONE	320000	10 U	9 U	18 U	20 U	24 U	11 U	20 U	34 U	84 U	35 U	
TETRACHLOROETHENE	72000	2	10 U	12 U	11 U	12 U	11 U	11 U	11 U	11 U	10 U	
TRICHLOROETHENE	29000	6	10 U	12 U	11 U	12 U	0.7	2	11 U	11 U	10 U	
Semivolatile Organics (ug/kg)												
ACENAPHTHENE	1200000											
ANTHRACENE	7880000											
BENZO(A)ANTHRACENE	NA											
BENZO(A)PYRENE	NA											
BENZO(B)FLUORANTHENE	NA											
BENZO(G,H,I)PERYLENE	NA											
BENZO(K)FLUORANTHENE	NA											
CARBAZOLE	700000											
CHRYSENE	NA											
DIBENZOFURAN	58000											
FLUORANTHENE	1080000											
FLUORENE	850000											
INDENO(1,2,3-CD)PYRENE	NA											
PHENANTHRENE	NA											
PYRENE	890000											
TOTAL CPAH	NA											
TOTAL PAH	NA											
BAP EQUIVALENTS	2000											
Pesticides/PCBs (ug/kg)												
4,4'-DDD	56000											
4,4'-DDE	40000											
4,4'-DDT	15000											
ENDRIN	8000											
GAMMA-CHLORDANE	NA											
Inorganics (mg/kg)												
ALUMINUM	26000											
ARSENIC	10											
BARIUM	1200											
CADMIUM	35											
CALCIUM	NA											
CHROMIUM	71											
COPPER	100											
IRON	7000											
LEAD	400											
MAGNESIUM	NA											
MANGANESE	1400											

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 8
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA E
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	E OU2 EB207 EB207A 1 - 3 7/21/92	E OU2 EB207 EB207F 13 - 15 7/21/92	E OU2 EB208 EB208A 1 - 3 7/21/92	E OU2 EB208 EB208A-D 1 - 3 7/21/92	E OU2 EB208 EB208F 13 - 15 7/21/92	E OU2 EB209 EB209A 1 - 3 7/22/92	E OU2 EB209 EB209B 3 - 5 7/22/92	E OU2 EB210 EB210A 1 - 3 7/22/92	E OU2 EB210 EB210A-D 1 - 3 7/22/92	E OU2 EB210 EB210E 10 - 12 7/22/92	
NICKEL	520											
POTASSIUM	NA											
SELENIUM	170											
SODIUM	NA											
VANADIUM	210											
ZINC	8700											
Miscellaneous Parameters (mg/kg)												
TOTAL ORGANIC CARBON	NA	2000	100	2500	4900	5900	1300	2300	2300	2100	170	

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 9
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - SUBAREA F
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	F1 OU2 FB001 FB001A 1 - 3 6/12/92	F1 OU2 FB001 FB001E 10 - 12 6/12/92	F2 OU2 FB002 FB002A 1 - 3 6/11/92	F2 OU2 FB002 FB002C 6 - 8 7/7/92	F2 OU2 FB002 FB002H 18 - 20 6/11/92	F2 OU2 FB003 FB003A 1 - 3 6/11/92	F2 OU2 FB003 FB003E 10 - 12 6/11/92	F2 OU2 FB004 FB004A 1 - 3 6/11/92	F2 OU2 FB004 FB004G 16 - 18 6/11/92			
Volatile Organics (ug/kg)													
ACETONE	320000	17 U	140 U	5 U	79 U	710	510	1600	11 U	180			
Semivolatile Organics (ug/kg)													
BENZO(A)ANTHRACENE	NA	200	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
BENZO(A)PYRENE	NA	170	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
BENZO(B)FLUORANTHENE	NA	240	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
BENZO(K)FLUORANTHENE	NA	160	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
CHRYSENE	NA	230	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
FLUORANTHENE	1080000	390	340 U	1500 U	380 U	340 U	3700 U	330 U	96	340 U			
PHENANTHRENE	NA	220	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
PYRENE	890000	410	340 U	1500 U	380 U	340 U	3700 U	330 U	79	340 U			
TOTAL CPAH	NA	1000	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
TOTAL PAH	NA	2020	340 U	1500 U	380 U	340 U	3700 U	330 U	175	340 U			
BAP EQUIVALENTS	2000	490.83	340 U	1500 U	380 U	340 U	3700 U	330 U	360 U	340 U			
Pesticides/PCBs (ug/kg)													
4,4'-DDD	56000	5 U	3.4 U	3.6 U	3.8 U	3.4 U	30	3.3 U	3.6 U	3.4 U			
4,4'-DDE	40000	18	3.4 U	3.6 U	3.8 U	3.4 U	15	3.3 U	6.5	3.4 U			
4,4'-DDT	15000	21	3.4 U	3.6 U	3.8 U	3.4 U	3.7 U	3.3 U	9.9	3.4 U			
Inorganics (mg/kg)													
ALUMINUM	26000	4650	1240	2510	3990	1690	5920	1800	5620	1280			
ARSENIC	10	4.8	1.7	3.8	0.7	0.63 U	3.9	0.62 U	3.7	0.78			
BARIUM	1200	99.5	10.8 U	92	34.6	10.5 U	173	10.6 U	113	10.4 U			
CALCIUM	NA	9640	24300	2880	8530	18300	17100	25900	7260	24900			
CHROMIUM	71	9.9	4.5	8.4	14.3	6.4	18.2	4.5	11.8	7.5			
COBALT	2000	12.9 U	10.8 U	10.7 U	11.1 U	11	11.3 U	10.4 U	11.1 U	10.4 U			
COPPER	100	26.2	4.3 U	6.9	4.5	6.2	20.4	6.8	11.2	7.7			
IRON	7000	16200	3490	8420	6640	4780	16100	4870	13900	4370			
LEAD	400	22.4	1.3	4.1	5.8	2.5	6.5	2.1	6.2	2.3			
MAGNESIUM	NA	2590	6770	1150	4660	5730	3620	8100	3050	6530			
MANGANESE	1400	787	281	723	87.2	161	1610	243	1020	245			
NICKEL	520	12.4	8.7 U	8.6 U	9.6	26.8	16.7	14.1	9.3	18.1			
POTASSIUM	NA	457	108 U	164	1000 U	106	428	189 U	273	104 U			
SODIUM	NA	129 U	108 U	107 U	111 U	105 U	167	104 U	111 U	104 U			
VANADIUM	210	18.3	10.8 U	10.7 U	20.7	10.5 U	19.9	10.4 U	16.9	10.4 U			
ZINC	8700	66.7	8	12.4	20.1	15.6	27	10.8	24.9	15.3			
Miscellaneous Parameters (mg/kg)													
TOTAL ORGANIC CARBON	NA	16000	650	4700	940	1500	16000	1600	16000	7600			

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 10
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - "OTHER" AREAS
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	NORTH 40 OU2 SCS-09 SA7-SCS-09 5 5/9/96	NORTH 40 OU2 SCS-10 SA7-SCS-10 5 5/9/96	NORTH 40 OU2 SCS-11 SA8-SCS-11 5 5/9/96	NORTH 40 OU2 SCS-12 SA8-SCS-12 5 5/9/96	NORTH 40 OU2 SCS-13 SA8-SCS-13 5 5/9/96	NORTH 40 OU2 SCS-30 SA9-SCS-030 5 5/9/96	NORTH 40 OU2 SCS-31 SA9-SCS-031 5 5/9/96	NORTH 40 OU2 SCS-16 SB11-SCS-16 5 5/9/96	NORTH 40 OU2 SCS-17 SB11-SCS-17 5 5/9/96
Volatile Organics (ug/kg)										
TRICHLOROETHENE	29000	11 U	11 U	10 U	10 U	10 U	12 U	11 U	10 U	10 U
Semivolatile Organics (ug/kg)										
2-CHLOROPHENOL	12600	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
4-CHLORO-3-METHYLPHENOL	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
BENZO(A)ANTHRACENE	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
BENZO(A)PYRENE	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
BENZO(K)FLUORANTHENE	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
CHRYSENE	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
INDENO(1,2,3-CD)PYRENE	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
PENTACHLOROPHENOL	71000	900 U	880 U	870 U	860 U	860 U	1000 U	920 U	860 U	860 U
PYRENE	890000	360 U	350 U	28	340 U	340 U	410 U	370 U	340 U	340 U
TOTAL CPAH	NA	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
TOTAL PAH	NA	360 U	350 U	28	340 U	340 U	410 U	370 U	340 U	340 U
BAP EQUIVALENTS	2000	360 U	350 U	350 U	340 U	340 U	410 U	370 U	340 U	340 U
Inorganics (mg/kg)										
ANTIMONY	14	0.33 U	0.32 U	0.32 U	0.31	0.31 U	0.34 U	0.33 U	0.31 U	0.31 U
BARIUM	1200	11.8	8.6	3	3.8	4.2	151	261	3.3	8.6
CADMIUM	35	0.05	0.04 U	0.04 U	0.06	0.05	0.13	0.08	0.04 U	0.04
CHROMIUM	71	4	5.1	3.1	4	4	5.7	5.4	3.8	5.6
COPPER	100	1.7	3.2	1.8	2.4	1.8	2.9	3.4	1.6	2.6
CYANIDE	62	0.11 U	0.11 U	0.11 U	0.1 U	0.1 U	0.11 U	0.11 U	0.1 U	0.1 U
LEAD	400	1.2	2.5	0.93	1.4	1.1	2	2	0.91	1.4
NICKEL	520	5.7	4.3	4	5.7	4.8	9.8	8.9	4.6	6.4
ZINC	8700	9.3	11.1	8.3	8.2	8	9.5	10.9	7.3	9.9
Miscellaneous Parameters (mg/kg)										
SULFATE	NA	8.53	5.65	14	6.71	8.4	74	106	6.75	6.17
TOTAL ORGANIC HALIDES	NA	10.8 U	10.6 U	10.5 U	10.3 U	10.4 U	12.3 U	11.2 U	10.3 U	10.4 U

NA - Not available.
Shading indicates concentration exceeds the SRV.

TABLE 10
SUMMARY OF DETECTED CHEMICALS IN SOIL
OPERABLE UNIT 2 - "OTHER" AREAS
NIROP FRIDLEY, MINNESOTA

SITE: OPERABLE UNIT: LOCATION: SAMPLE NUMBER: DEPTH (FEET): SAMPLE DATE:	Residential Soil Risk Value	NORTH 40 OU2 SCS-18 SB12-SCS-18 5 5/9/96	NORTH 40 OU2 SCS-19 SB12-SCS-19 5 5/9/96	NORTH 40 OU2 SCS-19 SB12-SCS-19-D 5 5/9/96	NORTH 40 OU2 SCS-14 SB5-SCS-14 5 5/9/96	NORTH 40 OU2 SCS-15 SB5-SCS-15 5 5/9/96				
Volatile Organics (ug/kg)										
TRICHLOROETHENE	29000	10 U	10 U	1	10 U	10 U				
Semivolatile Organics (ug/kg)										
2-CHLOROPHENOL	12600	340 U	350 U	340 U	24	340 U				
4-CHLORO-3-METHYLPHENOL	NA	340 U	350 U	340 U	20	340 U				
BENZO(A)ANTHRACENE	NA	340 U	22	36	330 U	340 U				
BENZO(A)PYRENE	NA	340 U	22	28	330 U	340 U				
BENZO(K)FLUORANTHENE	NA	340 U	350 U	32	330 U	340 U				
CHRYSENE	NA	340 U	29	39	330 U	340 U				
INDENO(1,2,3-CD)PYRENE	NA	340 U	350 U	22	330 U	340 U				
PENTACHLOROPHENOL	71000	850 U	870 U	860 U	30	850 U				
PYRENE	890000	340 U	31	65	330 U	340 U				
TOTAL CPAH	NA	340 U	73	157	330 U	340 U				
TOTAL PAH	NA	340 U	104	222	330 U	340 U				
BAP EQUIVALENTS	2000	340 U	235.979	221.159	330 U	340 U				
Inorganics (mg/kg)										
ANTIMONY	14	0.31 U	0.32 U	0.55	0.3 U	0.31 U				
BARIUM	1200	6	15.6	14.9	5.5	7.5				
CADMIUM	35	0.04	0.08	0.11	0.04 U	0.04 U				
CHROMIUM	71	5.1	5.6	6.9	4.3	5.3				
COPPER	100	3.3	7.3	8.3	2.5	2.2				
CYANIDE	62	0.1 U	0.13	0.1 U	0.1 U	0.14				
LEAD	400	1.3	11.3	16.3	1.5	1.5				
NICKEL	520	6.2	6.1	7.5	5.6	4.5				
ZINC	8700	10.3	20.3	21.1	8.2	7.8				
Miscellaneous Parameters (mg/kg)										
SULFATE	NA	5.83	9.98	6.59	6.29	10.5				
TOTAL ORGANIC HALIDES	NA	10.2 U	10.5 U	10.4 U	10 U	14.3				

NA - Not available.
Shading indicates concentration exceeds the SRV.

APPENDIX B

SPREADSHEETS FOR SCREENING RISK EVALUATION

TABLE B-1
SUMMARY OF SCREENING EVALUATION
NIROP FRIDLEY, MINNESOTA

Exposure Scenario	Estimated Risk									
	Sub Area A1	Sub Area A2	Sub Area A3	Sub Area A4	Area B1	Area B2	Area D	Area E	Area F	Other
Residential	HQ > 0.2 Iron ICR = 4E-6	HQ > 0.2 Iron, Manganese Acute HQ > 1 Copper ICR = 1E-5	HQ > 0.2 Antimony, Chromium, Iron, Manganese, 2-Butanone, PCE, Toluene, 1,1,1-TCA, Xylenes Acute HQ > 1 Copper HQ > 1 Lead ICR = 2E-4 (1,1-DCA, PCE, TCE, cPAHs)	HQ > 0.2 Iron, Manganese, 1,2-DCE, Acute HQ > 1 Copper ICR = 3E-4 (Arsenic, TCE, cPAHs)	HQ > 0.2 Iron ICR = 1E-5	HQ > 0.2 Iron ICR = 5E-6	HQ > 0.2 Iron Manganese Acute HQ > 1 Copper ICR = 1E-5	HQ > 0.2 Iron Acute HQ > 1 Copper ICR = 2E-5 (cPAHs)	HQ > 0.2 Iron ICR = 7E-6	HQ < 0.2 ICR = 1E-6
Typical Industrial Worker	HQ < 0.2 ICR = 2E-6	HQ < 0.2 ICR = 5E-6	HQ > 0.2 Iron, Manganese, PCE, 1,1,1-TCA, Xylenes ICR = 1E-4 (PCE, TCE)	HQ ≤ 0.2 ICR = 2E-4 (TCE, cPAHs)	HQ < 0.2 ICR = 6E-6	HQ < 0.2 ICR = 2E-6	HQ < 0.2 ICR = 7E-6	HQ < 0.2 ICR = 1E-5	HQ < 0.2 ICR = 4E-6	HQ < 0.2 ICR = 6E-7
Minor Frequent Construction Worker	HQ < 0.2 ICR = 1E-6	HQ < 0.2 ICR = 5E-6	HQ > 0.2 Iron, Manganese PCE, 1,1,1-TCA ICR = 7E-5 (PCE, TCE, cPAHS)	HQ < 0.2 ICR = 2E-4 (TCE, cPAHs)	HQ < 0.2 ICR = 7E-6	HQ < 0.2 ICR = 3E-6	HQ < 0.2 ICR = 8E-6	HQ < 0.2 ICR = 2E-5 (cPAHs)	HQ < 0.2 ICR = 4E-6	HQ < 0.2 ICR = 8E-7

Notes:
The results presented in this table are utilized in a qualitative way to identify COCs and areas for further evaluation only (i.e., the results do not represent actual risks).
Screening evaluation is based on the maximum detected concentration of all soil samples collected in each sub area.
Shading indicates that the estimated risks exceed acceptable levels (ICRs > 1E-5, HQs > 0.2)
1,1-DCA = 1,1-Dichloroethane
PCE = Tetrachloroethane
TCE = Trichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
cPAHs = Carcinogenic PAHs

RESIDENTIAL RECEPTORS

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
Inorganics:																									
Aluminum	7429905		26000	4190	0.032		Or			0.032						0.032						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	3.4	0.068	In	Or		0.068	0.068								0.068				3.40E-06	A		Or
Barium	7440393		1200		0.000		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	13.6	0.038		Or															1.53E-07	A	Or De	In
Copper	7440508		100	10.3	0.103	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	24300	0.694	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	927	0.132		Or			0.132												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210		0.000	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2																			0.00E+00	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.068	0.233	0.000	0.000	0.000	0.000	0.000	0.032	0.000	0.068	0.000	0.000	0.000	4E-06			

VOC? - "y" indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

							Path-ways		NONCANCER TARGET ENDPOINTS (2)														CANCER		Path-ways	
	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Missin	Drivin	ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	ELCR (1)	Class	Missin	Drivin
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drivingg	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drivingg
Inorganics:																									
Aluminum	7429905		26000	5270	0.041		Or			0.041						0.041						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	8.3	0.166	In	Or		0.166	0.166								0.166				8.30E-06	A		Or
Barium	7440393		1200	227	0.189		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	11.3	0.032		Or															1.27E-07	A	Or De	In
Copper	7440508		100	158	1.580	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	18000	0.514	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	2230	0.319		Or			0.319												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210		0.000	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29	4.1																		1.41E-06	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	0.341																		1.71E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.166	0.525	0.000	0.000	0.000	0.000	0.000	0.041	0.000	0.166	0.000	0.000	0.000	1E-05			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missin	Pathways Drivin	NONCANCER TARGET ENDPOINTS (2) ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missin	Pathways Drivin
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missin	Pathways Drivin g	NONCANCER TARGET ENDPOINTS (2) ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missin	Pathways Drivin g
Inorganics:																									
Aluminum	7429905		26000	6370	0.049		Or			0.049						0.049						NA	NA		
Antimony	7440360		14	105	1.500		Or		1.500												1.500	NA	NA		
Arsenic	7440382		10	6.6	0.132	In	Or		0.132	0.132								0.132				6.60E-06	A		Or
Barium	7440393		1200	327	0.273		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35	5.3	0.030		Or						0.030									6.06E-09	B1	Or De	In
Chromium VI	18540299		71	114	0.321		Or															1.28E-06	A	Or De	In
Copper	7440508		100	1290	12.900	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	275000	7.857	In	Or															NA	NA		
Lead	7439921		400	453	1.133		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	20700	2.957		Or			2.957												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7	0.19	0.054		In			0.054		0.054										NA	D		
Methyl Mercury	22967926		3	0.000	0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520	142	0.055	In	Or														0.055	4.01E-08	A	Or De	In
Vanadium	7440622 1314621		210	32.9	0.031	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34	34	0.060		In						0.060									1.00E-05	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8	1.8	0.045		In							0.045								NA	D		
Ethyl benzene	100414	y	200	140	0.098		In						0.098	0.098		0.098						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400	3500	0.500		In									0.500						NA	D		
Naphthalene	91203	y	10	2.7	0.054		In		0.054								0.054				0.054	NA	D		
Tetrachloroethylene (PCE)	127184	y	72	1200	3.333		In			3.333			3.333	3.333								1.50E-04	B2/C		In
Toluene	108883	y	107	190	0.355		In			0.355			0.355	0.355			0.355					NA	D		
1,1,1 - Trichloroethane	71556	y	140	2600	3.714		In			3.714				3.714								NA	D		
Trichloroethylene (TCE)	79016	y	29	120																		4.14E-05	B2/C		In
Xylenes (mixed)	1330207	y	110	580	1.055		In			1.055							1.055				1.055	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	3.17																		1.59E-05	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	1.686	11.650	0.000	0.054	3.877	7.546	0.000	0.647	1.464	0.132	0.000	0.000	2.663	2E-04			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
Inorganics:																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missin	Pathways Drivin	NONCANCER TARGET ENDPOINTS (2) ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missin	Pathways Drivin
Inorganics:																									
Aluminum	7429905		26000	6830	0.053		Or			0.053						0.053						NA	NA		
Antimony	7440360		14	2.3	0.033		Or		0.033												0.033	NA	NA		
Arsenic	7440382		10	11.4	0.228	In	Or		0.228	0.228								0.228				1.14E-05	A		Or
Barium	7440393		1200	306	0.255		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	22.6	0.064		Or															2.55E-07	A	Or De	In
Copper	7440508		100	1900	19.000	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	38100	1.089	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	5950	0.850		Or			0.850												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7	0.12	0.034		In			0.034		0.034										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210	26.1	0.025	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8	14	0.350		In							0.350								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10	1.1	0.022		In		0.022								0.022				0.022	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29	96																		3.31E-05	B2/C		In
Xylenes (mixed)	1330207	y	110	28	0.051		In			0.051							0.051				0.051	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	60.7																		3.04E-04	B2		Or
Fluoranthene	206440		1080	160	0.030		Or		0.030				0.030	0.030								NA	D		
Pyrene	129000		890	130	0.029		Or						0.029									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.312	1.216	0.000	0.034	0.059	0.380	0.000	0.053	0.073	0.228	0.000	0.000	0.106	3E-04			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drivingg	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drivingg
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted). cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drivig	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drivig
Inorganics:																									
Aluminum	7429905		26000	4580	0.035		Or			0.035						0.035						NA	NA		
Antimony	7440360		14	2.3	0.033		Or		0.033												0.033	NA	NA		
Arsenic	7440382		10	9.4	0.188	In	Or		0.188	0.188								0.188				9.40E-06	A		Or
Barium	7440393		1200	197	0.164		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	12.8	0.036		Or															1.44E-07	A	Or De	In
Copper	7440508		100	43.1	0.431	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	12300	0.351	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	1560	0.223		Or			0.223												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210	24.6	0.023	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	0.759																		3.80E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.221	0.446	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.188	0.000	0.000	0.033	1E-05			

VOC? - "y" indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missin	Pathways: Drivin	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missin	Pathways: Drivin
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
								NONCANCER TARGET ENDPOINTS (2)																	
Inorganics:																									
Aluminum	7429905		26000	3960	0.030		Or			0.030						0.030						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	3	0.060	In	Or		0.060	0.060								0.060				3.00E-06	A		Or
Barium	7440393		1200		0.000		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	7.8	0.022		Or															8.79E-08	A	Or De	In
Copper	7440508		100	11.5	0.115	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	9910	0.283	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	747	0.107		Or			0.107												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210		0.000	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	0.4																		2.00E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.060	0.197	0.000	0.000	0.000	0.000	0.000	0.030	0.000	0.060	0.000	0.000	0.000	5E-06			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
Inorganics:																									
Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2) ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
WHOLE BODY - increased mortality, decreased growth rate, etc.																									
### Class A - Known human carcinogen																									
Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
Class C - Possible human carcinogen																									
Class D - Not Classifiable																									
NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missin	Pathways: Drivin g	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missin	Pathways: Drivin g
Inorganics:																									
Aluminum	7429905		26000	5420	0.042		Or			0.042						0.042						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	6	0.120	In	Or		0.120	0.120								0.120				6.00E-06	A		Or
Barium	7440393		1200	129	0.108		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35	4.3	0.025		Or						0.025									4.91E-09	B1	Or De	In
Chromium VI	18540299		71	43.2	0.122		Or															4.87E-07	A	Or De	In
Copper	7440508		100	937	9.370	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	30100	0.860	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	1960	0.280		Or			0.280												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210	21.4	0.020	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	1.59																		7.95E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.120	0.442	0.000	0.000	0.025	0.000	0.000	0.042	0.000	0.120	0.000	0.000	0.000	1E-05			

VOC? - "y" indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC ?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drivingg	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drivingg
Inorganics:																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Miss In	Pathways Drivg	NONCANCER TARGET ENDPOINTS (2) ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Miss In	Pathways Drivg
Inorganics:																									
Aluminum	7429905		26000	4620	0.036		Or			0.036						0.036						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	3.5	0.070	In	Or		0.070	0.070								0.070				3.50E-06	A		Or
Barium	7440393		1200		0.000		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	28.3	0.080		Or															3.19E-07	A	Or De	In
Copper	7440508		100	176	1.760	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	14500	0.414	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	387	0.055		Or			0.055												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210	23.4	0.022	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	4.15																		2.08E-05	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.070	0.161	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.070	0.000	0.000	0.000	2E-05			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drivingg	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drivingg
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																									
Aluminum	7429905		26000	5920	0.046		Or			0.046						0.046						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10	4.8	0.096	In	Or		0.096	0.096								0.096				4.80E-06	A		Or
Barium	7440393		1200	173	0.144		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71	18.2	0.051		Or															2.05E-07	A	Or De	In
Copper	7440508		100	26.2	0.262	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000	16200	0.463	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400	1610	0.230		Or			0.230												NA	D		
Mercury (Inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210		0.000	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	0.491																		2.46E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.096	0.372	0.000	0.000	0.000	0.000	0.000	0.046	0.000	0.096	0.000	0.000	0.000	7E-06			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Mission	Pathways: Drivingg	NONCANCER TARGET ENDPOINTS (2): ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Mission	Pathways: Drivingg
Inorganics:																									
Aluminum	7429905		26000		0.000		Or			0.000						0.000						NA	NA		
Antimony	7440360		14		0.000		Or		0.000												0.000	NA	NA		
Arsenic	7440382		10		0.000	In	Or		0.000	0.000								0.000				0.00E+00	A		Or
Barium	7440393		1200	261	0.218		Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	NA		0
Cadmium	7440439		35		0.000		Or						0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		71		0.000		Or															0.00E+00	A	Or De	In
Copper	7440508		100		0.000	In	Or	Based on Acute Intake. If HQ > 1 there may be an acute health concern														NA	D		
Iron	7439896		7000		0.000	In	Or															NA	NA		
Lead	7439921		400		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.														NA	B2		
Manganese	7439965		1400		0.000		Or			0.000												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	0.7		0.000		In			0.000		0.000										NA	D		
Methyl Mercury	22967926		3		0.000	In	Or			0.000						0.000						NA	NA		
Nickel	various		520		0.000	In	Or														0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		210		0.000	In	Or															NA	D		
Volatile Organics																									
1,1 - Dichloroethane	75343	y	34		0.000		In						0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	8		0.000		In							0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In						0.000	0.000		0.000						NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	1400		0.000		In									0.000						NA	D		
Naphthalene	91203	y	10		0.000		In		0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	72		0.000		In			0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	107		0.000		In			0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	140		0.000		In			0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	29																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	110		0.000		In			0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																									
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		2	0.235979																		1.18E-06	B2		Or
Fluoranthene	206440		1080		0.000		Or		0.000				0.000	0.000								NA	D		
Pyrene	129000		890		0.000		Or						0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1E-06			

VOC? - 'y' indicates that the contaminant is considered volatile.

(1) Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).

Tier 2 Residential Soil Reference Value Risk Evaluation (1999 Version)

							Path-ways		NONCANCER TARGET ENDPOINTS (2)														CANCER		Path-ways	
	Chemical	CAS No.	VOC?	Residential SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Missin	Drivin g	ADREN	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	ELCR (1)	Class	Missin	Drivin g
	Inorganics:																									
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																									
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																									
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																									
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																									
	WHOLE BODY - increased mortality, decreased growth rate, etc.																									
###	Class A - Known human carcinogen																									
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																									
	Class C - Possible human carcinogen																									
	Class D - Not Classifiable																									
	NA - No EPA Classification Available.																									

TYPICAL INDUSTRIAL WORKERS

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Drinking	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Drinking
								NONCANCER TARGET ENDPOINTS (2)																		
Inorganics:																										
Aluminum	7429905		100000	4190	0.008		Or In				0.008						0.008						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	3.4	0.010	In	Or			0.010	0.010								0.010				1.36E-06	A		Or
Barium	7440393		12500	0	0.000		Or							0.000			0.000						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	13.6	0.006		Or																3.20E-07	A	Or De	In
Copper	7440508		9000	10.3	0.000	In	Or								0.000								NA	D		
Iron	7439896		46000	24300	0.106	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	927	0.033		In Or				0.033												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	0	0.000	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0																			0.00E+00	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.010	0.051	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.010	0.000	0.000	0.000	2E-06			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
								NONCANCER TARGET ENDPOINTS (2)																		
Inorganics:																										
Aluminum	7429905		100000	5270	0.011		Or In				0.011						0.011						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	8.3	0.023	In	Or			0.023	0.023								0.023				3.32E-06	A		Or
Barium	7440393		12500	227	0.004		Or							0.004			0.004						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	11.3	0.005		Or																2.66E-07	A	Or De	In
Copper	7440508		9000	158	0.004	In	Or								0.004								NA	D		
Iron	7439896		46000	18000	0.078	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	2230	0.080		In Or				0.080												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	0	0.000	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	4.1																			8.91E-07	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.341																			8.53E-07	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.023	0.113	0.000	0.000	0.004	0.004	0.000	0.014	0.000	0.023	0.000	0.000	0.000	5E-06			

VOC? - "Y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	voc	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
								NONCANCER TARGET ENDPOINTS (2)																		
Inorganics:																										
Aluminum	7429905		100000	6370	0.013		Or In				0.013						0.013						NA	NA		
Antimony	7440360		100	105	0.210		Or			0.210												0.210	NA	NA		
Arsenic	7440382		25	6.6	0.018	In	Or			0.018	0.018								0.018				2.64E-06	A		Or
Barium	7440393		12500	327	0.005		Or							0.005			0.005						NA	NA		
Cadmium	7440439		250	5.3	0.004		Or							0.004									1.27E-08	B1	Or De	In
Chromium VI	18540299		425	114	0.054		Or																2.68E-06	A	Or De	In
Copper	7440508		9000	1290	0.029	In	Or								0.029								NA	D		
Iron	7439896		46000	275000	1.196	In	Or																NA	NA		
Lead	7439921		700	453	0.647		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	20700	0.739		In Or				0.739												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.19	0.019		In	Not Protective of High			0.019		0.019	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	142	0.009	In	Or															0.009	9.47E-08	A	Or De	In
Vanadium	7440622 1314621		1340	32.9	0.005	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	34	0.025		In							0.025									6.18E-06	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	1.8	0.016		In								0.016								NA	D		
Ethyl benzene	100414	y	200	140	0.700		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	3500	0.163		In	Not Protective of High Short-term Exposure									0.163						NA	D		
Naphthalene	91203	y	28	2.7	0.019		In			0.019								0.019				0.019	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	1200	0.916		In				0.916			0.916	0.916								9.16E-05	B2/C		In
Toluene	108883	y	305	190	0.125		In				0.125			0.125	0.125			0.125					NA	D		
1,1,1 - Trichloroethane	71556	y	472	2600	1.102		In				1.102				1.102								NA	D		
Trichloroethylene (TCE)	79016	y	46	120																			2.61E-05	B2/C		In
Xylenes (mixed)	1330207	y	248	580	0.468		In				0.468							0.468				0.468	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	3.17																			7.93E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.248	3.400	0.000	0.019	1.075	2.187	0.000	0.181	0.612	0.018	0.000	0.000	0.706	1E-04			

VOC? - "Y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Drlving	NONCANCER TARGET ENDPOINTS (2): ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Drlving
Inorganics:																										
Aluminum	7429905		100000	6830	0.014		Or In				0.014						0.014						NA	NA		
Antimony	7440360		100	2.3	0.005		Or			0.005												0.005	NA	NA		
Arsenic	7440382		25	11.4	0.032	In	Or			0.032	0.032								0.032				4.56E-06	A		Or
Barium	7440393		12500	306	0.005		Or							0.005			0.005						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	22.6	0.011		Or																5.32E-07	A	Or De	In
Copper	7440508		9000	1900	0.042	In	Or								0.042								NA	D		
Iron	7439896		46000	38100	0.166	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	5950	0.213		In Or				0.213												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.12	0.012		In	Not Protective of High			0.012		0.012	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	26.1	0.004	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	14	0.127		In								0.127								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	1.1	0.008		In			0.008								0.008				0.008	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	96																			2.09E-05	B2/C		In
Xylenes (mixed)	1330207	y	248	28	0.023		In				0.023							0.023				0.023	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	60.7																			1.52E-04	B2		Or
Fluoranthene	206440		6800	160	0.005		Or			0.005				0.005	0.005								NA	D		
Pyrene	129000		5800	130	0.004		Or							0.004									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.049	0.293	0.000	0.012	0.014	0.174	0.000	0.019	0.030	0.032	0.000	0.000	0.035	2E-04			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	4580	0.009		Or In				0.009						0.009						NA	NA		
Antimony	7440360		100	2.3	0.005		Or			0.005												0.005	NA	NA		
Arsenic	7440382		25	9.4	0.026	In	Or			0.026	0.026								0.026				3.76E-06	A		Or
Barium	7440393		12500	197	0.003		Or							0.003			0.003						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	12.8	0.006		Or																3.01E-07	A	Or De	In
Copper	7440508		9000	43.1	0.001	In	Or								0.001								NA	D		
Iron	7439896		46000	12300	0.053	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	1560	0.056		In Or				0.056												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	24.6	0.004	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.759																			1.90E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.031	0.091	0.000	0.000	0.003	0.001	0.000	0.012	0.000	0.026	0.000	0.000	0.005	6E-06			

VOC? - "Y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
								NONCANCER TARGET ENDPOINTS (2)																		
Inorganics:																										
Aluminum	7429905		100000	3960	0.008		Or In				0.008						0.008						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	3	0.008	In	Or			0.008	0.008								0.008				1.20E-06	A		Or
Barium	7440393		12500	0	0.000		Or							0.000			0.000						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	7.8	0.004		Or																1.84E-07	A	Or De	In
Copper	7440508		9000	11.5	0.000	In	Or								0.000								NA	D		
Iron	7439896		46000	9910	0.043	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	747	0.027		In Or				0.027												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	0	0.000	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.4																			1.00E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.008	0.043	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.000	0.000	2E-06			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
								NONCANCER TARGET ENDPOINTS (2)																		
Inorganics:																										
Aluminum	7429905		100000	5420	0.011		Or In				0.011						0.011						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	6	0.017	In	Or			0.017	0.017								0.017				2.40E-06	A		Or
Barium	7440393		12500	129	0.002		Or							0.002			0.002						NA	NA		
Cadmium	7440439		250	4.3	0.003		Or							0.003									1.03E-08	B1	Or De	In
Chromium VI	18540299		425	43.2	0.020		Or																1.02E-06	A	Or De	In
Copper	7440508		9000	937	0.021	In	Or								0.021								NA	D		
Iron	7439896		46000	30100	0.131	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	1960	0.070		In Or				0.070												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	21.4	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	1.59																			3.98E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.017	0.098	0.000	0.000	0.006	0.021	0.000	0.013	0.000	0.017	0.000	0.000	0.000	7E-06			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
									NONCANCER TARGET ENDPOINTS (2)																		
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	4620	0.009		Or In				0.009						0.009						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	3.5	0.010	In	Or			0.010	0.010								0.010				1.40E-06	A		Or
Barium	7440393		12500	0	0.000		Or							0.000			0.000						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	28.3	0.013		Or																6.66E-07	A	Or De	In
Copper	7440508		9000	176	0.004	In	Or								0.004								NA	D		
Iron	7439896		46000	14500	0.063	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	387	0.014		In Or				0.014												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	23.4	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	4.15																			1.04E-05	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.010	0.033	0.000	0.000	0.000	0.004	0.000	0.009	0.000	0.010	0.000	0.000	0.000	1E-05			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
									NONCANCER TARGET ENDPOINTS (2)																		
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	5920	0.012		Or In				0.012						0.012						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	4.8	0.013	In	Or			0.013	0.013								0.013				1.92E-06	A		Or
Barium	7440393		12500	173	0.003		Or							0.003			0.003						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	18.2	0.009		Or																4.28E-07	A	Or De	In
Copper	7440508		9000	26.2	0.001	In	Or								0.001								NA	D		
Iron	7439896		46000	16200	0.070	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	1610	0.058		In Or				0.058												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	0	0.000	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.491																			1.23E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.013	0.083	0.000	0.000	0.003	0.001	0.000	0.015	0.000	0.013	0.000	0.000	0.000	4E-06			

VOC? - 'Y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
									NONCANCER TARGET ENDPOINTS (2)																		
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	0	0.000		Or In				0.000						0.000						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	0	0.000	In	Or			0.000	0.000								0.000				0.00E+00	A		Or
Barium	7440393		12500	261	0.004		Or							0.004			0.004						NA	NA		
Cadmium	7440439		250	0	0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	0	0.000		Or																0.00E+00	A	Or De	In
Copper	7440508		9000	0	0.000	In	Or								0.000								NA	D		
Iron	7439896		46000	0	0.000	In	Or																NA	NA		
Lead	7439921		700	0	0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	0	0.000		In Or				0.000												NA	D		
Mercury (inorganic: elemental and mercuric chloric	7439976 7487947	y	2	0	0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	0	0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	0	0.000	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0	0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0	0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305	0	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0																			0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248	0	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.235979																			5.90E-07	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	6E-07			

VOC? - "Y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

MINOR CONSTRUCTION WORKERS

Minor Construction/Utility Worker - Chronic Ingestion of Soil Exposure

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs (back-calculated)		
IR	Ingestion Rate (mg soil/day)	200	C	
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from contaminated area	1.00	U	
EF	Exposure Frequency (day/yr)	80	C	Based on site specific information exposure
ED	Exposure duration (years)	25	U	95th percentile worker tenure (8 yrs - mean) US Dept. Labor. Bureau of Labor Statistics. 1991
BW	Body weight (kg)	70	C	EPA 1989b
AT	Averaging Time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available

C = Central Tendency Value

U = Upper Bound Value

Minor Constsruction/Utility Worker - Chronic Dermal Contact with Soil Exposure

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Skin surface area potentially in contact with dust/soil (cm2)	4900	C	25% of ave total body surface area (19400 cm2) (equivalent to hands, arms and part of head)
AF	Skin Adherence factor (mg/cm2)	0.3	C	Outdoor worker (Kissel et al., as cited in EPA 1995 Draft and EPA 1992)
ABS	Absorption factor	Chemical Specific		
EF	Exposure Frequency (day/yr)	80	NA	Assume 5 d/wk for 5 mon/yr (e.g.,May - Sept) minus precipitation days (1 d/wk)
ED	Exposure Duration (years)	25	U	95th percentile worker tenure (8 yrs - mean) US Dept. Labor. Bureau of Labor Statistics. 1991
BW	Body Weight (kg)	70	C	
AT	Averaging time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available

C = Central Tendency Value

M = between Central Tendency and Upper Bound Values

U = Upper Bound Value

Minor Construction/Utility Worker - Calculation of Chronic Volatilization Factor (VF)

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Variable	Definition	Variable Utilized	Rationale/Reference
VF	Volatilization Factor (m3/kg)	back-calculated	
(Q/C)	Inverse of the mean concentration at the center of a source (g/m2-s per kg/m3) (use site-specific area if available)	61.03	EPA Technical Background Document for SSLs (1996) Annual Estimate Q/C value for Minneapolis for a 5 acre source
Da	Apparent Diffusivity (cm^2/s) $= [((\theta_a^{10/3} \times Di \times H') + (\theta_w^{10/3} \times Dw)) / n^2]/(\rho_b \times K_d + \theta_w + \theta_a \times H')$	Chemical Specific	EPA Region IX PRG table
θ_w	Water filled soil porosity $= (f_m \times \rho_b)$	0.15	Calculated
θ_a	Air filled soil porosity $= n - \theta_w$	0.28	Calculated
n	Total soil porosity $= 1 - (\rho_b/\rho_s)$	0.43	Calculated
f_m	Soil moisture content (cm^3-water/g-soil)	0.1	Default, use site specific if available.
ρ_b	Dry soil bulk density (g/cm^3)	1.5	EPA Technical Background Document for SSLs (1996) (Use site-specific information if available)
ρ_s	Soil particle density (g/cm^3)	2.65	EPA Technical Background Document for SSLs (1996) (Use site-specific information if available)
Di	Diffusivity in air (cm2/s)	Chemical Specific	EPA Region IX PRG table
Dw	Diffusivity in water (cm2/s)	Chemical Specific	EPA Region IX PRG table
H	Henry's constant (atm - m3/mol)	Chemical Specific	EPA Region IX PRG table
H'	dimensionless Henry's constant = H x 41	Chemical Specific	Calculated
K_d	Soil-water partition coefficient (cm^3/g) $= K_{oc} \times f_{oc}$	Chemical Specific	Calculated
K_{oc}	Organic carbon partition coefficient (cm^3/g)	Chemical Specific	EPA Region IX PRG table
f_{oc}	Organic carbon content of soil	0.005	Default, use site specific if available.
T	Exposure interval (s)	7.88E+08	Assumes 350 days/year because Q/C is based on annual average.

Minor Construction/Utility Worker - Calculation of Chronic Particulate Emission Factor (PEF)

$$PEF\ (m^3/kg) = (Q/C) \times [(3600\ sec/hr)/(0.036 \times (1-V) \times (U_m/U_t)^3 \times F(x)]$$

Variable	Definition	Variable Utilized	Rationale/Reference
PEF	Particulate Emission Factor (m^3/kg)	3.83E+08	
(Q/C)	Inverse of the mean concentration at the center of a source (g/m^2-s per kg/m^3)	61.03	EPA Technical Background Document for SSLs (1996) Annual Estimate Q/C value for Minneapolis for a 5 acre source *(Use site-specific if available)*
V	Fraction of vegetative cover	0.00	Default. *(Use Cowherd et al., 1985 and site data to develop site-specific value)*
U_m	Mean annual windspeed (m/s)	4.92	Based on climatic data for Minneapolis/St. Paul metropolitan area *(use Cowherd et al., 1985 and site data to develop site-specific value)*
U_t	Equivalent threshold value of windspeed at 7 meters (m/s)	11.32	EPA Technical Background Document for SSLs (1996) Default. *(Use Cowherd et al., 1985 and site data to develop site-specific value)*
F(x)	Function dependent upon U_m/U_t	0.194	EPA Technical Background Document for SSLs (1996) Derived using Cowherd et al., 1985

Minor Construction/Utility Worker - Chronic Daily Air Concentration Estimation

Noncancer Evaluation: ADC (mg/m3) = [Cs x (1/VF + 1/PEF) x EF x ED]/AT

Cancer Evaluation: LADC (ug/m3) = [Cs x (1/VF + 1/PEF) x EF x ED x 1000 ug/mg]/AT

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
1/VF	Inverse of the volatiliaztion factor (kg/m3)	Chemical specific calculation		EPA Methodology
1/PEF	Inverse of the particulate emission factor (kg/m3)	2.6098E-09	NA	Based on EPA 1995 SSL Technical Support Document. Information for Minneapolis. Assumes limited disturbance of soil due to wind erosion. May not be protective for dustry conditions (e.g., vehicle traffic). Use site-specific data if possible.
EF	Exposure Frequency (day/yr)	80		VF and PEF utilize annual estimates.
ED	Exposure duration (years)	25	U	95th percentile worker tenure (8 yrs - mean) US Dept. Labor. Bureau of Labor Statistics. 1991
AT	Averaging time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available

C = Central Tendency Value M = between Central Tendency and Upper Bound Values

U = Upper Bound Value

Calculation of soil saturation limit (volatilization model is only applicable if Cs is < Csat)

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Variable	Definition	Variable Utilized	Rationale/Reference
Csat	Soil Saturation Concentration (mg/kg)	Csat back-calculated	
S	Solubility in water (mg/l)	Chemical Specific	
ρ_b	Soil bulk density (kg/l)	1.5	EPA Technical Background Document for SSLs (1996) (Use site-specific information if available)
K_d	Soil water partition coefficient (l/kg) $= K_{oc} \times f_{oc}$	Chemical -Specifc/Site-Specific	
K_{oc}	Organic carbon partition coefficient (l/kg)	Chemical Specific	
f_{oc}	Organic carbon content of soil	0.005	Default, use site specific if available.
θ_w	Water filled soil porosity (unitless) $= f_m \times \rho_b$	0.150	Calculated
f_m	Average unsaturated zone soil gravimetric water content (kg water/kg soil)	0.1	Default. Use Site Specific information if available
H'	Modified Henry's constant =41 x H	Chemical Specific	
H	Henry's constant (atm - m3/mol)	Chemical Specific	
θ_a	Air-filled soil porosity (unitless) $= n - \theta_w$	0.28	Calculated
n	Total soil porosity (unitless) $= 1 - \rho_b/\rho_s$	0.43	Calculated
ρ_s	Soil density or particulate density (kg/l)	2.65	EPA Technical Background Document for SSLs (1996) (Use site-specific information if available)

Csat for each contaminant is the concentration at which the adsorptive limit of the soil plus the theoretical dissolution limit of the contaminant in the available soil moisture has been reached. Concentrations > Csat indicates "free phase" contaminants within the soil matrix. The equation presented here is a modification of the equation presented in Part B RAGS guidance. The above equation takes into account the amount of contaminant that is in vapor phase in the pore spaces of the soil.
spaces of the soil.

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	4190.000	200	1.00E-06	1.00	80	25	70	9125	2.62E-03	25550	9.37E-04
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.400	200	1.00E-06	1.00	80	25	70	9125	2.13E-06	25550	7.60E-07
Barium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.600	200	1.00E-06	1.00	80	25	70	9125	8.52E-06	25550	3.04E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	10.300	200	1.00E-06	1.00	80	25	70	9125	6.45E-06	25550	2.30E-06
Iron	24300.000	200	1.00E-06	1.00	80	25	70	9125	1.52E-02	25550	5.43E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	927.000	200	1.00E-06	1.00	80	25	70	9125	5.81E-04	25550	2.07E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	4190.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.93E-05	25550	6.89E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.40	4900	1.00E-06	0.30	0.03	80	25	70	9125	4.69E-07	25550	1.68E-07
Barium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.60	4900	1.00E-06	0.30	0.01	80	25	70	9125	6.26E-07	25550	2.24E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	10.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	4.74E-07	25550	1.69E-07
Iron	24300.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.12E-03	25550	3.99E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	927.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	4.27E-06	25550	1.52E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	4190.00		2.6098E-09	80	25	9125	2.40E-06	25550	8.56E-04
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	3.40		2.6098E-09	80	25	9125	1.94E-09	25550	6.95E-07
Barium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.60		2.6098E-09	80	25	9125	7.78E-09	25550	2.78E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	10.30		2.6098E-09	80	25	9125	5.89E-09	25550	2.10E-06
Iron	24300.00		2.6098E-09	80	25	9125	1.39E-05	25550	4.96E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	927.00		2.6098E-09	80	25	9125	5.30E-07	25550	1.89E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.62E-03	1.00	0.003	58%	1.93E-05	0.01	0.002	42%	NA	2.40E-06			0.005
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.13E-06	1.00	0.007	80%	4.69E-07	0.90	0.002	20%	5.00E-04	1.94E-09	0.000	0%	0.009
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	8.52E-06	1.00	0.002	21%	6.26E-07	0.05	0.003	31%	2.00E-06	7.78E-09	0.004	48%	0.008
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	6.45E-06	1.00	0.000	89%	4.74E-07	0.60	0.000	11%	NA	5.89E-09			0.000
Iron	3.00E-01	1.52E-02	1.00	0.051		1.12E-03	0.05	0.075		NA	NA			0.125
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	5.81E-04	1.00	0.012	50%	4.27E-06	0.05	0.002	7%	5.00E-05	5.30E-07	0.011	43%	0.025
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.2

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	9.37E-04	1.00			6.89E-06	0.01			NA	8.56E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	7.60E-07	1.00	1.14E-06	80%	1.68E-07	0.90	2.79E-07	20%	4.00E-03	6.95E-07	2.78E-09	0%	1.42E-06
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	3.04E-06	1.00			2.24E-07	0.05			1.20E-02	2.78E-06	3.33E-08	100%	3.33E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.30E-06	1.00			1.69E-07	0.60			NA	2.10E-06			
Iron	NA	5.43E-03	1.00			3.99E-04	0.05			NA	4.96E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	2.07E-04	1.00			1.52E-06	0.05			NA	1.89E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.80	0.00E+00	#DIV/0!	1.70E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 1E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	5270.000	200	1.00E-06	1.00	80	25	70	9125	3.30E-03	25550	1.18E-03
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	8.300	200	1.00E-06	1.00	80	25	70	9125	5.20E-06	25550	1.86E-06
Barium	227.000	200	1.00E-06	1.00	80	25	70	9125	1.42E-04	25550	5.08E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	11.300	200	1.00E-06	1.00	80	25	70	9125	7.08E-06	25550	2.53E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	158.000	200	1.00E-06	1.00	80	25	70	9125	9.89E-05	25550	3.53E-05
Iron	18000.000	200	1.00E-06	1.00	80	25	70	9125	1.13E-02	25550	4.03E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	2230.000	200	1.00E-06	1.00	80	25	70	9125	1.40E-03	25550	4.99E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.341	200	1.00E-06	1.00	80	25	70	9125	2.14E-07	25550	7.63E-08
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.100	200	1.00E-06	1.00	80	25	70	9125	2.57E-06	25550	9.17E-07
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	5270.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.43E-05	25550	8.66E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	8.30	4900	1.00E-06	0.30	0.03	80	25	70	9125	1.15E-06	25550	4.09E-07
Barium	227.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.04E-06	25550	3.73E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	11.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.20E-07	25550	1.86E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	158.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	7.27E-06	25550	2.60E-06
Iron	18000.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	8.28E-04	25550	2.96E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	2230.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.03E-05	25550	3.67E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.34	4900	1.00E-06	0.30	0.13	80	25	70	9125	2.04E-07	25550	7.29E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.10	4900	1.00E-06	0.30	0.05	80	25	70	9125	9.44E-07	25550	3.37E-07
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	5270.00		2.6098E-09	80	25	9125	3.01E-06	25550	1.08E-03
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	8.30		2.6098E-09	80	25	9125	4.75E-09	25550	1.70E-06
Barium	227.00		2.6098E-09	80	25	9125	1.30E-07	25550	4.64E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	11.30		2.6098E-09	80	25	9125	6.46E-09	25550	2.31E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	158.00		2.6098E-09	80	25	9125	9.04E-08	25550	3.23E-05
Iron	18000.00		2.6098E-09	80	25	9125	1.03E-05	25550	3.68E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	2230.00		2.6098E-09	80	25	9125	1.28E-06	25550	4.56E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.34		2.6098E-09	80	25	9125	1.95E-10	25550	6.97E-08
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.10	5.10E-04	2.6098E-09	80	25	9125	4.58E-04	25550	1.64E-01
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.30E-03	1.00	0.003	58%	2.43E-05	0.01	0.002	42%	NA	3.01E-06			0.006
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	5.20E-06	1.00	0.017	80%	1.15E-06	0.90	0.004	20%	5.00E-04	4.75E-09	0.000	0%	0.022
Barium	7.00E-02	1.42E-04	1.00	0.002	78%	1.04E-06	0.05	0.000	12%	5.00E-04	1.30E-07	0.000	10%	0.003
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	7.08E-06	1.00	0.001	21%	5.20E-07	0.05	0.002	31%	2.00E-06	6.46E-09	0.003	48%	0.007
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	9.89E-05	1.00	0.003	89%	7.27E-06	0.60	0.000	11%	NA	9.04E-08			0.003
Iron	3.00E-01	1.13E-02	1.00	0.038		8.28E-04	0.05	0.055		NA	NA			0.093
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.40E-03	1.00	0.030	50%	1.03E-05	0.05	0.004	7%	5.00E-05	1.28E-06	0.026	43%	0.060
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	2.14E-07	1.00			2.04E-07	0.80			NA	1.95E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	2.57E-06	1.00			9.44E-07	0.90			NA	4.58E-04			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.192

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.18E-03	1.00			8.66E-06	0.01			NA	1.08E-03			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	1.86E-06	1.00	2.78E-06	80%	4.09E-07	0.90	6.82E-07	20%	4.00E-03	1.70E-06	6.78E-09	0%	3.47E-06
Barium	NA	5.08E-05	1.00			3.73E-07	0.05			NA	4.64E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.53E-06	1.00			1.86E-07	0.05			1.20E-02	2.31E-06	2.77E-08	100%	2.77E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.53E-05	1.00			2.60E-06	0.60			NA	3.23E-05			
Iron	NA	4.03E-03	1.00			2.96E-04	0.05			NA	3.68E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	4.99E-04	1.00			3.67E-06	0.05			NA	4.56E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	7.63E-08	1.00	5.57E-07	46%	7.29E-08	0.80	6.65E-07	54%	1.70E-03	6.97E-08	1.18E-10	0%	1.22E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	9.17E-07	1.00	1.01E-08	3%	3.37E-07	0.90	4.12E-09	1%	1.70E-06	1.64E-01	2.78E-07	95%	2.92E-07
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 5E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	6370.000	200	1.00E-06	1.00	80	25	70	9125	3.99E-03	25550	1.42E-03
Antimony	105.000	200	1.00E-06	1.00	80	25	70	9125	6.58E-05	25550	2.35E-05
Arsenic	6.600	200	1.00E-06	1.00	80	25	70	9125	4.13E-06	25550	1.48E-06
Barium	327.000	200	1.00E-06	1.00	80	25	70	9125	2.05E-04	25550	7.31E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	5.300	200	1.00E-06	1.00	80	25	70	9125	3.32E-06	25550	1.19E-06
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	114.000	200	1.00E-06	1.00	80	25	70	9125	7.14E-05	25550	2.55E-05
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1290.000	200	1.00E-06	1.00	80	25	70	9125	8.08E-04	25550	2.89E-04
Iron	275000.000	200	1.00E-06	1.00	80	25	70	9125	1.72E-01	25550	6.15E-02
Lead	453.000	200	1.00E-06	1.00	80	25	70	9125	2.84E-04	25550	1.01E-04
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	20700.000	200	1.00E-06	1.00	80	25	70	9125	1.30E-02	25550	4.63E-03
Mercury (inorganic)	0.190	200	1.00E-06	1.00	80	25	70	9125	1.19E-07	25550	4.25E-08
Nickel	142.000	200	1.00E-06	1.00	80	25	70	9125	8.89E-05	25550	3.18E-05
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	32.900	200	1.00E-06	1.00	80	25	70	9125	2.06E-05	25550	7.36E-06
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	3.170	200	1.00E-06	1.00	80	25	70	9125	1.99E-06	25550	7.09E-07
1,1 - Dichloroethane	34.000	200	1.00E-06	1.00	80	25	70	9125	2.13E-05	25550	7.60E-06
1,2 - Dichloroethylene (mixed isomers)	1.800	200	1.00E-06	1.00	80	25	70	9125	1.13E-06	25550	4.03E-07
Ethyl benzene	140.000	200	1.00E-06	1.00	80	25	70	9125	8.77E-05	25550	3.13E-05
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.000	200	1.00E-06	1.00	80	25	70	9125	2.19E-03	25550	7.83E-04
Naphthalene	2.700	200	1.00E-06	1.00	80	25	70	9125	1.69E-06	25550	6.04E-07
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.000	200	1.00E-06	1.00	80	25	70	9125	7.51E-04	25550	2.68E-04
Toluene	190.000	200	1.00E-06	1.00	80	25	70	9125	1.19E-04	25550	4.25E-05
1,1,1 - Trichloroethane	2600.000	200	1.00E-06	1.00	80	25	70	9125	1.63E-03	25550	5.81E-04
Trichloroethylene (TCE)	120.000	200	1.00E-06	1.00	80	25	70	9125	7.51E-05	25550	2.68E-05
Xylenes (mixed)	580.000	200	1.00E-06	1.00	80	25	70	9125	3.63E-04	25550	1.30E-04

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	6370.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.93E-05	25550	1.05E-05
Antimony	105.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	4.83E-07	25550	1.73E-07
Arsenic	6.60	4900	1.00E-06	0.30	0.03	80	25	70	9125	9.11E-07	25550	3.25E-07
Barium	327.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.51E-06	25550	5.38E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	5.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	2.44E-07	25550	8.71E-08
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	114.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.25E-06	25550	1.87E-06
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1290.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.94E-05	25550	2.12E-05
Iron	275000.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.27E-02	25550	4.52E-03
Lead	453.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	20700.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	9.53E-05	25550	3.40E-05
Mercury (inorganic)	0.19	4900	1.00E-06	0.30	0.05	80	25	70	9125	4.37E-08	25550	1.56E-08
Nickel	142.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	32.90	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.51E-06	25550	5.41E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	3.17	4900	1.00E-06	0.30	0.13	80	25	70	9125	1.90E-06	25550	6.77E-07
1,1 - Dichloroethane	34.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	7.82E-06	25550	2.79E-06
1,2 - Dichloroethylene (mixed isomers)	1.80	4900	1.00E-06	0.30	0.05	80	25	70	9125	4.14E-07	25550	1.48E-07
Ethyl benzene	140.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	3.22E-05	25550	1.15E-05
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	1.61E-03	25550	5.75E-04
Naphthalene	2.70	4900	1.00E-06	0.30	0.05	80	25	70	9125	6.21E-07	25550	2.22E-07
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.76E-04	25550	9.86E-05
Toluene	190.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	4.37E-05	25550	1.56E-05

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	2600.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	5.98E-04	25550	2.14E-04
Trichloroethylene (TCE)	120.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.76E-05	25550	9.86E-06
Xylenes (mixed)	580.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	1.33E-04	25550	4.77E-05

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	6370.00		2.6098E-09	80	25	9125	3.64E-06	25550	1.30E-03
Antimony	105.00		2.6098E-09	80	25	9125	6.01E-08	25550	2.15E-05
Arsenic	6.60		2.6098E-09	80	25	9125	3.78E-09	25550	1.35E-06
Barium	327.00		2.6098E-09	80	25	9125	1.87E-07	25550	6.68E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	5.30		2.6098E-09	80	25	9125	3.03E-09	25550	1.08E-06
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	114.00		2.6098E-09	80	25	9125	6.52E-08	25550	2.33E-05
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	1290.00		2.6098E-09	80	25	9125	7.38E-07	25550	2.64E-04
Iron	275000.00		2.6098E-09	80	25	9125	1.57E-04	25550	5.62E-02
Lead	453.00		2.6098E-09	80	25	9125	2.59E-07	25550	9.25E-05
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	20700.00		2.6098E-09	80	25	9125	1.18E-05	25550	4.23E-03
Mercury (inorganic)	0.19	3.78E-05	2.6098E-09	80	25	9125	1.57E-06	25550	5.62E-04
Nickel	142.00		2.6098E-09	80	25	9125	8.12E-08	25550	2.90E-05
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	32.90		2.6098E-09	80	25	9125	1.88E-08	25550	6.72E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	3.17		2.6098E-09	80	25	9125	1.81E-09	25550	6.48E-07
1,1 - Dichloroethane	34.00	4.65E-04	2.6098E-09	80	25	9125	3.47E-03	25550	1.24E+00
1,2 - Dichloroethylene (mixed isomers)	1.80	4.55E-04	2.6098E-09	80	25	9125	1.80E-04	25550	6.42E-02
Ethyl benzene	140.00	3.30E-04	2.6098E-09	80	25	9125	1.01E-02	25550	3.61E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.00	6.54E-05	2.6098E-09	80	25	9125	5.01E-02	25550	1.79E+01
Naphthalene	2.70	3.17E-05	2.6098E-09	80	25	9125	1.87E-05	25550	6.70E-03
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.00	4.17E-04	2.6098E-09	80	25	9125	1.10E-01	25550	3.92E+01
Toluene	190.00	3.79E-04	2.6098E-09	80	25	9125	1.58E-02	25550	5.64E+00
1,1,1 - Trichloroethane	2600.00	5.51E-04	2.6098E-09	80	25	9125	3.14E-01	25550	1.12E+02
Trichloroethylene (TCE)	120.00	5.10E-04	2.6098E-09	80	25	9125	1.34E-02	25550	4.79E+00
Xylenes (mixed)	580.00	2.83E-04	2.6098E-09	80	25	9125	3.59E-02	25550	1.28E+01

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.99E-03	1.00	0.004	58%	2.93E-05	0.01	0.003	42%	NA	3.64E-06			0.007
Antimony	4.00E-04	6.58E-05	1.00	0.164	87%	4.83E-07	0.05	0.024	13%	2.00E-04	6.01E-08	0.000	0%	0.189
Arsenic	3.00E-04	4.13E-06	1.00	0.014	80%	9.11E-07	0.90	0.003	20%	5.00E-04	3.78E-09	0.000	0%	0.017
Barium	7.00E-02	2.05E-04	1.00	0.003	78%	1.51E-06	0.05	0.000	12%	5.00E-04	1.87E-07	0.000	10%	0.004
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	3.32E-06	1.00	0.003	93%	2.44E-07	1.00	0.000	7%	2.00E-04	3.03E-09	0.000	0%	0.004
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	7.14E-05	1.00	0.014	21%	5.25E-06	0.05	0.021	31%	2.00E-06	6.52E-08	0.033	48%	0.068
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	8.08E-04	1.00	0.022	89%	5.94E-05	0.60	0.003	11%	NA	7.38E-07			0.025
Iron	3.00E-01	1.72E-01	1.00	0.574		1.27E-02	0.05	0.844		NA	NA			1.418
Lead	NA	2.84E-04	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.30E-02	1.00	0.276	50%	9.53E-05	0.05	0.041	7%	5.00E-05	1.18E-05	0.237	43%	0.553
Mercury (inorganic)	3.00E-04	1.19E-07	1.00	0.000	35%	4.37E-08	0.20	0.001	65%	3.00E-04	1.57E-06			0.001
Nickel	2.00E-02	8.89E-05	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	2.06E-05	1.00	0.003	58%	1.51E-06	0.10	0.002	42%	NA	1.88E-08			0.005
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	1.99E-06	1.00			1.90E-06	0.80			NA	1.81E-09			
1,1 - Dichloroethane	1.00E-01	2.13E-05	1.00	0.000	3%	7.82E-06	0.90	0.000	1%	5.00E-01	3.47E-03	0.007	96%	0.007
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	1.13E-06	1.00	0.000	2%	4.14E-07	0.90	0.000	1%	3.50E-02	1.80E-04	0.005	97%	0.005
Ethyl benzene	1.00E-01	8.77E-05	1.00	0.001	8%	3.22E-05	0.85	0.000	3%	1.00E+00	1.01E-02	0.010	89%	0.011
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	2.19E-03	1.00	0.004	6%	1.61E-03	0.90	0.003	5%	1.00E+00	5.01E-02	0.050	88%	0.057
Naphthalene	2.00E-02	1.69E-06	1.00	0.000	1%	6.21E-07	0.80	0.000	1%	3.00E-03	1.87E-05	0.006	98%	0.006
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	7.51E-04	1.00	0.075	20%	2.76E-04	0.90	0.031	8%	4.00E-01	1.10E-01	0.274	72%	0.380
Toluene	2.00E-01	1.19E-04	1.00	0.001	1%	4.37E-05	0.90	0.000	1%	4.00E-01	1.58E-02	0.039	98%	0.040
1,1,1 - Trichloroethane	2.00E-02	1.63E-03	1.00	0.081	19%	5.98E-04	0.90	0.033	8%	1.00E+00	3.14E-01	0.314	73%	0.429
Trichloroethylene (TCE)	NA	7.51E-05	1.00			2.76E-05	0.90			NA	1.34E-02			
Xylenes (mixed)	2.00E+00	3.63E-04	1.00	0.000	0%	1.33E-04	0.90	0.000	0%	3.00E-01	3.59E-02	0.120	100%	0.120

SCREENING HI = 3.346

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.42E-03	1.00			1.05E-05	0.01			NA	1.30E-03			
Antimony	NA	2.35E-05	1.00			1.73E-07	0.05			NA	2.15E-05			
Arsenic	1.50	1.48E-06	1.00	2.21E-06	80%	3.25E-07	0.90	5.42E-07	20%	4.00E-03	1.35E-06	5.39E-09	0%	2.76E-06
Barium	NA	7.31E-05	1.00			5.38E-07	0.05			NA	6.68E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	1.19E-06	1.00			8.71E-08	1.00			1.80E-03	1.08E-06	1.95E-09	100%	1.95E-09
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.55E-05	1.00			1.87E-06	0.05			1.20E-02	2.33E-05	2.79E-07	100%	2.79E-07
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.89E-04	1.00			2.12E-05	0.60			NA	2.64E-04			
Iron	NA	6.15E-02	1.00			4.52E-03	0.05			NA	5.62E-02			
Lead	NA	1.01E-04	0.00			NA	0.00			NA	9.25E-05			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	4.63E-03	1.00			3.40E-05	0.05			NA	4.23E-03			
Mercury (inorganic)	NA	4.25E-08	1.00			1.56E-08	0.20			NA	5.62E-04			
Nickel	NA	3.18E-05	1.00			NA	0.05			4.80E-04	2.90E-05	1.39E-08	100%	1.39E-08
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	7.36E-06	1.00			5.41E-07	0.10			NA	6.72E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	7.09E-07	1.00	5.18E-06	46%	6.77E-07	0.80	6.18E-06	54%	1.70E-03	6.48E-07	1.10E-09	0%	1.14E-05
1,1 - Dichloroethane	0.01	7.60E-06	1.00	4.33E-08	2%	2.79E-06	0.90	1.77E-08	1%	1.60E-06	1.24E+00	1.98E-06	97%	2.04E-06
1,2 - Dichloroethylene (mixed isomers)	NA	4.03E-07	1.00			1.48E-07	0.90			NA	6.42E-02			
Ethyl benzene	NA	3.13E-05	1.00			1.15E-05	0.85			NA	3.61E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	7.83E-04	1.00			5.75E-04	0.90			NA	1.79E+01			
Naphthalene	NA	6.04E-07	1.00			2.22E-07	0.80			NA	6.70E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	2.68E-04	1.00	1.40E-05	33%	9.86E-05	0.90	5.70E-06	13%	5.80E-07	3.92E+01	2.27E-05	54%	4.24E-05
Toluene	NA	4.25E-05	1.00			1.56E-05	0.90			NA	5.64E+00			
1,1,1 - Trichloroethane	NA	5.81E-04	1.00			2.14E-04	0.90			NA	1.12E+02			
Trichloroethylene (TCE)	0.01	2.68E-05	1.00	2.95E-07	3%	9.86E-06	0.90	1.21E-07	1%	1.70E-06	4.79E+00	8.14E-06	95%	8.56E-06
Xylenes (mixed)	NA	1.30E-04	1.00			4.77E-05	0.90			NA	1.28E+01			

ECR = Excess Cancer Risk

TOTAL ECR = 7E-05

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	6830.000	200	1.00E-06	1.00	80	25	70	9125	4.28E-03	25550	1.53E-03
Antimony	2.300	200	1.00E-06	1.00	80	25	70	9125	1.44E-06	25550	5.14E-07
Arsenic	11.400	200	1.00E-06	1.00	80	25	70	9125	7.14E-06	25550	2.55E-06
Barium	306.000	200	1.00E-06	1.00	80	25	70	9125	1.92E-04	25550	6.84E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	22.600	200	1.00E-06	1.00	80	25	70	9125	1.42E-05	25550	5.05E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1900.000	200	1.00E-06	1.00	80	25	70	9125	1.19E-03	25550	4.25E-04
Iron	38100.000	200	1.00E-06	1.00	80	25	70	9125	2.39E-02	25550	8.52E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	5950.000	200	1.00E-06	1.00	80	25	70	9125	3.73E-03	25550	1.33E-03
Mercury (inorganic)	0.120	200	1.00E-06	1.00	80	25	70	9125	7.51E-08	25550	2.68E-08
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	26.100	200	1.00E-06	1.00	80	25	70	9125	1.63E-05	25550	5.84E-06
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	60.700	200	1.00E-06	1.00	80	25	70	9125	3.80E-05	25550	1.36E-05
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14.000	200	1.00E-06	1.00	80	25	70	9125	8.77E-06	25550	3.13E-06
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	160.000	200	1.00E-06	1.00	80	25	70	9125	1.00E-04	25550	3.58E-05
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.100	200	1.00E-06	1.00	80	25	70	9125	6.89E-07	25550	2.46E-07
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	130.000	200	1.00E-06	1.00	80	25	70	9125	8.14E-05	25550	2.91E-05
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96.000	200	1.00E-06	1.00	80	25	70	9125	6.01E-05	25550	2.15E-05
Xylenes (mixed)	28.000	200	1.00E-06	1.00	80	25	70	9125	1.75E-05	25550	6.26E-06

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	6830.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	3.14E-05	25550	1.12E-05
Antimony	2.30	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.06E-08	25550	3.78E-09
Arsenic	11.40	4900	1.00E-06	0.30	0.03	80	25	70	9125	1.57E-06	25550	5.62E-07
Barium	306.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.41E-06	25550	5.03E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	22.60	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.04E-06	25550	3.72E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1900.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	8.75E-05	25550	3.12E-05
Iron	38100.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.75E-03	25550	6.26E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	5950.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.74E-05	25550	9.78E-06
Mercury (inorganic)	0.12	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.76E-08	25550	9.86E-09
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	26.10	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.20E-06	25550	4.29E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	60.70	4900	1.00E-06	0.30	0.13	80	25	70	9125	3.63E-05	25550	1.30E-05
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	3.22E-06	25550	1.15E-06
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	160.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	9.57E-05	25550	3.42E-05
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.10	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.53E-07	25550	9.04E-08
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	130.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	5.98E-05	25550	2.14E-05
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.21E-05	25550	7.89E-06
Xylenes (mixed)	28.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	6.44E-06	25550	2.30E-06

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	6830.00		2.6098E-09	80	25	9125	3.91E-06	25550	1.40E-03
Antimony	2.30		2.6098E-09	80	25	9125	1.32E-09	25550	4.70E-07
Arsenic	11.40		2.6098E-09	80	25	9125	6.52E-09	25550	2.33E-06
Barium	306.00		2.6098E-09	80	25	9125	1.75E-07	25550	6.25E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	22.60		2.6098E-09	80	25	9125	1.29E-08	25550	4.62E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	1900.00		2.6098E-09	80	25	9125	1.09E-06	25550	3.88E-04
Iron	38100.00		2.6098E-09	80	25	9125	2.18E-05	25550	7.78E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	5950.00		2.6098E-09	80	25	9125	3.40E-06	25550	1.22E-03
Mercury (inorganic)	0.12	3.78E-05	2.6098E-09	80	25	9125	9.95E-07	25550	3.55E-04
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	26.10		2.6098E-09	80	25	9125	1.49E-08	25550	5.33E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	60.70		2.6098E-09	80	25	9125	3.47E-08	25550	1.24E-05
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14.00	4.55E-04	2.6098E-09	80	25	9125	1.40E-03	25550	4.99E-01
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	160.00	6.62E-07	2.6098E-09	80	25	9125	2.33E-05	25550	8.32E-03
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.10	3.17E-05	2.6098E-09	80	25	9125	7.64E-06	25550	2.73E-03
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	130.00	4.46E-07	2.6098E-09	80	25	9125	1.28E-05	25550	4.57E-03
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96.00	5.10E-04	2.6098E-09	80	25	9125	1.07E-02	25550	3.83E+00
Xylenes (mixed)	28.00	2.83E-04	2.6098E-09	80	25	9125	1.73E-03	25550	6.19E-01

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	4.28E-03	1.00	0.004	58%	3.14E-05	0.01	0.003	42%	NA	3.91E-06			0.007
Antimony	4.00E-04	1.44E-06	1.00	0.004	87%	1.06E-08	0.05	0.001	13%	2.00E-04	1.32E-09	0.000	0%	0.004
Arsenic	3.00E-04	7.14E-06	1.00	0.024	80%	1.57E-06	0.90	0.006	20%	5.00E-04	6.52E-09	0.000	0%	0.030
Barium	7.00E-02	1.92E-04	1.00	0.003	78%	1.41E-06	0.05	0.000	12%	5.00E-04	1.75E-07	0.000	10%	0.003
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	1.42E-05	1.00	0.003	21%	1.04E-06	0.05	0.004	31%	2.00E-06	1.29E-08	0.006	48%	0.013
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.19E-03	1.00	0.032	89%	8.75E-05	0.60	0.004	11%	NA	1.09E-06			0.036
Iron	3.00E-01	2.39E-02	1.00	0.080		1.75E-03	0.05	0.117		NA	NA			0.196
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	3.73E-03	1.00	0.079	50%	2.74E-05	0.05	0.012	7%	5.00E-05	3.40E-06	0.068	43%	0.159
Mercury (inorganic)	3.00E-04	7.51E-08	1.00	0.000	35%	2.76E-08	0.20	0.000	65%	3.00E-04	9.95E-07			0.001
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.63E-05	1.00	0.002	58%	1.20E-06	0.10	0.002	42%	NA	1.49E-08			0.004
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	3.80E-05	1.00			3.63E-05	0.80			NA	3.47E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	8.77E-06	1.00	0.001	2%	3.22E-06	0.90	0.000	1%	3.50E-02	1.40E-03	0.040	97%	0.041
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	1.00E-04	0.80	0.002	39%	9.57E-05	0.80	0.003	58%	1.40E-01	2.33E-05	0.000	3%	0.005
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	6.89E-07	1.00	0.000	1%	2.53E-07	0.80	0.000	1%	3.00E-03	7.64E-06	0.003	98%	0.003
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	8.14E-05	0.80	0.002	45%	5.98E-05	0.80	0.002	52%	1.10E-01	1.28E-05	0.000	2%	0.005
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	6.01E-05	1.00			2.21E-05	0.90			NA	1.07E-02			
Xylenes (mixed)	2.00E+00	1.75E-05	1.00	0.000	0%	6.44E-06	0.90	0.000	0%	3.00E-01	1.73E-03	0.006	100%	0.006

SCREENING HI = 0.514

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.53E-03	1.00			1.12E-05	0.01			NA	1.40E-03			
Antimony	NA	5.14E-07	1.00			3.78E-09	0.05			NA	4.70E-07			
Arsenic	1.50	2.55E-06	1.00	3.82E-06	80%	5.62E-07	0.90	9.37E-07	20%	4.00E-03	2.33E-06	9.32E-09	0%	4.77E-06
Barium	NA	6.84E-05	1.00			5.03E-07	0.05			NA	6.25E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	5.05E-06	1.00			3.72E-07	0.05			1.20E-02	4.62E-06	5.54E-08	100%	5.54E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	4.25E-04	1.00			3.12E-05	0.60			NA	3.88E-04			
Iron	NA	8.52E-03	1.00			6.26E-04	0.05			NA	7.78E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	1.33E-03	1.00			9.78E-06	0.05			NA	1.22E-03			
Mercury (inorganic)	NA	2.68E-08	1.00			9.86E-09	0.20			NA	3.55E-04			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.84E-06	1.00			4.29E-07	0.10			NA	5.33E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	1.36E-05	1.00	9.91E-05	46%	1.30E-05	0.80	1.18E-04	54%	1.70E-03	1.24E-05	2.11E-08	0%	2.17E-04
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	3.13E-06	1.00			1.15E-06	0.90			NA	4.99E-01			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	3.58E-05	0.80			3.42E-05	0.80			NA	8.32E-03			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	2.46E-07	1.00			9.04E-08	0.80			NA	2.73E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	2.91E-05	0.80			2.14E-05	0.80			NA	4.57E-03			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	2.15E-05	1.00	2.36E-07	3%	7.89E-06	0.90	9.64E-08	1%	1.70E-06	3.83E+00	6.52E-06	95%	6.85E-06
Xylenes (mixed)	NA	6.26E-06	1.00			2.30E-06	0.90			NA	6.19E-01			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-04

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	4580.000	200	1.00E-06	1.00	80	25	70	9125	2.87E-03	25550	1.02E-03
Antimony	2.300	200	1.00E-06	1.00	80	25	70	9125	1.44E-06	25550	5.14E-07
Arsenic	9.400	200	1.00E-06	1.00	80	25	70	9125	5.89E-06	25550	2.10E-06
Barium	197.000	200	1.00E-06	1.00	80	25	70	9125	1.23E-04	25550	4.41E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	12.800	200	1.00E-06	1.00	80	25	70	9125	8.02E-06	25550	2.86E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	43.100	200	1.00E-06	1.00	80	25	70	9125	2.70E-05	25550	9.64E-06
Iron	12300.000	200	1.00E-06	1.00	80	25	70	9125	7.70E-03	25550	2.75E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	1560.000	200	1.00E-06	1.00	80	25	70	9125	9.77E-04	25550	3.49E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	24.600	200	1.00E-06	1.00	80	25	70	9125	1.54E-05	25550	5.50E-06
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.759	200	1.00E-06	1.00	80	25	70	9125	4.75E-07	25550	1.70E-07
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	4580.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.11E-05	25550	7.53E-06
Antimony	2.30	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.06E-08	25550	3.78E-09
Arsenic	9.40	4900	1.00E-06	0.30	0.03	80	25	70	9125	1.30E-06	25550	4.64E-07
Barium	197.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	9.07E-07	25550	3.24E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	12.80	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.89E-07	25550	2.10E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	43.10	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.98E-06	25550	7.08E-07
Iron	12300.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.66E-04	25550	2.02E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	1560.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	7.18E-06	25550	2.56E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	24.60	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.13E-06	25550	4.04E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.76	4900	1.00E-06	0.30	0.13	80	25	70	9125	4.54E-07	25550	1.62E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	4580.00		2.6098E-09	80	25	9125	2.62E-06	25550	9.36E-04
Antimony	2.30		2.6098E-09	80	25	9125	1.32E-09	25550	4.70E-07
Arsenic	9.40		2.6098E-09	80	25	9125	5.38E-09	25550	1.92E-06
Barium	197.00		2.6098E-09	80	25	9125	1.13E-07	25550	4.02E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	12.80		2.6098E-09	80	25	9125	7.32E-09	25550	2.61E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	43.10		2.6098E-09	80	25	9125	2.47E-08	25550	8.81E-06
Iron	12300.00		2.6098E-09	80	25	9125	7.04E-06	25550	2.51E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	1560.00		2.6098E-09	80	25	9125	8.92E-07	25550	3.19E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	24.60		2.6098E-09	80	25	9125	1.41E-08	25550	5.03E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.76		2.6098E-09	80	25	9125	4.34E-10	25550	1.55E-07
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.87E-03	1.00	0.003	58%	2.11E-05	0.01	0.002	42%	NA	2.62E-06			0.005
Antimony	4.00E-04	1.44E-06	1.00	0.004	87%	1.06E-08	0.05	0.001	13%	2.00E-04	1.32E-09	0.000	0%	0.004
Arsenic	3.00E-04	5.89E-06	1.00	0.020	80%	1.30E-06	0.90	0.005	20%	5.00E-04	5.38E-09	0.000	0%	0.024
Barium	7.00E-02	1.23E-04	1.00	0.002	78%	9.07E-07	0.05	0.000	12%	5.00E-04	1.13E-07	0.000	10%	0.002
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	8.02E-06	1.00	0.002	21%	5.89E-07	0.05	0.002	31%	2.00E-06	7.32E-09	0.004	48%	0.008
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	2.70E-05	1.00	0.001	89%	1.98E-06	0.60	0.000	11%	NA	2.47E-08			0.001
Iron	3.00E-01	7.70E-03	1.00	0.026		5.66E-04	0.05	0.038		NA	NA			0.063
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	9.77E-04	1.00	0.021	50%	7.18E-06	0.05	0.003	7%	5.00E-05	8.92E-07	0.018	43%	0.042
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.54E-05	1.00	0.002	58%	1.13E-06	0.10	0.002	42%	NA	1.41E-08			0.004
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	4.75E-07	1.00			4.54E-07	0.80			NA	4.34E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.153

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.02E-03	1.00			7.53E-06	0.01			NA	9.36E-04			
Antimony	NA	5.14E-07	1.00			3.78E-09	0.05			NA	4.70E-07			
Arsenic	1.50	2.10E-06	1.00	3.15E-06	80%	4.64E-07	0.90	7.73E-07	20%	4.00E-03	1.92E-06	7.68E-09	0%	3.93E-06
Barium	NA	4.41E-05	1.00			3.24E-07	0.05			NA	4.02E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.86E-06	1.00			2.10E-07	0.05			1.20E-02	2.61E-06	3.14E-08	100%	3.14E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	9.64E-06	1.00			7.08E-07	0.60			NA	8.81E-06			
Iron	NA	2.75E-03	1.00			2.02E-04	0.05			NA	2.51E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	3.49E-04	1.00			2.56E-06	0.05			NA	3.19E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.50E-06	1.00			4.04E-07	0.10			NA	5.03E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	1.70E-07	1.00	1.24E-06	46%	1.62E-07	0.80	1.48E-06	54%	1.70E-03	1.55E-07	2.64E-10	0%	2.72E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 7E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	3960.000	200	1.00E-06	1.00	80	25	70	9125	2.48E-03	25550	8.86E-04
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.000	200	1.00E-06	1.00	80	25	70	9125	1.88E-06	25550	6.71E-07
Barium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	7.800	200	1.00E-06	1.00	80	25	70	9125	4.88E-06	25550	1.74E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	11.500	200	1.00E-06	1.00	80	25	70	9125	7.20E-06	25550	2.57E-06
Iron	9910.000	200	1.00E-06	1.00	80	25	70	9125	6.21E-03	25550	2.22E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	747.000	200	1.00E-06	1.00	80	25	70	9125	4.68E-04	25550	1.67E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.400	200	1.00E-06	1.00	80	25	70	9125	2.50E-07	25550	8.95E-08
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	3960.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.82E-05	25550	6.51E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.00	4900	1.00E-06	0.30	0.03	80	25	70	9125	4.14E-07	25550	1.48E-07
Barium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	7.80	4900	1.00E-06	0.30	0.01	80	25	70	9125	3.59E-07	25550	1.28E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	11.50	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.29E-07	25550	1.89E-07
Iron	9910.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	4.56E-04	25550	1.63E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	747.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	3.44E-06	25550	1.23E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.40	4900	1.00E-06	0.30	0.13	80	25	70	9125	2.39E-07	25550	8.55E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	3960.00		2.6098E-09	80	25	9125	2.27E-06	25550	8.09E-04
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	3.00		2.6098E-09	80	25	9125	1.72E-09	25550	6.13E-07
Barium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	7.80		2.6098E-09	80	25	9125	4.46E-09	25550	1.59E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	11.50		2.6098E-09	80	25	9125	6.58E-09	25550	2.35E-06
Iron	9910.00		2.6098E-09	80	25	9125	5.67E-06	25550	2.02E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	747.00		2.6098E-09	80	25	9125	4.27E-07	25550	1.53E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.40		2.6098E-09	80	25	9125	2.29E-10	25550	8.17E-08
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.48E-03	1.00	0.002	58%	1.82E-05	0.01	0.002	42%	NA	2.27E-06			0.004
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	1.88E-06	1.00	0.006	80%	4.14E-07	0.90	0.002	20%	5.00E-04	1.72E-09	0.000	0%	0.008
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	4.88E-06	1.00	0.001	21%	3.59E-07	0.05	0.001	31%	2.00E-06	4.46E-09	0.002	48%	0.005
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	7.20E-06	1.00	0.000	89%	5.29E-07	0.60	0.000	11%	NA	6.58E-09			0.000
Iron	3.00E-01	6.21E-03	1.00	0.021		4.56E-04	0.05	0.030		NA	NA			0.051
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	4.68E-04	1.00	0.010	50%	3.44E-06	0.05	0.001	7%	5.00E-05	4.27E-07	0.009	43%	0.020
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	2.50E-07	1.00			2.39E-07	0.80			NA	2.29E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.088

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	8.86E-04	1.00			6.51E-06	0.01			NA	8.09E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	6.71E-07	1.00	1.01E-06	80%	1.48E-07	0.90	2.47E-07	20%	4.00E-03	6.13E-07	2.45E-09	0%	1.26E-06
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	1.74E-06	1.00			1.28E-07	0.05			1.20E-02	1.59E-06	1.91E-08	100%	1.91E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.57E-06	1.00			1.89E-07	0.60			NA	2.35E-06			
Iron	NA	2.22E-03	1.00			1.63E-04	0.05			NA	2.02E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	1.67E-04	1.00			1.23E-06	0.05			NA	1.53E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	8.95E-08	1.00	6.53E-07	46%	8.55E-08	0.80	7.80E-07	54%	1.70E-03	8.17E-08	1.39E-10	0%	1.43E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 3E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	5420.000	200	1.00E-06	1.00	80	25	70	9125	3.39E-03	25550	1.21E-03
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	6.000	200	1.00E-06	1.00	80	25	70	9125	3.76E-06	25550	1.34E-06
Barium	129.000	200	1.00E-06	1.00	80	25	70	9125	8.08E-05	25550	2.89E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	4.300	200	1.00E-06	1.00	80	25	70	9125	2.69E-06	25550	9.62E-07
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	43.200	200	1.00E-06	1.00	80	25	70	9125	2.71E-05	25550	9.66E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	937.000	200	1.00E-06	1.00	80	25	70	9125	5.87E-04	25550	2.10E-04
Iron	30100.000	200	1.00E-06	1.00	80	25	70	9125	1.88E-02	25550	6.73E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	1960.000	200	1.00E-06	1.00	80	25	70	9125	1.23E-03	25550	4.38E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	21.400	200	1.00E-06	1.00	80	25	70	9125	1.34E-05	25550	4.79E-06
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	1.590	200	1.00E-06	1.00	80	25	70	9125	9.96E-07	25550	3.56E-07
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	5420.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.49E-05	25550	8.91E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	6.00	4900	1.00E-06	0.30	0.03	80	25	70	9125	8.28E-07	25550	2.96E-07
Barium	129.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	5.94E-07	25550	2.12E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	4.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.98E-07	25550	7.07E-08
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	43.20	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.99E-06	25550	7.10E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	937.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	4.31E-05	25550	1.54E-05
Iron	30100.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.39E-03	25550	4.95E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	1960.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	9.02E-06	25550	3.22E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	21.40	4900	1.00E-06	0.30	0.01	80	25	70	9125	9.85E-07	25550	3.52E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	1.59	4900	1.00E-06	0.30	0.13	80	25	70	9125	9.51E-07	25550	3.40E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	5420.00		2.6098E-09	80	25	9125	3.10E-06	25550	1.11E-03
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	6.00		2.6098E-09	80	25	9125	3.43E-09	25550	1.23E-06
Barium	129.00		2.6098E-09	80	25	9125	7.38E-08	25550	2.64E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	4.30		2.6098E-09	80	25	9125	2.46E-09	25550	8.78E-07
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	43.20		2.6098E-09	80	25	9125	2.47E-08	25550	8.83E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	937.00		2.6098E-09	80	25	9125	5.36E-07	25550	1.91E-04
Iron	30100.00		2.6098E-09	80	25	9125	1.72E-05	25550	6.15E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	1960.00		2.6098E-09	80	25	9125	1.12E-06	25550	4.00E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	21.40		2.6098E-09	80	25	9125	1.22E-08	25550	4.37E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	1.59		2.6098E-09	80	25	9125	9.10E-10	25550	3.25E-07
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.39E-03	1.00	0.003	58%	2.49E-05	0.01	0.002	42%	NA	3.10E-06			0.006
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	3.76E-06	1.00	0.013	80%	8.28E-07	0.90	0.003	20%	5.00E-04	3.43E-09	0.000	0%	0.016
Barium	7.00E-02	8.08E-05	1.00	0.001	78%	5.94E-07	0.05	0.000	12%	5.00E-04	7.38E-08	0.000	10%	0.001
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	2.69E-06	1.00	0.003	93%	1.98E-07	1.00	0.000	7%	2.00E-04	2.46E-09	0.000	0%	0.003
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	2.71E-05	1.00	0.005	21%	1.99E-06	0.05	0.008	31%	2.00E-06	2.47E-08	0.012	48%	0.026
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	5.87E-04	1.00	0.016	89%	4.31E-05	0.60	0.002	11%	NA	5.36E-07			0.018
Iron	3.00E-01	1.88E-02	1.00	0.063		1.39E-03	0.05	0.092		NA	NA			0.155
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.23E-03	1.00	0.026	50%	9.02E-06	0.05	0.004	7%	5.00E-05	1.12E-06	0.022	43%	0.052
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.34E-05	1.00	0.002	58%	9.85E-07	0.10	0.001	42%	NA	1.22E-08			0.003
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	9.96E-07	1.00			9.51E-07	0.80			NA	9.10E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.280

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.21E-03	1.00			8.91E-06	0.01			NA	1.11E-03			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	1.34E-06	1.00	2.01E-06	80%	2.96E-07	0.90	4.93E-07	20%	4.00E-03	1.23E-06	4.90E-09	0%	2.51E-06
Barium	NA	2.89E-05	1.00			2.12E-07	0.05			NA	2.64E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	9.62E-07	1.00			7.07E-08	1.00			1.80E-03	8.78E-07	1.58E-09	100%	1.58E-09
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	9.66E-06	1.00			7.10E-07	0.05			1.20E-02	8.83E-06	1.06E-07	100%	1.06E-07
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.10E-04	1.00			1.54E-05	0.60			NA	1.91E-04			
Iron	NA	6.73E-03	1.00			4.95E-04	0.05			NA	6.15E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	4.38E-04	1.00			3.22E-06	0.05			NA	4.00E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	4.79E-06	1.00			3.52E-07	0.10			NA	4.37E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	3.56E-07	1.00	2.60E-06	46%	3.40E-07	0.80	3.10E-06	54%	1.70E-03	3.25E-07	5.52E-10	0%	5.70E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 8E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	4620.000	200	1.00E-06	1.00	80	25	70	9125	2.89E-03	25550	1.03E-03
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.500	200	1.00E-06	1.00	80	25	70	9125	2.19E-06	25550	7.83E-07
Barium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	28.300	200	1.00E-06	1.00	80	25	70	9125	1.77E-05	25550	6.33E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	176.000	200	1.00E-06	1.00	80	25	70	9125	1.10E-04	25550	3.94E-05
Iron	14500.000	200	1.00E-06	1.00	80	25	70	9125	9.08E-03	25550	3.24E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	387.000	200	1.00E-06	1.00	80	25	70	9125	2.42E-04	25550	8.66E-05
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23.400	200	1.00E-06	1.00	80	25	70	9125	1.47E-05	25550	5.23E-06
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	4.150	200	1.00E-06	1.00	80	25	70	9125	2.60E-06	25550	9.28E-07
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	4620.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.13E-05	25550	7.59E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	3.50	4900	1.00E-06	0.30	0.03	80	25	70	9125	4.83E-07	25550	1.73E-07
Barium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	28.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.30E-06	25550	4.65E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	176.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	8.10E-06	25550	2.89E-06
Iron	14500.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	6.67E-04	25550	2.38E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	387.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.78E-06	25550	6.36E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23.40	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.08E-06	25550	3.85E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	4.15	4900	1.00E-06	0.30	0.13	80	25	70	9125	2.48E-06	25550	8.87E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	4620.00		0.00000004	78	91	1.58E-04	25550	5.64E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	3.50		0.00000004	78	91	1.20E-07	25550	4.27E-07
Barium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	28.30		0.00000004	78	91	9.70E-07	25550	3.46E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	176.00		0.00000004	78	91	6.03E-06	25550	2.15E-05
Iron	14500.00		0.00000004	78	91	4.97E-04	25550	1.77E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	387.00		0.00000004	78	91	1.33E-05	25550	4.73E-05
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	23.40		0.00000004	78	91	8.02E-07	25550	2.86E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	4.15		0.00000004	78	91	1.42E-07	25550	5.07E-07
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.89E-03	1.00	0.003	58%	2.13E-05	0.01	0.002	42%	NA	2.64E-06			0.005
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.19E-06	1.00	0.007	80%	4.83E-07	0.90	0.002	20%	5.00E-04	2.00E-09	0.000	0%	0.009
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	1.77E-05	1.00	0.004	21%	1.30E-06	0.05	0.005	31%	2.00E-06	1.62E-08	0.008	48%	0.017
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.10E-04	1.00	0.003	89%	8.10E-06	0.60	0.000	11%	NA	1.01E-07			0.003
Iron	3.00E-01	9.08E-03	1.00	0.030		6.67E-04	0.05	0.044		NA	NA			0.075
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	2.42E-04	1.00	0.005	50%	1.78E-06	0.05	0.001	7%	5.00E-05	2.21E-07	0.004	43%	0.010
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	-0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.47E-05	1.00	0.002	58%	1.08E-06	0.10	0.002	42%	NA	1.34E-08			0.(
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	2.60E-06	1.00			2.48E-06	0.80			NA	2.37E-09			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.0
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.0
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.0
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.0
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.0
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.0
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.123

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.03E-03	1.00			7.59E-06	0.01			NA	9.44E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	7.83E-07	1.00	1.17E-06	80%	1.73E-07	0.90	2.88E-07	20%	4.00E-03	7.15E-07	2.86E-09	0%	1.46E-06
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	6.33E-06	1.00			4.65E-07	0.05			1.20E-02	5.78E-06	6.94E-08	100%	6.94E-0
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.94E-05	1.00			2.89E-06	0.60			NA	3.60E-05			
Iron	NA	3.24E-03	1.00			2.38E-04	0.05			NA	2.96E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	8.66E-05	1.00			6.36E-07	0.05			NA	7.91E-05			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.23E-06	1.00			3.85E-07	0.10			NA	4.78E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	9.28E-07	1.00	6.78E-06	46%	8.87E-07	0.80	8.09E-06	54%	1.70E-03	8.48E-07	1.44E-09	0%	1.49E-05
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-05

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	5920.000	200	1.00E-06	1.00	80	25	70	9125	3.71E-03	25550	1.32E-03
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	4.800	200	1.00E-06	1.00	80	25	70	9125	3.01E-06	25550	1.07E-06
Barium	173.000	200	1.00E-06	1.00	80	25	70	9125	1.08E-04	25550	3.87E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	18.200	200	1.00E-06	1.00	80	25	70	9125	1.14E-05	25550	4.07E-06
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	26.200	200	1.00E-06	1.00	80	25	70	9125	1.64E-05	25550	5.86E-06
Iron	16200.000	200	1.00E-06	1.00	80	25	70	9125	1.01E-02	25550	3.62E-03
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	1610.000	200	1.00E-06	1.00	80	25	70	9125	1.01E-03	25550	3.60E-04
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.491	200	1.00E-06	1.00	80	25	70	9125	3.07E-07	25550	1.10E-07
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	5920.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.72E-05	25550	9.73E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	4.80	4900	1.00E-06	0.30	0.03	80	25	70	9125	6.63E-07	25550	2.37E-07
Barium	173.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	7.96E-07	25550	2.84E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	18.20	4900	1.00E-06	0.30	0.01	80	25	70	9125	8.38E-07	25550	2.99E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	26.20	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.21E-06	25550	4.31E-07
Iron	16200.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	7.46E-04	25550	2.66E-04
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	1610.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	7.41E-06	25550	2.65E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.49	4900	1.00E-06	0.30	0.13	80	25	70	9125	2.94E-07	25550	1.05E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	5920.00		2.6098E-09	80	25	9125	3.39E-06	25550	1.21E-03
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	4.80		2.6098E-09	80	25	9125	2.75E-09	25550	9.81E-07
Barium	173.00		2.6098E-09	80	25	9125	9.90E-08	25550	3.53E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	18.20		2.6098E-09	80	25	9125	1.04E-08	25550	3.72E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	26.20		2.6098E-09	80	25	9125	1.50E-08	25550	5.35E-06
Iron	16200.00		2.6098E-09	80	25	9125	9.27E-06	25550	3.31E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	1610.00		2.6098E-09	80	25	9125	9.21E-07	25550	3.29E-04
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.49		2.6098E-09	80	25	9125	2.81E-10	25550	1.00E-07
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.71E-03	1.00	0.004	58%	2.72E-05	0.01	0.003	42%	NA	3.39E-06			0.006
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	3.01E-06	1.00	0.010	80%	6.63E-07	0.90	0.002	20%	5.00E-04	2.75E-09	0.000	0%	0.012
Barium	7.00E-02	1.08E-04	1.00	0.002	78%	7.96E-07	0.05	0.000	12%	5.00E-04	9.90E-08	0.000	10%	0.002
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	1.14E-05	1.00	0.002	21%	8.38E-07	0.05	0.003	31%	2.00E-06	1.04E-08	0.005	48%	0.011
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.64E-05	1.00	0.000	89%	1.21E-06	0.60	0.000	11%	NA	1.50E-08			0.000
Iron	3.00E-01	1.01E-02	1.00	0.034		7.46E-04	0.05	0.050		NA	NA			0.084
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.01E-03	1.00	0.021	50%	7.41E-06	0.05	0.003	7%	5.00E-05	9.21E-07	0.018	43%	0.043
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	3.07E-07	1.00			2.94E-07	0.80			NA	2.81E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.159

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.32E-03	1.00			9.73E-06	0.01			NA	1.21E-03			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	1.07E-06	1.00	1.61E-06	80%	2.37E-07	0.90	3.95E-07	20%	4.00E-03	9.81E-07	3.92E-09	0%	2.01E-06
Barium	NA	3.87E-05	1.00			2.84E-07	0.05			NA	3.53E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	4.07E-06	1.00			2.99E-07	0.05			1.20E-02	3.72E-06	4.46E-08	100%	4.46E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	5.86E-06	1.00			4.31E-07	0.60			NA	5.35E-06			
Iron	NA	3.62E-03	1.00			2.66E-04	0.05			NA	3.31E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	3.60E-04	1.00			2.65E-06	0.05			NA	3.29E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	1.10E-07	1.00	8.02E-07	46%	1.05E-07	0.80	9.57E-07	54%	1.70E-03	1.00E-07	1.71E-10	0%	1.76E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 4E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Antimony	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Barium	261.000	200	1.00E-06	1.00	80	25	70	9125	1.63E-04	25550	5.84E-05
Beryllium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cobalt	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Iron	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Lead	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Magnesium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Mercury (inorganic)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.236	200	1.00E-06	1.00	80	25	70	9125	1.48E-07	25550	5.28E-08
1,1 - Dichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Surface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Pyrene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.000	200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	0.00	4900	1.00E-06	0.30	0.03	80	25	70	9125	0.00E+00	25550	0.00E+00
Barium	261.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.20E-06	25550	4.29E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Iron	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Lead	0.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.24	4900	1.00E-06	0.30	0.13	80	25	70	9125	1.41E-07	25550	5.04E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Barium	261.00		2.6098E-09	80	25	9125	1.49E-07	25550	5.33E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Iron	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.24		2.6098E-09	80	25	9125	1.35E-10	25550	4.82E-08
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Barium	7.00E-02	1.63E-04	1.00	0.002	78%	1.20E-06	0.05	0.000	12%	5.00E-04	1.49E-07	0.000	10%	0.003
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-06	0.00E+00	0.000	#DIV/0!	0.000
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.60	0.000	#DIV/0!	NA	0.00E+00			0.000
Iron	3.00E-01	0.00E+00	1.00	0.000		0.00E+00	0.05	0.000		NA	NA			0.000
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	1.48E-07	1.00			1.41E-07	0.80			NA	1.35E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.003

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	0.00E+00	1.00			0.00E+00	0.01			NA	0.00E+00			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	4.00E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Barium	NA	5.84E-05	1.00			4.29E-07	0.05			NA	5.33E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	0.00E+00	1.00			0.00E+00	0.05			1.20E-02	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	0.00E+00	1.00			0.00E+00	0.60			NA	0.00E+00			
Iron	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	5.28E-08	1.00	3.85E-07	46%	5.04E-08	0.80	4.60E-07	54%	1.70E-03	4.82E-08	8.20E-11	0%	8.46E-07
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 8E-07

APPENDIX C

EXPOSURE POINT CONCENTRATIONS

TABLE 1
EXPOSURE POINT CONCENTRATIONS FOR INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREA A3 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Parameter	Units	Frequency of Detection	Average Concentration	W Statistic Normal Distribution	W Statistic Lognormal Distribution	W Test	Distribution	UCL Normal Distribution	UCL Lognormal Distribution	Maximum Detected Concentration	Exposure Point Concentration (1)
Volatile Organics Compounds											
1,1,1-Trichloroethane	mg/kg	18/45	0.024	0.165	0.668	0.945	LOGNORMAL	0.055	0.012	0.85	0.012
1,1-Dichloroethane	mg/kg	7/45	0.007	0.331	0.643	0.945	LOGNORMAL	0.009	0.008	0.057	0.008
1,2-Dichloroethene (Total)	mg/kg	25/45	0.030	0.294	0.808	0.945	LOGNORMAL	0.056	0.026	0.65	0.026
Tetrachloroethene	mg/kg	11/45	0.406	0.152	0.381	0.945	LOGNORMAL	1.08	0.025	18	0.025
Toluene	mg/kg	1/45	0.007	0.401	0.520	0.945	LOGNORMAL	0.008	0.009	0.027	0.009
Trichloroethene	mg/kg	39/45	0.140	0.313	0.959	0.945	LOGNORMAL	0.256	0.280	2.38	0.280
Xylenes, Total	mg/kg	1/43	0.015	0.173	0.334	0.943	LOGNORMAL	0.029	0.010	0.375	0.010
Semivolatile Organics Compounds											
BaP Equivalent	mg/kg	2/9	0.551	0.702	0.697	0.829	LOGNORMAL	0.923	1.78	1.73	1.73
Inorganics											
Aluminum	mg/kg	7/7	3864	0.942	0.912	0.803	NORMAL	4537	4828	5050	5050
Arsenic	mg/kg	7/7	3.20	0.903	0.884	0.803	NORMAL	4.05	4.83	4.5	4.5
Barium	mg/kg	9/9	54.5	0.785	0.937	0.829	LOGNORMAL	88.8	262	188	188
Cadmium	mg/kg	3/9	0.566	0.707	0.736	0.829	LOGNORMAL	0.849	2.37	1.65	1.65
Chromium	mg/kg	9/9	10.9	0.914	0.837	0.829	NORMAL	14.0	20.2	16.8	16.8
Copper	mg/kg	9/9	55.4	0.736	0.965	0.829	LOGNORMAL	101	769	204	204
Iron	mg/kg	7/7	11239	0.879	0.913	0.803	LOGNORMAL	13789	14698	16200	16200
Lead	mg/kg	9/9	20.3	0.839	0.920	0.829	LOGNORMAL	33.2	244	54.9	54.9
Manganese	mg/kg	7/7	687	0.634	0.843	0.803	LOGNORMAL	1140	1495	2060	2060
Mercury	mg/kg	1/9	0.054	0.747	0.754	0.829	LOGNORMAL	0.074	0.107	0.125	0.125
Nickel	mg/kg	9/9	12.7	0.715	0.845	0.829	LOGNORMAL	15.9	16.0	25.5	25.5
Vanadium	mg/kg	5/7	14.3	0.912	0.823	0.803	NORMAL	19.3	29.2	23.1	23.1

Notes:

The Shapiro-Wilk W-test (Gilbert, 1987) was used to determine the distribution of the dataset.

UCL = 95th percentile upper confidence limit on the mean concentration.

(1) - If more than 10 samples were collected then the exposure point concentration is the UCL for a normal distribution if the data is normally distributed or the UCL for a lognormal distribution if the data is lognormally distributed. If the distribution is undefined then the UCL for a lognormal distribution is used for the exposure point concentration. If the UCL exceeded the maximum detected concentration then the maximum detected concentration was used as the exposure point concentration. If less than 10 samples were collected then the maximum detected concentration is used as the exposure point concentration.

TABLE 2
EXPOSURE POINT CONCENTRATIONS FOR INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Parameter	Units	Frequency of Detection	Average Concentration	W Statistic Normal Distribution	W Statistic Lognormal Distribution	W Test	Distribution	UCL Normal Distribution	UCL Lognormal Distribution	Maximum Detected Concentration	Exposure Point Concentration (1)
Volatile Organics Compounds											
1,2-Dichloroethene (Total)	mg/kg	22/50	0.180	0.189	0.745	0.947	LOGNORMAL	0.416	0.086	7.0045	0.086
Trichloroethene	mg/kg	37/50	1.94	0.214	0.810	0.947	LOGNORMAL	4.17	0.607	48.055	0.607
Xylenes, Total	mg/kg	2/39	0.071	0.219	0.371	0.939	LOGNORMAL	0.159	0.025	2	0.025
Semivolatile Organics Compounds											
BaP Equivalent	mg/kg	19/31	3.51	0.323	0.873	0.929	LOGNORMAL	6.84	5.62	60.7	5.62
Fluoranthene	mg/kg	15/20	11.4	0.335	0.934	0.905	LOGNORMAL	25.1	44.9	160	44.9
Naphthalene	mg/kg	1/20	0.590	0.699	0.813	0.905	LOGNORMAL	0.830	0.948	0.95	0.948
Pyrene	mg/kg	20/31	6.42	0.287	0.945	0.929	LOGNORMAL	13.5	22.6	130	22.6
Inorganics											
Aluminum	mg/kg	20/20	4063	0.923	0.954	0.905	LOGNORMAL	4490	4555	6830	4555
Antimony	mg/kg	1/31	0.811	0.760	0.695	0.929	LOGNORMAL	0.975	1.40	2.3	1.40
Arsenic	mg/kg	19/20	4.44	0.947	0.820	0.905	NORMAL	5.32	7.00	10.1	5.32
Barium	mg/kg	31/31	73.9	0.866	0.902	0.929	LOGNORMAL	95.7	190	306	190
Chromium	mg/kg	31/31	10.8	0.950	0.925	0.929	NORMAL	12.5	14.0	22.6	12.5
Copper	mg/kg	30/31	139	0.425	0.960	0.929	LOGNORMAL	248	580	1900	580
Iron	mg/kg	20/20	14502	0.810	0.962	0.905	LOGNORMAL	17180	17502	38100	17502
Manganese	mg/kg	20/20	862	0.910	0.931	0.905	LOGNORMAL	1066	1275	1790	1275
Mercury	mg/kg	1/31	0.042	0.782	0.761	0.929	LOGNORMAL	0.050	0.061	0.12	0.061
Vanadium	mg/kg	20/20	18.0	0.970	0.980	0.905	LOGNORMAL	19.2	19.3	26.1	19.3

Notes:

The Shapiro-Wilk W-test (Gilbert, 1987) was used to determine the distribution of the dataset.

UCL = 95th percentile upper confidence limit on the mean concentration.

(1) - If more than 10 samples were collected then the exposure point concentration is the UCL for a normal distribution if the data is normally distributed or the UCL for a lognormal distribution if the data is lognormally distributed. If the distribution is undefined then the UCL for a lognormal distribution is used for the exposure point concentration. If the UCL exceeded the maximum detected concentration then the maximum detected concentration was used as the exposure point concentration. If less than 10 samples were collected then the maximum detected concentration is used as the exposure point concentration.

TABLE 3
EXPOSURE POINT CONCENTRATIONS FOR INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREA A4 EXCLUDING SAMPLE AB032 - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Parameter	Units	Frequency of Detection	Average Concentration	W Statistic Normal Distribution	W Statistic Lognormal Distribution	W Test	Distribution	UCL Normal Distribution	UCL Lognormal Distribution	Maximum Detected Concentration	Exposure Point Concentration (1)
Volatile Organics Compounds											
1,2-Dichloroethene (Total)	mg/kg	21/49	0.184	0.190	0.739	0.947	LOGNORMAL	0.424	0.090	7.00	0.090
Trichloroethene	mg/kg	36/49	1.98	0.216	0.798	0.947	LOGNORMAL	4.26	0.594	48.1	0.594
Xylenes, Total	mg/kg	2/38	0.072	0.222	0.376	0.938	LOGNORMAL	0.164	0.026	2.00	0.026
Semivolatile Organics Compounds											
BaP Equivalent	mg/kg	18/30	1.60	0.580	0.875	0.927	LOGNORMAL	2.41	3.01	10.4	3.01
Fluoranthene	mg/kg	14/19	3.59	0.666	0.935	0.901	LOGNORMAL	5.72	14.2	20.0	14.2
Pyrene	mg/kg	19/30	2.30	0.583	0.938	0.927	LOGNORMAL	3.61	9.53	18.0	9.53
Inorganics											
Aluminum	mg/kg	19/19	4093	0.927	0.951	0.901	LOGNORMAL	4541	4620	6830	4620
Antimony	mg/kg	1/30	0.803	0.761	0.700	0.927	LOGNORMAL	0.972	1.41	2.30	1.41
Arsenic	mg/kg	18/19	4.47	0.954	0.826	0.901	NORMAL	5.40	7.29	10.1	5.40
Barium	mg/kg	30/30	74.2	0.863	0.901	0.927	LOGNORMAL	96.8	198	306	198
Chromium	mg/kg	30/30	10.9	0.951	0.920	0.927	NORMAL	12.6	14.3	22.6	12.6
Copper	mg/kg	29/30	142	0.429	0.956	0.927	LOGNORMAL	254	642	1900	642
Iron	mg/kg	19/19	14686	0.820	0.966	0.901	LOGNORMAL	17497	17946	38100	17946
Manganese	mg/kg	19/19	883	0.918	0.924	0.901	LOGNORMAL	1095	1343	1790	1343
Mercury	mg/kg	1/30	0.042	0.787	0.770	0.927	LOGNORMAL	0.050	0.061	0.120	0.061
Vanadium	mg/kg	19/19	18.1	0.970	0.974	0.901	LOGNORMAL	19.4	19.6	26.1	19.6

Notes:

The Shapiro-Wilk W-test (Gilbert, 1987) was used to determine the distribution of the dataset.

UCL = 95th percentile upper confidence limit on the mean concentration.

(1) - If more than 10 samples were collected then the exposure point concentration is the UCL for a normal distribution if the data is normally distributed or the UCL for a lognormal distribution if the data is lognormally distributed. If the distribution is undefined then the UCL for a lognormal distribution is used for the exposure point concentration. If the UCL exceeded the maximum detected concentration then the maximum detected concentration was used as the exposure point concentration. If less than 10 samples were collected then the maximum detected concentration is used as the exposure point concentration.

TABLE 4
EXPOSURE POINT CONCENTRATIONS FOR INDUSTRIAL WORKERS AND MINOR FREQUENT CONSTRUCTION WORKERS
SUB AREA E - SURFACE SOIL (0 TO 5 FEET)
NIROP FRIDLEY, MINNESOTA

Parameter	Units	Frequency of Detection	Average Concentration	W Statistic Normal Distribution	W Statistic Lognormal Distribution	W Test	Distribution	UCL Normal Distribution	UCL Lognormal Distribution	Maximum Detected Concentration	Exposure Point Concentration (1)
Semivolatile Organics Compounds											
BaP Equivalent	mg/kg	3/4	1.72	0.910	0.987	0.748	LOGNORMAL	3.77	14395	4.15	4.15
Inorganics											
Aluminum	mg/kg	4/4	3988	0.910	0.890	0.748	NORMAL	4853	5469	4620	4620
Arsenic	mg/kg	4/4	2.32	0.986	0.914	0.748	NORMAL	3.55	12.4	3.5	3.5
Chromium	mg/kg	4/4	15.0	0.741	0.812	0.748	LOGNORMAL	25.5	62.8	28.3	28.3
Copper	mg/kg	4/4	94.8	0.978	0.909	0.748	NORMAL	179	104483	176	176
Iron	mg/kg	4/4	9323	0.895	0.912	0.748	LOGNORMAL	10471	10747	10700	10700
Manganese	mg/kg	4/4	337	0.923	0.923	0.748	LOGNORMAL	389	408	387	387
Zinc	mg/kg	4/4	18.0	0.942	0.913	0.748	NORMAL	21.7	24.0	21.2	21.2

Notes:

The Shapiro-Wilk W-test (Gilbert, 1987) was used to determine the distribution of the dataset.

UCL = 95th percentile upper confidence limit on the mean concentration.

(1) - If more than 10 samples were collected then the exposure point concentration is the UCL for a normal distribution if the data is normally distributed or the UCL for a lognormal distribution if the data is lognormally distributed. If the distribution is undefined then the UCL for a lognormal distribution is used for the exposure point concentration. If the UCL exceeded the maximum detected concentration then the maximum detected concentration was used as the exposure point concentration. If less than 10 samples were collected then the maximum detected concentration is used as the exposure point concentration.

APPENDIX D

SPREADSHEETS FOR REFINED RISK EVALUATION

TYPICAL INDUSTRIAL WORKERS
SURFACE SOIL

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A3 - SURFACE SOIL (0 TO 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Drivlng	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Drivlng
Inorganics:																										
Aluminum	7429905		100000	5050	0.010		Or In				0.010						0.010						NA	NA		
Antimony	7440360		100	0	0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	4.05	0.011	In	Or			0.011	0.011								0.011				1.62E-06	A		Or
Barium	7440393		12500	188	0.003		Or							0.003			0.003						NA	NA		
Cadmium	7440439		250	1.65	0.001		Or							0.001									3.96E-09	B1	Or De	In
Chromium VI	18540299		425	16.8	0.008		Or																3.95E-07	A	Or De	In
Copper	7440508		9000	204	0.005	In	Or								0.005								NA	D		
Iron	7439896		46000	16200	0.070	In	Or																NA	NA		
Lead	7439921		700	54.9	0.078		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	2060	0.074		In Or				0.074												NA	D		
Mercury (Inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.125	0.013		In	Not Protective of High			0.013		0.013	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22	0	0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	25.5	0.002	In	Or															0.002	1.70E-08	A	Or De	In
Vanadium	7440622 1314621		1340	23.1	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	0.008	0.000		In							0.000									1.45E-09	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0.026	0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200	0	0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	0	0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0	0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	0.025	0.000		In				0.000			0.000	0.000								1.91E-09	B2/C		In
Toluene	108883	y	305	0.009	0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472	0.012	0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0.28																			6.09E-08	B2/C		In
Xylenes (mixed)	1330207	y	248	0.01	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons				0																						
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	1.73																			4.33E-06	B2		Or
Fluoranthene	206440		6800	0	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.011	0.108	0.000	0.013	0.004	0.005	0.000	0.013	0.000	0.011	0.000	0.000	0.002	6E-06			

VOC? - "y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A3 - SURFACE SOIL (0 TO 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	4555	0.009		Or In				0.009						0.009						NA	NA		
Antimony	7440360		100	1.4	0.003		Or			0.003												0.003	NA	NA		
Arsenic	7440382		25	5.32	0.015	In	Or			0.015	0.015								0.015				2.13E-06	A		Or
Barium	7440393		12500	190	0.003		Or							0.003			0.003						NA	NA		
Cadmium	7440439		250		0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	12.5	0.006		Or																2.94E-07	A	Or De	In
Copper	7440508		9000	580	0.013	In	Or								0.013								NA	D		
Iron	7439896		46000	17502	0.076	In	Or																NA	NA		
Lead	7439921		700		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	1275	0.046		In Or				0.046												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.061	0.006		In	Not Protective of High			0.006		0.006	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22		0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000		0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	19.3	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55		0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0.865	0.008		In								0.008								NA	D		
Ethyl benzene	100414	y	200		0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300		0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	0.948	0.007		In			0.007								0.007				0.007	NA	D		
Tetrachloroethylene (PCE)	127184	y	131		0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305		0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472		0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0.607																			1.32E-07	B2/C		In
Xylenes (mixed)	1330207	y	248	0.025	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																										
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	5.62																			1.41E-05	B2		Or
Fluoranthene	206440		6800	44.9	0.001		Or			0.001				0.001	0.001								NA	D		
Pyrene	129000		5800	22.6	0.001		Or							0.001									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.026	0.076	0.000	0.006	0.005	0.022	0.000	0.012	0.007	0.015	0.000	0.000	0.010	2E-05			

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
	VOC? - 'Y' indicates that the contaminant is considered volatile.																										
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET) EXCLUDING SAMPLE AB032

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	4620	0.009		Or In				0.009						0.009						NA	NA		
Antimony	7440360		100	1.41	0.003		Or			0.003												0.003	NA	NA		
Arsenic	7440382		25	5.4	0.015	In	Or			0.015	0.015								0.015				2.16E-06	A		Or
Barium	7440393		12500	198	0.003		Or							0.003			0.003						NA	NA		
Cadmium	7440439		250		0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	12.6	0.006		Or																2.96E-07	A	Or De	In
Copper	7440508		9000	642	0.014	In	Or								0.014								NA	D		
Iron	7439896		46000	17946	0.078	In	Or																NA	NA		
Lead	7439921		700		0.000		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	1343	0.048		In Or				0.048												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.061	0.006		In	Not Protective of High			0.006		0.006	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22		0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000		0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	19.6	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55		0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0.09	0.001		In								0.001								NA	D		
Ethyl benzene	100414	y	200		0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300		0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28		0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131		0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305		0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472		0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	0.594																			1.29E-07	B2/C		In
Xylenes (mixed)	1330207	y	248	0.264	0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																										
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	3.01																			7.53E-06	B2		Or
Fluoranthene	206440		6800	14.2	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	9.53	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.018	0.079	0.000	0.006	0.004	0.016	0.000	0.012	0.000	0.015	0.000	0.000	0.003	1E-05			

VOC? - "y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SURFACE SOIL (0 TO 5 FEET) EXCLUDING SAMPLE AB032

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - Increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

TYPICAL INDUSTRIAL WORKERS
SUBSURFACE SOIL

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A3 - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	6370	0.013		Or In				0.013						0.013						NA	NA		
Antimony	7440360		100	105	0.210		Or			0.210												0.210	NA	NA		
Arsenic	7440382		25	6.6	0.018	In	Or			0.018	0.018								0.018				2.64E-06	A		Or
Barium	7440393		12500	327	0.005		Or							0.005			0.005						NA	NA		
Cadmium	7440439		250	5.3	0.004		Or							0.004									1.27E-08	B1	Or De	In
Chromium VI	18540299		425	114	0.054		Or																2.68E-06	A	Or De	In
Copper	7440508		9000	1290	0.029	In	Or								0.029								NA	D		
Iron	7439896		46000	275000	1.196	In	Or																NA	NA		
Lead	7439921		700	453	0.647		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	20700	0.739		In Or				0.739												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2	0.14	0.014		In	Not Protective of High			0.014		0.014	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22		0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000	142	0.009	In	Or															0.009	9.47E-08	A	Or De	In
Vanadium	7440622 1314621		1340	32.9	0.005	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55	34	0.025		In							0.025									6.18E-06	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	1.8	0.016		In								0.016								NA	D		
Ethyl benzene	100414	y	200	140	0.700		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300	3500	0.163		In	Not Protective of High Short-term Exposure									0.163						NA	D		
Naphthalene	91203	y	28	2.7	0.019		In			0.019								0.019				0.019	NA	D		
Tetrachloroethylene (PCE)	127184	y	131	1200	0.916		In				0.916			0.916	0.916								9.16E-05	B2/C		In
Toluene	108883	y	305	190	0.125		In				0.125			0.125	0.125			0.125					NA	D		
1,1,1 - Trichloroethane	71556	y	472	2600	1.102		In				1.102				1.102								NA	D		
Trichloroethylene (TCE)	79016	y	46	120																			2.61E-05	B2/C		In
Xylenes (mixed)	1330207	y	248	580	0.468		In				0.468							0.468				0.468	NA	D		
Polyaromatic Hydrocarbons																										
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	3.166																			7.92E-06	B2		Or
Fluoranthene	206440		6800	4.4	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	5.1	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.248	3.395	0.000	0.014	1.075	2.187	0.000	0.181	0.612	0.018	0.000	0.000	0.706	1E-04			

VOC? - "y" indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A3 - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways: Missing	Pathways: Driving	NONCANCER TARGET ENDPOINTS (2): ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER: ELCR (1)	Class	Pathways: Missing	Pathways: Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pahtway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	3160	0.006		Or In				0.006						0.006						NA	NA		
Antimony	7440360		100		0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	11.4	0.032	In	Or			0.032	0.032								0.032				4.56E-06	A		Or
Barium	7440393		12500	38.3	0.001		Or							0.001			0.001						NA	NA		
Cadmium	7440439		250		0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	13.8	0.006		Or																3.25E-07	A	Or De	In
Copper	7440508		9000	37.3	0.001	In	Or								0.001								NA	D		
Iron	7439896		46000	18600	0.081	In	Or																NA	NA		
Lead	7439921		700	4.1	0.006		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	5950	0.213		In Or				0.213												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2		0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22		0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000		0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	23	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55		0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22	0.92	0.008		In								0.008								NA	D		
Ethyl benzene	100414	y	200		0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300		0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28	1.1	0.008		In			0.008								0.008				0.008	NA	D		
Tetrachloroethylene (PCE)	127184	y	131		0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305		0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472		0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46	6.1																			1.33E-06	B2/C		In
Xylenes (mixed)	1330207	y	248	28	0.023		In				0.023							0.023				0.023	NA	D		
Polyaromatic Hydrocarbons																										
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.704																			1.76E-06	B2		Or
Fluoranthene	206440		6800	1.1	0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800	0.93	0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.040	0.273	0.000	0.000	0.001	0.009	0.000	0.007	0.030	0.032	0.000	0.000	0.030	8E-06			

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA A4 - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
	VOC? - 'Y' indicates that the contaminant is considered volatile.																										
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

NOTE:Based on LIMITED multiple pathway exposure scenario (i.e., incidential soil/dust ingestion, dermal contact and inhalation of outdoor dust and vapors). If multiple contaminants are present cumulative risk MUST be evaluated. Concerns regarding ecological receptors, vapor migration, and ground or surface water impacts must be evaluated by other methods.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA E - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
Inorganics:																										
Aluminum	7429905		100000	3960	0.008		Or In				0.008						0.008						NA	NA		
Antimony	7440360		100		0.000		Or			0.000												0.000	NA	NA		
Arsenic	7440382		25	1.8	0.005	In	Or			0.005	0.005								0.005				7.20E-07	A		Or
Barium	7440393		12500		0.000		Or							0.000			0.000						NA	NA		
Cadmium	7440439		250		0.000		Or							0.000									0.00E+00	B1	Or De	In
Chromium VI	18540299		425	10.2	0.005		Or																2.40E-07	A	Or De	In
Copper	7440508		9000	14.8	0.000	In	Or								0.000								NA	D		
Iron	7439896		46000	14500	0.063	In	Or																NA	NA		
Lead	7439921		700	7.4	0.011		Or	Based on blood lead levels. HQ > 1 blood lead levels may exceed 10 ug/dl.															NA	B2		
Manganese	7439965		5600	172	0.006		In Or				0.006												NA	D		
Mercury (inorganic: elemental and mercuric chlorid	7439976 7487947	y	2		0.000		In	Not Protective of High			0.000		0.000	Short-term Exposure									NA	D		
Methyl Mercury	22967926		22		0.000	In	Or				0.000						0.000						NA	NA		
Nickel	various		3000		0.000	In	Or															0.000	0.00E+00	A	Or De	In
Vanadium	7440622 1314621		1340	23.4	0.003	In	Or																NA	D		
Volatile Organics																										
1,1 - Dichloroethane	75343	y	55		0.000		In							0.000									0.00E+00	C		In
1,2 - Dichloroethylene (mixed isomers)	540590	y	22		0.000		In								0.000								NA	D		
Ethyl benzene	100414	y	200		0.000		In	Based on Csat. If > 1 indicates potential for free product in soil.															NA	D		
Methyl ethyl ketone (2-butanone)	78933	y	4300		0.000		In	Not Protective of High Short-term Exposure									0.000						NA	D		
Naphthalene	91203	y	28		0.000		In			0.000								0.000				0.000	NA	D		
Tetrachloroethylene (PCE)	127184	y	131		0.000		In				0.000			0.000	0.000								0.00E+00	B2/C		In
Toluene	108883	y	305		0.000		In				0.000			0.000	0.000			0.000					NA	D		
1,1,1 - Trichloroethane	71556	y	472		0.000		In				0.000				0.000								NA	D		
Trichloroethylene (TCE)	79016	y	46																				0.00E+00	B2/C		In
Xylenes (mixed)	1330207	y	248		0.000		In				0.000							0.000				0.000	NA	D		
Polyaromatic Hydrocarbons																										
Benzo(a)pyrene equivalents (see BaP equiv. Calculation spreadsheeet)	50328		4	0.36																			9.00E-07	B2		Or
Fluoranthene	206440		6800		0.000		Or			0.000				0.000	0.000								NA	D		
Pyrene	129000		5800		0.000		Or							0.000									NA	D		
			Cumulative Site Soil Risk (1) =					0.000	0.000	0.005	0.019	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.005	0.000	0.000	0.000	2E-06			

VOC? - 'y' indicates that the contaminant is considered volatile.

Pathways: Or = oral; De= Dermal; In = Inhalation; ? = not known.

SUB AREA E - SUBSURFACE SOIL (> 5 FEET)

Tier 2 Industrial Scenario Risk Evaluation (1999 Version)

	Chemical	CAS No.	VOC	Industrial SRV (mg/kg)	Site Concen (mg/kg) dry weight	Site HQ (1)	Pathways Missing	Pathways Driving	NONCANCER TARGET ENDPOINTS (2) ADREN	BONE	CV/BLD	CNS/PNS	EYE	IMMUN	KIDN	LIV/GI	PROSTATE	REPRO	RESP	SKIN	SPLEEN	THYROID	WHOLE BODY	CANCER ELCR (1)	Class	Pathways Missing	Pathways Driving
(1)	Site Hazard Quotient (HQ) = Site Exposure Point Conc. x (SRV HQ /SRV). Site ECR = Site Exposure Point Concentration x (SRV ECR/SRV).																										
	Individual chemical specific HQ should not exceed 0.2 (except where noted), cumulative HI should not exceed 1 for each target endpoint.																										
	Individual excess lifetime cancer risk as well as cumulative excess lifetime cancer risk should not exceed 1 per 100,000 (i.e., 1 E-5).																										
(2)	ADREN - adrenal; BONE; CV/BLD - cardiovascular/blood system; CNS/PNS - central/peripheral nervous system; EYE; IMMUN - immune system; KIDN - kidney; LIV/GI - liver/gastrointestinal system;																										
	PROST - prostrate; REPRO - reproductive system (incl. teratogenic/developmental effects); RESP - respiratory system; SKIN - skin irritation or other effects; SPLEEN; THYROID;																										
	WHOLE BODY - increased mortality, decreased growth rate, etc.																										
	NOTE: Not Protective of High Short-term Exposure - SRV based on short-term worker scenario (e.g., construction worker, utility worker, landscaper, etc.) is																										
	significantly lower than the industrial worker SRV presented here.																										
(3)	Class A - Known human carcinogen																										
	Class B - Probable human carcinogen (B1 - limited evidence in humans; B2 - inadequate evidence in humans but adequate in animals)																										
	Class C - Possible human carcinogen																										
	Class D - Not Classifiable																										
	NA - No EPA Classification Available.																										

MINOR INFREQUENT CONSTRUCTION WORKERS
SURFACE SOIL

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	4620.00		2.6098E-09	80	25	9125	2.64E-06	25550	9.44E-04
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	3.50		2.6098E-09	80	25	9125	2.00E-09	25550	7.15E-07
Barium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	28.30		2.6098E-09	80	25	9125	1.62E-08	25550	5.78E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	176.00		2.6098E-09	80	25	9125	1.01E-07	25550	3.60E-05
Iron	10700.00		2.6098E-09	80	25	9125	6.12E-06	25550	2.19E-03
Lead	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	387.00		2.6098E-09	80	25	9125	2.21E-07	25550	7.91E-05
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	21.20		2.6098E-09	80	25	9125	1.21E-08	25550	4.33E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	4.15		2.6098E-09	80	25	9125	2.37E-09	25550	8.48E-07
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.89E-03	1.00	0.003	58%	2.13E-05	0.01	0.002	42%	NA	2.64E-06			0.005
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.19E-06	1.00	0.007	80%	4.83E-07	0.90	0.002	20%	5.00E-04	2.00E-09	0.000	0%	0.009
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	1.77E-05	1.00	0.004	21%	1.30E-06	0.05	0.005	31%	2.00E-06	1.62E-08	0.008	48%	0.017
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.10E-04	1.00	0.003	89%	8.10E-06	0.60	0.000	11%	NA	1.01E-07			0.003
Iron	3.00E-01	6.70E-03	1.00	0.022		4.92E-04	0.05	0.033		NA	NA			0.055
Lead	NA	0.00E+00	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	2.42E-04	1.00	0.005	50%	1.78E-06	0.05	0.001	7%	5.00E-05	2.21E-07	0.004	43%	0.010
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.33E-05	1.00	0.002	58%	9.76E-07	0.10	0.001	42%	NA	1.21E-08			0.003
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	2.60E-06	1.00			2.48E-06	0.80			NA	2.37E-09			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.1

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.03E-03	1.00			7.59E-06	0.01			NA	9.44E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	7.83E-07	1.00	1.17E-06	80%	1.73E-07	0.90	2.88E-07	20%	4.00E-03	7.15E-07	2.86E-09	0%	1.46E-06
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	6.33E-06	1.00			4.65E-07	0.05			1.20E-02	5.78E-06	6.94E-08	100%	6.94E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.94E-05	1.00			2.89E-06	0.60			NA	3.60E-05			
Iron	NA	2.39E-03	1.00			1.76E-04	0.05			NA	2.19E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	8.66E-05	1.00			6.36E-07	0.05			NA	7.91E-05			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	4.74E-06	1.00			3.48E-07	0.10			NA	4.33E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	9.28E-07	1.00	6.78E-06	46%	8.87E-07	0.80	8.09E-06	54%	1.70E-03	8.48E-07	1.44E-09	0%	1.49E-05
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-05

MINOR INFREQUENT CONSTRUCTION WORKERS
SUBSURFACE SOIL

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	6370	200	1.00E-06	1.00	80	25	70	9125	3.99E-03	25550	1.42E-03
Antimony	105	200	1.00E-06	1.00	80	25	70	9125	6.58E-05	25550	2.35E-05
Arsenic	6.6	200	1.00E-06	1.00	80	25	70	9125	4.13E-06	25550	1.48E-06
Barium	327	200	1.00E-06	1.00	80	25	70	9125	2.05E-04	25550	7.31E-05
Beryllium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	5.3	200	1.00E-06	1.00	80	25	70	9125	3.32E-06	25550	1.19E-06
Calcium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	114	200	1.00E-06	1.00	80	25	70	9125	7.14E-05	25550	2.55E-05
Cobalt		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1290	200	1.00E-06	1.00	80	25	70	9125	8.08E-04	25550	2.89E-04
Iron	275000	200	1.00E-06	1.00	80	25	70	9125	1.72E-01	25550	6.15E-02
Lead	453	200	1.00E-06	1.00	80	25	70	9125	2.84E-04	25550	1.01E-04
Magnesium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	20700	200	1.00E-06	1.00	80	25	70	9125	1.30E-02	25550	4.63E-03
Mercury (inorganic)	0.14	200	1.00E-06	1.00	80	25	70	9125	8.77E-08	25550	3.13E-08
Nickel	142	200	1.00E-06	1.00	80	25	70	9125	8.89E-05	25550	3.18E-05
Potassium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	32.9	200	1.00E-06	1.00	80	25	70	9125	2.06E-05	25550	7.36E-06
Zinc		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	3.170	200	1.00E-06	1.00	80	25	70	9125	1.99E-06	25550	7.09E-07
1,1 - Dichloroethane	34.000	200	1.00E-06	1.00	80	25	70	9125	2.13E-05	25550	7.60E-06
1,2 - Dichloroethylene (mixed isomers)	1.800	200	1.00E-06	1.00	80	25	70	9125	1.13E-06	25550	4.03E-07
Ethyl benzene	140.000	200	1.00E-06	1.00	80	25	70	9125	8.77E-05	25550	3.13E-05
Fluoranthene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.000	200	1.00E-06	1.00	80	25	70	9125	2.19E-03	25550	7.83E-04
Naphthalene	2.700	200	1.00E-06	1.00	80	25	70	9125	1.69E-06	25550	6.04E-07
2-Nitroaniline		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Tetrachloroethylene (PCE)	1200.000	200	1.00E-06	1.00	80	25	70	9125	7.51E-04	25550	2.68E-04
Toluene	190.000	200	1.00E-06	1.00	80	25	70	9125	1.19E-04	25550	4.25E-05
1,1,1 - Trichloroethane	2600.000	200	1.00E-06	1.00	80	25	70	9125	1.63E-03	25550	5.81E-04
Trichloroethylene (TCE)	120.000	200	1.00E-06	1.00	80	25	70	9125	7.51E-05	25550	2.68E-05
Xylenes (mixed)	580.000	200	1.00E-06	1.00	80	25	70	9125	3.63E-04	25550	1.30E-04

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	6370.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.93E-05	25550	1.05E-05
Antimony	105.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	4.83E-07	25550	1.73E-07
Arsenic	6.60	4900	1.00E-06	0.30	0.03	80	25	70	9125	9.11E-07	25550	3.25E-07
Barium	327.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.51E-06	25550	5.38E-07
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	5.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	2.44E-07	25550	8.71E-08
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	114.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.25E-06	25550	1.87E-06
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	1290.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	5.94E-05	25550	2.12E-05
Iron	275000.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.27E-02	25550	4.52E-03
Lead	453.00	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	20700.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	9.53E-05	25550	3.40E-05
Mercury (inorganic)	0.14	4900	1.00E-06	0.30	0.05	80	25	70	9125	3.22E-08	25550	1.15E-08
Nickel	142.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	32.90	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.51E-06	25550	5.41E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	3.17	4900	1.00E-06	0.30	0.13	80	25	70	9125	1.90E-06	25550	6.77E-07
1,1 - Dichloroethane	34.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	7.82E-06	25550	2.79E-06
1,2 - Dichloroethylene (mixed isomers)	1.80	4900	1.00E-06	0.30	0.05	80	25	70	9125	4.14E-07	25550	1.48E-07
Ethyl benzene	140.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	3.22E-05	25550	1.15E-05
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	1.61E-03	25550	5.75E-04
Naphthalene	2.70	4900	1.00E-06	0.30	0.05	80	25	70	9125	6.21E-07	25550	2.22E-07
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.76E-04	25550	9.86E-05
Toluene	190.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	4.37E-05	25550	1.56E-05
1,1,1 - Trichloroethane	2600.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	5.98E-04	25550	2.14E-04

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Trichloroethylene (TCE)	120.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.76E-05	25550	9.86E-06
Xylenes (mixed)	580.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	1.33E-04	25550	4.77E-05

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	6370.00		2.6098E-09	80	25	9125	3.64E-06	25550	1.30E-03
Antimony	105.00		2.6098E-09	80	25	9125	6.01E-08	25550	2.15E-05
Arsenic	6.60		2.6098E-09	80	25	9125	3.78E-09	25550	1.35E-06
Barium	327.00		2.6098E-09	80	25	9125	1.87E-07	25550	6.68E-05
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	5.30		2.6098E-09	80	25	9125	3.03E-09	25550	1.08E-06
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	114.00		2.6098E-09	80	25	9125	6.52E-08	25550	2.33E-05
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	1290.00		2.6098E-09	80	25	9125	7.38E-07	25550	2.64E-04
Iron	275000.00		2.6098E-09	80	25	9125	1.57E-04	25550	5.62E-02
Lead	453.00		2.6098E-09	80	25	9125	2.59E-07	25550	9.25E-05
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	20700.00		2.6098E-09	80	25	9125	1.18E-05	25550	4.23E-03
Mercury (inorganic)	0.14	3.78E-05	2.6098E-09	80	25	9125	1.16E-06	25550	4.14E-04
Nickel	142.00		2.6098E-09	80	25	9125	8.12E-08	25550	2.90E-05
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	32.90		2.6098E-09	80	25	9125	1.88E-08	25550	6.72E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	3.17		2.6098E-09	80	25	9125	1.81E-09	25550	6.48E-07
1,1 - Dichloroethane	34.00	4.65E-04	2.6098E-09	80	25	9125	3.47E-03	25550	1.24E+00
1,2 - Dichloroethylene (mixed isomers)	1.80	4.55E-04	2.6098E-09	80	25	9125	1.80E-04	25550	6.42E-02
Ethyl benzene	140.00	3.30E-04	2.6098E-09	80	25	9125	1.01E-02	25550	3.61E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.00	6.54E-05	2.6098E-09	80	25	9125	5.01E-02	25550	1.79E+01
Naphthalene	2.70	3.17E-05	2.6098E-09	80	25	9125	1.87E-05	25550	6.70E-03
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Tetrachloroethylene (PCE)	1200.00	4.17E-04	2.6098E-09	80	25	9125	1.10E-01	25550	3.92E+01
Toluene	190.00	3.79E-04	2.6098E-09	80	25	9125	1.58E-02	25550	5.64E+00
1,1,1 - Trichloroethane	2600.00	5.51E-04	2.6098E-09	80	25	9125	3.14E-01	25550	1.12E+02
Trichloroethylene (TCE)	120.00	5.10E-04	2.6098E-09	80	25	9125	1.34E-02	25550	4.79E+00
Xylenes (mixed)	580.00	2.83E-04	2.6098E-09	80	25	9125	3.59E-02	25550	1.28E+01

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.99E-03	1.00	0.004	58%	2.93E-05	0.01	0.003	42%	NA	3.64E-06			0.007
Antimony	4.00E-04	6.58E-05	1.00	0.164	87%	4.83E-07	0.05	0.024	13%	2.00E-04	6.01E-08	0.000	0%	0.189
Arsenic	3.00E-04	4.13E-06	1.00	0.014	80%	9.11E-07	0.90	0.003	20%	5.00E-04	3.78E-09	0.000	0%	0.017
Barium	7.00E-02	2.05E-04	1.00	0.003	78%	1.51E-06	0.05	0.000	12%	5.00E-04	1.87E-07	0.000	10%	0.004
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	3.32E-06	1.00	0.003	93%	2.44E-07	1.00	0.000	7%	2.00E-04	3.03E-09	0.000	0%	0.004
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	7.14E-05	1.00	0.014	21%	5.25E-06	0.05	0.021	31%	2.00E-06	6.52E-08	0.033	48%	0.068
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	8.08E-04	1.00	0.022	89%	5.94E-05	0.60	0.003	11%	NA	7.38E-07			0.025
Iron	3.00E-01	1.72E-01	1.00	0.574		1.27E-02	0.05	0.844		NA	NA			1.418
Lead	NA	2.84E-04	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.30E-02	1.00	0.276	50%	9.53E-05	0.05	0.041	7%	5.00E-05	1.18E-05	0.237	43%	0.553
Mercury (inorganic)	3.00E-04	8.77E-08	1.00	0.000	35%	3.22E-08	0.20	0.001	65%	3.00E-04	1.16E-06			0.001
Nickel	2.00E-02	8.89E-05	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	2.06E-05	1.00	0.003	58%	1.51E-06	0.10	0.002	42%	NA	1.88E-08			0.005
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	1.99E-06	1.00			1.90E-06	0.80			NA	1.81E-09			
1,1 - Dichloroethane	1.00E-01	2.13E-05	1.00	0.000	3%	7.82E-06	0.90	0.000	1%	5.00E-01	3.47E-03	0.007	96%	0.007
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	1.13E-06	1.00	0.000	2%	4.14E-07	0.90	0.000	1%	3.50E-02	1.80E-04	0.005	97%	0.005
Ethyl benzene	1.00E-01	8.77E-05	1.00	0.001	8%	3.22E-05	0.85	0.000	3%	1.00E+00	1.01E-02	0.010	89%	0.011
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	2.19E-03	1.00	0.004	6%	1.61E-03	0.90	0.003	5%	1.00E+00	5.01E-02	0.050	88%	0.057
Naphthalene	2.00E-02	1.69E-06	1.00	0.000	1%	6.21E-07	0.80	0.000	1%	3.00E-03	1.87E-05	0.006	98%	0.006
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	7.51E-04	1.00	0.075	20%	2.76E-04	0.90	0.031	8%	4.00E-01	1.10E-01	0.274	72%	0.380
Toluene	2.00E-01	1.19E-04	1.00	0.001	1%	4.37E-05	0.90	0.000	1%	4.00E-01	1.58E-02	0.039	98%	0.040
1,1,1 - Trichloroethane	2.00E-02	1.63E-03	1.00	0.081	19%	5.98E-04	0.90	0.033	8%	1.00E+00	3.14E-01	0.314	73%	0.429
Trichloroethylene (TCE)	NA	7.51E-05	1.00			2.76E-05	0.90			NA	1.34E-02			
Xylenes (mixed)	2.00E+00	3.63E-04	1.00	0.000	0%	1.33E-04	0.90	0.000	0%	3.00E-01	3.59E-02	0.120	100%	0.120

SCREENING HI = 3.3

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.42E-03	1.00			1.05E-05	0.01			NA	1.30E-03			
Antimony	NA	2.35E-05	1.00			1.73E-07	0.05			NA	2.15E-05			
Arsenic	1.50	1.48E-06	1.00	2.21E-06	80%	3.25E-07	0.90	5.42E-07	20%	4.00E-03	1.35E-06	5.39E-09	0%	2.76E-06
Barium	NA	7.31E-05	1.00			5.38E-07	0.05			NA	6.68E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	1.19E-06	1.00			8.71E-08	1.00			1.80E-03	1.08E-06	1.95E-09	100%	1.95E-09
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.55E-05	1.00			1.87E-06	0.05			1.20E-02	2.33E-05	2.79E-07	100%	2.79E-07
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.89E-04	1.00			2.12E-05	0.60			NA	2.64E-04			
Iron	NA	6.15E-02	1.00			4.52E-03	0.05			NA	5.62E-02			
Lead	NA	1.01E-04	0.00			NA	0.00			NA	9.25E-05			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	4.63E-03	1.00			3.40E-05	0.05			NA	4.23E-03			
Mercury (inorganic)	NA	3.13E-08	1.00			1.15E-08	0.20			NA	4.14E-04			
Nickel	NA	3.18E-05	1.00			NA	0.05			4.80E-04	2.90E-05	1.39E-08	100%	1.39E-08
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	7.36E-06	1.00			5.41E-07	0.10			NA	6.72E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	7.09E-07	1.00	5.18E-06	46%	6.77E-07	0.80	6.18E-06	54%	1.70E-03	6.48E-07	1.10E-09	0%	1.14E-05
1,1 - Dichloroethane	0.01	7.60E-06	1.00	4.33E-08	2%	2.79E-06	0.90	1.77E-08	1%	1.60E-06	1.24E+00	1.98E-06	97%	2.04E-06
1,2 - Dichloroethylene (mixed isomers)	NA	4.03E-07	1.00			1.48E-07	0.90			NA	6.42E-02			
Ethyl benzene	NA	3.13E-05	1.00			1.15E-05	0.85			NA	3.61E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	7.83E-04	1.00			5.75E-04	0.90			NA	1.79E+01			
Naphthalene	NA	6.04E-07	1.00			2.22E-07	0.80			NA	6.70E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	2.68E-04	1.00	1.40E-05	33%	9.86E-05	0.90	5.70E-06	13%	5.80E-07	3.92E+01	2.27E-05	54%	4.24E-05
Toluene	NA	4.25E-05	1.00			1.56E-05	0.90			NA	5.64E+00			
1,1,1 - Trichloroethane	NA	5.81E-04	1.00			2.14E-04	0.90			NA	1.12E+02			
Trichloroethylene (TCE)	0.01	2.68E-05	1.00	2.95E-07	3%	9.86E-06	0.90	1.21E-07	1%	1.70E-06	4.79E+00	8.14E-06	95%	8.56E-06
Xylenes (mixed)	NA	1.30E-04	1.00			4.77E-05	0.90			NA	1.28E+01			

ECR = Excess Cancer Risk

TOTAL ECR = 7E-05

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	3160	200	1.00E-06	1.00	80	25	70	9125	1.98E-03	25550	7.07E-04
Antimony		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	11.4	200	1.00E-06	1.00	80	25	70	9125	7.14E-06	25550	2.55E-06
Barium	38.3	200	1.00E-06	1.00	80	25	70	9125	2.40E-05	25550	8.57E-06
Beryllium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.8	200	1.00E-06	1.00	80	25	70	9125	8.64E-06	25550	3.09E-06
Cobalt		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	37.3	200	1.00E-06	1.00	80	25	70	9125	2.34E-05	25550	8.34E-06
Iron	18600	200	1.00E-06	1.00	80	25	70	9125	1.16E-02	25550	4.16E-03
Lead	4.1	200	1.00E-06	1.00	80	25	70	9125	2.57E-06	25550	9.17E-07
Magnesium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	5950	200	1.00E-06	1.00	80	25	70	9125	3.73E-03	25550	1.33E-03
Mercury (inorganic)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23	200	1.00E-06	1.00	80	25	70	9125	1.44E-05	25550	5.14E-06
Zinc		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.704	200	1.00E-06	1.00	80	25	70	9125	4.41E-07	25550	1.57E-07
1,1 - Dichloroethane		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.92	200	1.00E-06	1.00	80	25	70	9125	5.76E-07	25550	2.06E-07
Ethyl benzene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	1.1	200	1.00E-06	1.00	80	25	70	9125	6.89E-07	25550	2.46E-07
Methyl ethyl ketone (2-butanone)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.1	200	1.00E-06	1.00	80	25	70	9125	6.89E-07	25550	2.46E-07
2-Nitroaniline		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.93	200	1.00E-06	1.00	80	25	70	9125	5.82E-07	25550	2.08E-07

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Tetrachloroethylene (PCE)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	6.1	200	1.00E-06	1.00	80	25	70	9125	3.82E-06	25550	1.36E-06
Xylenes (mixed)	28	200	1.00E-06	1.00	80	25	70	9125	1.75E-05	25550	6.26E-06

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	3160.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.45E-05	25550	5.19E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	11.40	4900	1.00E-06	0.30	0.03	80	25	70	9125	1.57E-06	25550	5.62E-07
Barium	38.30	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.76E-07	25550	6.30E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.80	4900	1.00E-06	0.30	0.01	80	25	70	9125	6.35E-07	25550	2.27E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	37.30	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.72E-06	25550	6.13E-07
Iron	18600.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	8.56E-04	25550	3.06E-04
Lead	4.10	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	5950.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	2.74E-05	25550	9.78E-06
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.06E-06	25550	3.78E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.70	4900	1.00E-06	0.30	0.13	80	25	70	9125	4.21E-07	25550	1.50E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.92	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.12E-07	25550	7.56E-08
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	1.10	4900	1.00E-06	0.30	0.13	80	25	70	9125	6.58E-07	25550	2.35E-07
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.10	4900	1.00E-06	0.30	0.05	80	25	70	9125	2.53E-07	25550	9.04E-08
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.93	4900	1.00E-06	0.30	0.1	80	25	70	9125	4.28E-07	25550	1.53E-07
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Trichloroethylene (TCE)	6.10	4900	1.00E-06	0.30	0.05	80	25	70	9125	1.40E-06	25550	5.01E-07
Xylenes (mixed)	28.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	6.44E-06	25550	2.30E-06

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	3160.00		2.6098E-09	80	25	9125	1.81E-06	25550	6.46E-04
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	11.40		2.6098E-09	80	25	9125	6.52E-09	25550	2.33E-06
Barium	38.30		2.6098E-09	80	25	9125	2.19E-08	25550	7.82E-06
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	13.80		2.6098E-09	80	25	9125	7.89E-09	25550	2.82E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	37.30		2.6098E-09	80	25	9125	2.13E-08	25550	7.62E-06
Iron	18600.00		2.6098E-09	80	25	9125	1.06E-05	25550	3.80E-03
Lead	4.10		2.6098E-09	80	25	9125	2.35E-09	25550	8.38E-07
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	5950.00		2.6098E-09	80	25	9125	3.40E-06	25550	1.22E-03
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	23.00		2.6098E-09	80	25	9125	1.32E-08	25550	4.70E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.70		2.6098E-09	80	25	9125	4.03E-10	25550	1.44E-07
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.92	4.55E-04	2.6098E-09	80	25	9125	9.18E-05	25550	3.28E-02
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	1.10	6.62E-07	2.6098E-09	80	25	9125	1.60E-07	25550	5.72E-05
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	1.10	3.17E-05	2.6098E-09	80	25	9125	7.64E-06	25550	2.73E-03
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Pyrene	0.93	4.46E-07	2.6098E-09	80	25	9125	9.15E-08	25550	3.27E-05

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	6.10	5.10E-04	2.6098E-09	80	25	9125	6.82E-04	25550	2.44E-01
Xylenes (mixed)	28.00	2.83E-04	2.6098E-09	80	25	9125	1.73E-03	25550	6.19E-01

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	1.98E-03	1.00	0.002	58%	1.45E-05	0.01	0.001	42%	NA	1.81E-06			0.003
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	7.14E-06	1.00	0.024	80%	1.57E-06	0.90	0.006	20%	5.00E-04	6.52E-09	0.000	0%	0.030
Barium	7.00E-02	2.40E-05	1.00	0.000	78%	1.76E-07	0.05	0.000	12%	5.00E-04	2.19E-08	0.000	10%	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	8.64E-06	1.00	0.002	21%	6.35E-07	0.05	0.003	31%	2.00E-06	7.89E-09	0.004	48%	0.008
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	2.34E-05	1.00	0.001	89%	1.72E-06	0.60	0.000	11%	NA	2.13E-08			0.001
Iron	3.00E-01	1.16E-02	1.00	0.039		8.56E-04	0.05	0.057		NA	NA			0.096
Lead	NA	2.57E-06	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	3.73E-03	1.00	0.079	50%	2.74E-05	0.05	0.012	7%	5.00E-05	3.40E-06	0.068	43%	0.159
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.44E-05	1.00	0.002	58%	1.06E-06	0.10	0.002	42%	NA	1.32E-08			0.004
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	4.41E-07	1.00			4.21E-07	0.80			NA	4.03E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	5.76E-07	1.00	0.000	2%	2.12E-07	0.90	0.000	1%	3.50E-02	9.18E-05	0.003	97%	0.003
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	6.89E-07	0.80	0.000	39%	6.58E-07	0.80	0.000	58%	1.40E-01	1.60E-07	0.000	3%	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	6.89E-07	1.00	0.000	1%	2.53E-07	0.80	0.000	1%	3.00E-03	7.64E-06	0.003	98%	0.003
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	5.82E-07	0.80	0.000	45%	4.28E-07	0.80	0.000	52%	1.10E-01	9.15E-08	0.000	2%	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	3.82E-06	1.00			1.40E-06	0.90			NA	6.82E-04			
Xylenes (mixed)	2.00E+00	1.75E-05	1.00	0.000	0%	6.44E-06	0.90	0.000	0%	3.00E-01	1.73E-03	0.006	100%	0.006

SCREENING HI = 0.3

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	7.07E-04	1.00			5.19E-06	0.01			NA	6.46E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	2.55E-06	1.00	3.82E-06	80%	5.62E-07	0.90	9.37E-07	20%	4.00E-03	2.33E-06	9.32E-09	0%	4.77E-06
Barium	NA	8.57E-06	1.00			6.30E-08	0.05			NA	7.82E-06			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	3.09E-06	1.00			2.27E-07	0.05			1.20E-02	2.82E-06	3.38E-08	100%	3.38E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	8.34E-06	1.00			6.13E-07	0.60			NA	7.62E-06			
Iron	NA	4.16E-03	1.00			3.06E-04	0.05			NA	3.80E-03			
Lead	NA	9.17E-07	0.00			NA	0.00			NA	8.38E-07			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	1.33E-03	1.00			9.78E-06	0.05			NA	1.22E-03			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.14E-06	1.00			3.78E-07	0.10			NA	4.70E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	1.57E-07	1.00	1.15E-06	46%	1.50E-07	0.80	1.37E-06	54%	1.70E-03	1.44E-07	2.44E-10	0%	2.52E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	2.06E-07	1.00			7.56E-08	0.90			NA	3.28E-02			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	2.46E-07	0.80			2.35E-07	0.80			NA	5.72E-05			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	2.46E-07	1.00			9.04E-08	0.80			NA	2.73E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	2.08E-07	0.80			1.53E-07	0.80			NA	3.27E-05			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	1.36E-06	1.00	1.50E-08	3%	5.01E-07	0.90	6.13E-09	1%	1.70E-06	2.44E-01	4.14E-07	95%	4.35E-07
Xylenes (mixed)	NA	6.26E-06	1.00			2.30E-06	0.90			NA	6.19E-01			

ECR = Excess Cancer Risk

TOTAL ECR = 8E-06

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics											
Aluminum	3960	200	1.00E-06	1.00	80	25	70	9125	2.48E-03	25550	8.86E-04
Antimony		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	1.8	200	1.00E-06	1.00	80	25	70	9125	1.13E-06	25550	4.03E-07
Barium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium III		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	10.2	200	1.00E-06	1.00	80	25	70	9125	6.39E-06	25550	2.28E-06
Cobalt		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	14.8	200	1.00E-06	1.00	80	25	70	9125	9.27E-06	25550	3.31E-06
Iron	14500	200	1.00E-06	1.00	80	25	70	9125	9.08E-03	25550	3.24E-03
Lead	7.4	200	1.00E-06	1.00	80	25	70	9125	4.63E-06	25550	1.66E-06
Magnesium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Manganese	172	200	1.00E-06	1.00	80	25	70	9125	1.08E-04	25550	3.85E-05
Mercury (inorganic)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Potassium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Selenium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Sodium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Thallium		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23.4	200	1.00E-06	1.00	80	25	70	9125	1.47E-05	25550	5.23E-06
Zinc		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.36	200	1.00E-06	1.00	80	25	70	9125	2.25E-07	25550	8.05E-08
1,1 - Dichloroethane		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF x ED)/(BW x AT)

Minor Construction/Utility Worker1. Exposure Calculation for Subsurface Soil Ingestion

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Tetrachloroethylene (PCE)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)		200	1.00E-06	1.00	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Inorganics												
Aluminum	3960.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	1.82E-05	25550	6.51E-06
Antimony	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Arsenic	1.80	4900	1.00E-06	0.30	0.03	80	25	70	9125	2.49E-07	25550	8.88E-08
Barium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Chromium VI	10.20	4900	1.00E-06	0.30	0.01	80	25	70	9125	4.69E-07	25550	1.68E-07
Cobalt	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Copper	14.80	4900	1.00E-06	0.30	0.01	80	25	70	9125	6.81E-07	25550	2.43E-07
Iron	14500.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	6.67E-04	25550	2.38E-04
Lead	7.40	4900	1.00E-06	0.30		80	25	70	9125	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Manganese	172.00	4900	1.00E-06	0.30	0.001	80	25	70	9125	7.92E-07	25550	2.83E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Potassium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Selenium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	NA	25550	NA
Sodium	0.00	4900	1.00E-06	0.30	NA	80	25	70	9125	#VALUE!	25550	#VALUE!
Thallium	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Vanadium	23.40	4900	1.00E-06	0.30	0.01	80	25	70	9125	1.08E-06	25550	3.85E-07
Zinc	0.00	4900	1.00E-06	0.30	0.01	80	25	70	9125	0.00E+00	25550	0.00E+00
Organics												
Benzo(a)pyrene Equivalents	0.36	4900	1.00E-06	0.30	0.13	80	25	70	9125	2.15E-07	25550	7.69E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.13	80	25	70	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.1	80	25	70	9125	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Minor Construction/Utility Worker2. Exposure Calculation for Dermal Contact with Subsurface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	ED (years)	BW (kg)	AT (days)	Noncarcin ADD (mg/kg-d)	AT (days) (Carcin)	Carcin LADD (mg/kg-d)
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.05	80	25	70	9125	0.00E+00	25550	0.00E+00

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	2.64E+04
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents							
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	2.15E+03
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	2.20E+03
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	3.03E+03
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.51E+06
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.53E+04
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	3.16E+04

$$VF\ (m^3/kg) = (Q/C) \times [(3.14 \times D_a \times T)^{1/2}/(2 \times \rho_b \times D_a)] \times 10^{-4}\ m^2/cm^2$$

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	2.24E+06
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	2.40E+03
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	2.64E+03
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.82E+03
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.96E+03
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	3.54E+03

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43

$$Csat\ (mg/kg) = (S/\rho_b) \times [(K_d \times \rho_b) + \theta_w + (H' \times \theta_a)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Inorganics									
Aluminum	3960.00		2.6098E-09	80	25	9125	2.27E-06	25550	8.09E-04
Antimony	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Arsenic	1.80		2.6098E-09	80	25	9125	1.03E-09	25550	3.68E-07
Barium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Beryllium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Cadmium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Calcium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium III	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Chromium VI	10.20		2.6098E-09	80	25	9125	5.83E-09	25550	2.08E-06
Cobalt	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Copper	14.80		2.6098E-09	80	25	9125	8.47E-09	25550	3.02E-06
Iron	14500.00		2.6098E-09	80	25	9125	8.29E-06	25550	2.96E-03
Lead	7.40		2.6098E-09	80	25	9125	4.23E-09	25550	1.51E-06
Magnesium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Manganese	172.00		2.6098E-09	80	25	9125	9.84E-08	25550	3.51E-05
Mercury (inorganic)	0.00	3.78E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Nickel	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Potassium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Selenium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Sodium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Thallium	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Vanadium	23.40		2.6098E-09	80	25	9125	1.34E-08	25550	4.78E-06
Zinc	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Organics									
Benzo(a)pyrene Equivalents	0.36		2.6098E-09	80	25	9125	2.06E-10	25550	7.35E-08
1,1 - Dichloroethane	0.00	4.65E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4.55E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	3.30E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	6.62E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	6.54E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Naphthalene	0.00	3.17E-05	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Pyrene	0.00	4.46E-07	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility 'Worker3. Calculation of average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	ED (years)	AT (days) (Noncar)	Noncarcin ADC (mg/m3)	AT (days) (Carcin)	Carcin LADC (ug/m3)
Tetrachloroethylene (PCE)	0.00	4.17E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Toluene	0.00	3.79E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	5.51E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	5.10E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	2.83E-04	2.6098E-09	80	25	9125	0.00E+00	25550	0.00E+00

Minor Construction/Utility Worker4. Summary of Exposure and Noncarcinogenic Risk Calculations

Chemical	Oral RfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation RfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.48E-03	1.00	0.002	58%	1.82E-05	0.01	0.002	42%	NA	2.27E-06			0.004
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	1.13E-06	1.00	0.004	80%	2.49E-07	0.90	0.001	20%	5.00E-04	1.03E-09	0.000	0%	0.005
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	2.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	NA			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	5.00E-03	6.39E-06	1.00	0.001	21%	4.69E-07	0.05	0.002	31%	2.00E-06	5.83E-09	0.003	48%	0.006
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	1.02E-03	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	9.27E-06	1.00	0.000	89%	6.81E-07	0.60	0.000	11%	NA	8.47E-09			0.000
Iron	3.00E-01	9.08E-03	1.00	0.030		6.67E-04	0.05	0.044		NA	NA			0.075
Lead	NA	4.63E-06	0.00	NA	NA	NA	0.00	NA	NA	NA	NA			
Magnesium	NA	0.00E+00	0.00	#VALUE!	#VALUE!	#VALUE!	0.00	#VALUE!	#VALUE!	NA	0.00E+00			
Manganese	4.70E-02	1.08E-04	1.00	0.002	50%	7.92E-07	0.05	0.000	7%	5.00E-05	9.84E-08	0.002	43%	0.005
Mercury (inorganic)	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00			0.000
Nickel	2.00E-02	0.00E+00	1.00			NA	0.05			NA	NA			
Potassium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00			NA	0.90			NA	NA			
Sodium	NA	0.00E+00	NA	#VALUE!	#VALUE!	#VALUE!	NA	#VALUE!	#VALUE!	NA	0.00E+00			
Thallium	8.00E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.47E-05	1.00	0.002	58%	1.08E-06	0.10	0.002	42%	NA	1.34E-08			0.004
Zinc	3.00E-01	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	NA	2.25E-07	1.00			2.15E-07	0.80			NA	2.06E-10			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-02	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E-01	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-03	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E-01	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	4.00E-01	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

SCREENING HI = 0.1

Minor Construction/Utility Worker5. Summary of Exposure and Carcinogenic Risk Calculations.

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	8.86E-04	1.00			6.51E-06	0.01			NA	8.09E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50	4.03E-07	1.00	6.04E-07	80%	8.88E-08	0.90	1.48E-07	20%	4.00E-03	3.68E-07	1.47E-09	0%	7.53E-07
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.28E-06	1.00			1.68E-07	0.05			1.20E-02	2.08E-06	2.50E-08	100%	2.50E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.31E-06	1.00			2.43E-07	0.60			NA	3.02E-06			
Iron	NA	3.24E-03	1.00			2.38E-04	0.05			NA	2.96E-03			
Lead	NA	1.66E-06	0.00			NA	0.00			NA	1.51E-06			
Magnesium	NA	0.00E+00	0.00			#VALUE!	0.00			NA	0.00E+00			
Manganese	NA	3.85E-05	1.00			2.83E-07	0.05			NA	3.51E-05			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			NA	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			NA	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			#VALUE!	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.23E-06	1.00			3.85E-07	0.10			NA	4.78E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30	8.05E-08	1.00	5.88E-07	46%	7.69E-08	0.80	7.02E-07	54%	1.70E-03	7.35E-08	1.25E-10	0%	1.29E-06
1,1 - Dichloroethane	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	0.05	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	0.01	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-06

MAJOR CONSTRUCTION WORKERS

Short-term Major Construction/Utility Worker - Subchronic Ingestion of chemicals in soil.

Intake (mg/kg-day) = (Cs x IR x CF x FI x EF)/(BW x AT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs (back-calculated)		
IR	Ingestion Rate (mg soil/day)	480	C	EPA default for workers involved in construction activities
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from contaminated area	1.00	NA	
EF	Exposure Frequency (# days during exposure period)	78	NA	6 d/wk for 3 month period
BW	Body weight (kg)	70	C	EPA 1989b
AT	Averaging Time (days)	91		3 month period
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value

Short-term Major Construction/Utility Worker - Subchronic Dermal contact with chemicals in soil.

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF)/(BW x AT)

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Skin surface area potentially in contact with dust/soil (cm2)	4900	C	25% of ave total body surface area (19400 cm2) (equivalent to hands, arms and part of head)
AF	Skin Adherence factor (mg/cm2)	0.3	C	Outdoor worker (Kissel et al., as cited in EPA 1995 Draft and EPA 1992)
ABS	Absorption factor	Chemical Specific		
EF	Exposure Frequency (# days during exposure period)	78	NA	6 d/wk for 3 month period
BW	Body Weight (kg)	70	C	
AT	Averaging time (days)	91		3 month period
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available

C = Central Tendency Value M = between Central Tendency and Upper Bound Values

U = Upper Bound Value

Calculation of soil saturation limit (volatilization model is only applicable if Cs is < Csat)

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Variable	Definition	Variable Utilized	Rationale/Reference
Csat	Soil Saturation Concentration (mg/kg)	Csat back-calculated	
Kd	Soil water partiction coefficient (l/kg) = Koc x OC	Site-Specific	
Koc	Organic carbon partition coefficient (l/kg)	Chemical Specific	
OC	Organic carbon content of soil	0.005	
S	Solubility in water (mg/l)	Chemical Specific	
B	Soil bulk density (kg/l)	1.5	EPA default (EPA 1993)
Pw	Water filled soil porosity (unitless) =Pt - Pa	0.15	
Pt	Total soil porosity (unitless) =1- B/Ps	0.43	
Ps	True soil density or particulate density (kg/l)	2.65	EPA default (EPA 1993)
Pa	Air-filled soil porosity (unitless) = Pt - O	0.28	EPA default (EPA 1993)
O	Average unsaturated zone soil gravimetric water content (L water/L soil) =Om x B/Dw	0.15	
Om	Average unsaturated zone soil gravimetric water content (kg water/kg soil)	0.1	
Dw	Density of water (kg water/L water)	1	
H	Henry's constant (atm - m3/mol)	Chemical Specific	
H'	Modified Henry's constant (atm-m3/mol) =41 x H	Chemical Specific	

Csat for each contaminant is the concentration at which the adsorptive limit of the soil plus the theorectical dissolution limit of the contaminant in the available soil moisture has been reached. Concentrations > Csat indicates "free phase" contaminants within the soil matrix. The equation presented here is a modification of the equation presented in Part B RAGS guidance. The above equation takes into account the amount of contaminant that is in vapor phase in the pore spaces of the soil.

Calculation of Volatilization Factor (VF)

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Variable	Definition	Variable Utilized	Rationale/Reference
VF	Volatilization Factor (m3/kg)	back-calculated	
(Q/C)	Inverse of the mean concentration at the center of a source (g/m2-s per kg/m3) (use site-specific area if available)	46	EPA Technical Background Document for SSIs (1996) Approx. 90th percentile for annual averages - - used in combination with only warmer months of the year.
Da	Apparent Diffusivity (cm2/s) = [((Pa^(10/3) x Di x H') + (Pw^(10/3) x Dw)) / Pt^2]/(B x Kd + Pw + Pa x H')	Chemical Specific	EPA Region IX PRG table
Pw	Water filled soil porosity = (Om x B)	0.15	Calculated
Pa	Air filled soil porosity =Pt - Pw	0.28	Calculated
Pt	Total soil porosity =1 - (B/Ps)	0.43	Calculated
Om	Soil moisture content (cm3-water/g-soil)	0.1	Default, use site specific if available.
B	Dry soil bulk density (g/cm3)	1.5	EPA Technical Background Document for SSIs (1996)
Ps	soil particle density (g/cm3)	2.65	EPA Technical Background Document for SSIs (1996)
Di	Diffusivity in air (cm2/s)	Chemical Specific	EPA Region IX PRG table
Dw	Diffusivity in water (cm2/s)	Chemical Specific	EPA Region IX PRG table
H	Henry's constant (atm - m3/mol)	Chemical Specific	EPA Region IX PRG table
H'	dimensionless Henry's constant = H x 41	Chemical Specific	Calculated
Kd	Soil-water partition coefficient (cm3/g) =Koc x Oc	Chemical Specific	Calculated
Koc	Organic carbon partition coefficient (cm3/g)	Chemical Specific	EPA Region IX PRG table
Oc	Organic carbon content of soil	0.005	Default, use site specific if available.
T	Exposure interval (s)	7.86E+06	Assumes 3 month exposure period

Short-term Major Construction/Utility Worker - Subchronic Air Concentration Estimation

Noncancer Evaluation: Air Conc (mg/m3) = [Cs x (1/VF + 1/PEF) x EF]/AT

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
1/VF	Inverse of the volatiliaztion factor (kg/m3)	Chemical specific calculation		EPA Methodology
1/PEF	Inverse of the particulate emission factor (kg/m3)	4.00E-08	NA	Assume construction conditions (activity occurring on bare excavated soil, etc.)
EF	Exposure Frequency (# days during exposure period)	78		6 d/wk for 3 month period
AT	Averaging time (days)	91		3 month period

NA = Not available

C = Central Tendency Value M = between Central Tendency and Upper Bound Values

U = Upper Bound Value

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	4190	480	1.00E-06	1.00	78	70	91	2.46E-02	25550	8.77E-05
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3.4	480	1.00E-06	1.00	78	70	91	2.00E-05	25550	7.12E-08
Barium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	13.6	480	1.00E-06	1.00	78	70	91	7.99E-05	25550	2.85E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	10.3	480	1.00E-06	1.00	78	70	91	6.05E-05	25550	2.16E-07
Iron	24300	480	1.00E-06	1.00	78	70	91	1.43E-01	25550	5.09E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	927	480	1.00E-06	1.00	78	70	91	5.45E-03	25550	1.94E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	4190.00	4900	1.00E-06	0.30	0.001	78	70	91	7.54E-05	25550	2.69E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3.40	4900	1.00E-06	0.30	0.030	78	70	91	1.84E-06	25550	6.54E-09
Barium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	13.60	4900	1.00E-06	0.30	0.010	78	70	91	2.45E-06	25550	8.72E-09
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	10.30	4900	1.00E-06	0.30	0.010	78	70	91	1.85E-06	25550	6.60E-09
Iron	24300.00	4900	1.00E-06	0.30	0.010	78	70	91	4.37E-03	25550	1.56E-05
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	927.00	4900	1.00E-06	0.30	0.001	78	70	91	1.67E-05	25550	5.94E-08
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	4190.00		0.00000004	78	91	1.44E-04	25550	5.12E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	3.40		0.00000004	78	91	1.17E-07	25550	4.15E-07
Barium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	13.60		0.00000004	78	91	4.66E-07	25550	1.66E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	10.30		0.00000004	78	91	3.53E-07	25550	1.26E-06
Iron	24300.00		0.00000004	78	91	8.33E-04	25550	2.97E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	927.00		0.00000004	78	91	3.18E-05	25550	1.13E-04
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.46E-02	1.00	0.025	77%	7.54E-05	0.01	0.008	23%	NA	1.44E-04			0.032
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.00E-05	1.00	0.067	91%	1.84E-06	0.90	0.007	9%	NA	1.17E-07			0.073
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	7.99E-05	1.00	0.004	13%	2.45E-06	0.05	0.002	8%	2.00E-05	4.66E-07	0.023	78%	0.030
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	6.05E-05	1.00	0.002	95%	1.85E-06	0.60	0.000	5%	NA	3.53E-07			0.002
Iron	3.00E-01	1.43E-01	1.00	0.476		4.37E-03	0.05	0.292		NA	8.33E-04			0.768
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	5.45E-03	1.00	0.039	94%	1.67E-05	0.05	0.002	6%	NA	3.18E-05			0.041
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.946

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	8.77E-05	1.00			2.69E-07	0.01			NA	5.12E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	7.12E-08	1.00	1.07E-07	89%	6.54E-09	0.90	1.09E-08	9%	4.00E-03	4.15E-07	1.66E-09	1%	1.19E-07
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.85E-07	1.00			8.72E-09	0.05			1.20E-02	1.66E-06	1.99E-08	100%	1.99E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.16E-07	1.00			6.60E-09	0.60			NA	1.26E-06			
Iron	NA	5.09E-04	1.00			1.56E-05	0.05			NA	2.97E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	1.94E-05	1.00			5.94E-08	0.05			NA	1.13E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.80	0.00E+00	#DIV/0!	1.70E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 1E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	5270	480	1.00E-06	1.00	78	70	91	3.10E-02	25550	1.10E-04
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	8.3	480	1.00E-06	1.00	78	70	91	4.88E-05	25550	1.74E-07
Barium	227	480	1.00E-06	1.00	78	70	91	1.33E-03	25550	4.75E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	11.3	480	1.00E-06	1.00	78	70	91	6.64E-05	25550	2.37E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	158	480	1.00E-06	1.00	78	70	91	9.29E-04	25550	3.31E-06
Iron	18000	480	1.00E-06	1.00	78	70	91	1.06E-01	25550	3.77E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	2230	480	1.00E-06	1.00	78	70	91	1.31E-02	25550	4.67E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	0.341	480	1.00E-06	1.00	78	70	91	2.00E-06	25550	7.14E-09
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.1	480	1.00E-06	1.00	78	70	91	2.41E-05	25550	8.58E-08
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	5270.00	4900	1.00E-06	0.30	0.001	78	70	91	9.49E-05	25550	3.38E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	8.30	4900	1.00E-06	0.30	0.030	78	70	91	4.48E-06	25550	1.60E-08
Barium	227.00	4900	1.00E-06	0.30	0.001	78	70	91	4.09E-06	25550	1.46E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	11.30	4900	1.00E-06	0.30	0.010	78	70	91	2.03E-06	25550	7.24E-09
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	158.00	4900	1.00E-06	0.30	0.010	78	70	91	2.84E-05	25550	1.01E-07
Iron	18000.00	4900	1.00E-06	0.30	0.010	78	70	91	3.24E-03	25550	1.15E-05
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	2230.00	4900	1.00E-06	0.30	0.001	78	70	91	4.01E-05	25550	1.43E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.34	4900	1.00E-06	0.30	0.130	78	70	91	7.98E-07	25550	2.84E-09
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.10	4900	1.00E-06	0.30	0.050	78	70	91	3.69E-06	25550	1.31E-08
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	5270.00		0.00000004	78	91	1.81E-04	25550	6.44E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	8.30		0.00000004	78	91	2.85E-07	25550	1.01E-06
Barium	227.00		0.00000004	78	91	7.78E-06	25550	2.77E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	11.30		0.00000004	78	91	3.87E-07	25550	1.38E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	158.00		0.00000004	78	91	5.42E-06	25550	1.93E-05
Iron	18000.00		0.00000004	78	91	6.17E-04	25550	2.20E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	2230.00		0.00000004	78	91	7.65E-05	25550	2.72E-04
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.34		0.00000004	78	91	1.17E-08	25550	4.16E-08
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	4.10	6.78E-03	0.00000004	78	91	2.38E-02	25550	8.48E-02
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.10E-02	1.00	0.031	77%	9.49E-05	0.01	0.009	23%	NA	1.81E-04			0.040
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	4.88E-05	1.00	0.163	91%	4.48E-06	0.90	0.017	9%	NA	2.85E-07			0.179
Barium	7.00E-02	1.33E-03	1.00	0.019	87%	4.09E-06	0.05	0.001	5%	5.00E-03	7.78E-06	0.002	7%	0.022
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	6.64E-05	1.00	0.003	13%	2.03E-06	0.05	0.002	8%	2.00E-05	3.87E-07	0.019	78%	0.025
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	9.29E-04	1.00	0.025	95%	2.84E-05	0.60	0.001	5%	NA	5.42E-06			0.026
Iron	3.00E-01	1.06E-01	1.00	0.353		3.24E-03	0.05	0.216		NA	6.17E-04			0.569
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	1.31E-02	1.00	0.094	94%	4.01E-05	0.05	0.006	6%	NA	7.65E-05			0.099
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	2.00E-06	1.00			7.98E-07	0.80			NA	1.17E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	2.41E-05	1.00			3.69E-06	0.90			NA	2.38E-02			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.

Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.961

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.10E-04	1.00			3.38E-07	0.01			NA	6.44E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	1.74E-07	1.00	2.61E-07	89%	1.60E-08	0.90	2.66E-08	9%	4.00E-03	1.01E-06	4.05E-09	1%	2.91E-07
Barium	NA	4.75E-06	1.00			1.46E-08	0.05			NA	2.77E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.37E-07	1.00			7.24E-09	0.05			1.20E-02	1.38E-06	1.66E-08	100%	1.66E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.31E-06	1.00			1.01E-07	0.60			NA	1.93E-05			
Iron	NA	3.77E-04	1.00			1.15E-05	0.05			NA	2.20E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	4.67E-05	1.00			1.43E-07	0.05			NA	2.72E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	7.14E-09	1.00	5.21E-08	67%	2.84E-09	0.80	2.59E-08	33%	1.70E-03	4.16E-08	7.08E-11	0%	7.81E-08
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	8.58E-08	1.00	9.44E-10	1%	1.31E-08	0.90	1.61E-10	0%	1.70E-06	8.48E-02	1.44E-07	99%	1.45E-07
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 5E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	6370	480	1.00E-06	1.00	78	70	91	3.74E-02	25550	1.33E-04
Antimony	105	480	1.00E-06	1.00	78	70	91	6.17E-04	25550	2.20E-06
Arsenic	6.6	480	1.00E-06	1.00	78	70	91	3.88E-05	25550	1.38E-07
Barium	327	480	1.00E-06	1.00	78	70	91	1.92E-03	25550	6.85E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	5.3	480	1.00E-06	1.00	78	70	91	3.12E-05	25550	1.11E-07
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	114	480	1.00E-06	1.00	78	70	91	6.70E-04	25550	2.39E-06
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	1290	480	1.00E-06	1.00	78	70	91	7.58E-03	25550	2.70E-05
Iron	275000	480	1.00E-06	1.00	78	70	91	1.62E+00	25550	5.76E-03
Lead	453	480	1.00E-06	1.00	78	70	91	2.66E-03	25550	9.48E-06
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	20700	480	1.00E-06	1.00	78	70	91	1.22E-01	25550	4.33E-04
Mercury (inorganic)	0.19	480	1.00E-06	1.00	78	70	91	1.12E-06	25550	3.98E-09
Nickel	142	480	1.00E-06	1.00	78	70	91	8.35E-04	25550	2.97E-06
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	32.9	480	1.00E-06	1.00	78	70	91	1.93E-04	25550	6.89E-07
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	3.17	480	1.00E-06	1.00	78	70	91	1.86E-05	25550	6.64E-08
1,1 - Dichloroethane	34	480	1.00E-06	1.00	78	70	91	2.00E-04	25550	7.12E-07
1,2 - Dichloroethylene (mixed isomers)	1.8	480	1.00E-06	1.00	78	70	91	1.06E-05	25550	3.77E-08
Ethyl benzene	140	480	1.00E-06	1.00	78	70	91	8.23E-04	25550	2.93E-06
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	3500	480	1.00E-06	1.00	78	70	91	2.06E-02	25550	7.33E-05
Naphthalene	2.7	480	1.00E-06	1.00	78	70	91	1.59E-05	25550	5.65E-08
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200	480	1.00E-06	1.00	78	70	91	7.05E-03	25550	2.51E-05
Toluene	190	480	1.00E-06	1.00	78	70	91	1.12E-03	25550	3.98E-06
1,1,1 - Trichloroethane	2600	480	1.00E-06	1.00	78	70	91	1.53E-02	25550	5.44E-05
Trichloroethylene (TCE)	120	480	1.00E-06	1.00	78	70	91	7.05E-04	25550	2.51E-06
Xylenes (mixed)	580	480	1.00E-06	1.00	78	70	91	3.41E-03	25550	1.21E-05

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	6370.00	4900	1.00E-06	0.30	0.001	78	70	91	1.15E-04	25550	4.08E-07
Antimony	105.00	4900	1.00E-06	0.30	0.001	78	70	91	1.89E-06	25550	6.73E-09
Arsenic	6.60	4900	1.00E-06	0.30	0.030	78	70	91	3.56E-06	25550	1.27E-08
Barium	327.00	4900	1.00E-06	0.30	0.001	78	70	91	5.89E-06	25550	2.10E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	5.30	4900	1.00E-06	0.30	0.010	78	70	91	9.54E-07	25550	3.40E-09
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	114.00	4900	1.00E-06	0.30	0.010	78	70	91	2.05E-05	25550	7.31E-08
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	1290.00	4900	1.00E-06	0.30	0.010	78	70	91	2.32E-04	25550	8.27E-07
Iron	275000.00	4900	1.00E-06	0.30	0.010	78	70	91	4.95E-02	25550	1.76E-04
Lead	453.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	20700.00	4900	1.00E-06	0.30	0.001	78	70	91	3.73E-04	25550	1.33E-06
Mercury (inorganic)	0.19	4900	1.00E-06	0.30	0.050	78	70	91	1.71E-07	25550	6.09E-10
Nickel	142.00	4900	1.00E-06	0.30	0.010	78	70	91	2.56E-05	25550	9.10E-08
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	32.90	4900	1.00E-06	0.30	0.010	78	70	91	5.92E-06	25550	2.11E-08
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	3.17	4900	1.00E-06	0.30	0.130	78	70	91	7.42E-06	25550	2.64E-08
1,1 - Dichloroethane	34.00	4900	1.00E-06	0.30	0.050	78	70	91	3.06E-05	25550	1.09E-07
1,2 - Dichloroethylene (mixed isomers)	1.80	4900	1.00E-06	0.30	0.050	78	70	91	1.62E-06	25550	5.77E-09
Ethyl benzene	140.00	4900	1.00E-06	0.30	0.050	78	70	91	1.26E-04	25550	4.49E-07
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	3500.00	4900	1.00E-06	0.30	0.100	78	70	91	6.30E-03	25550	2.24E-05
Naphthalene	2.70	4900	1.00E-06	0.30	0.050	78	70	91	2.43E-06	25550	8.65E-09
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.00	4900	1.00E-06	0.30	0.050	78	70	91	1.08E-03	25550	3.85E-06
Toluene	190.00	4900	1.00E-06	0.30	0.050	78	70	91	1.71E-04	25550	6.09E-07
1,1,1 - Trichloroethane	2600.00	4900	1.00E-06	0.30	0.050	78	70	91	2.34E-03	25550	8.33E-06
Trichloroethylene (TCE)	120.00	4900	1.00E-06	0.30	0.050	78	70	91	1.08E-04	25550	3.85E-07
Xylenes (mixed)	580.00	4900	1.00E-06	0.30	0.050	78	70	91	5.22E-04	25550	1.86E-06

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	6370.00		0.00000004	78	91	2.18E-04	25550	7.78E-04
Antimony	105.00		0.00000004	78	91	3.60E-06	25550	1.28E-05
Arsenic	6.60		0.00000004	78	91	2.26E-07	25550	8.06E-07
Barium	327.00		0.00000004	78	91	1.12E-05	25550	3.99E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	5.30		0.00000004	78	91	1.82E-07	25550	6.47E-07
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	114.00		0.00000004	78	91	3.91E-06	25550	1.39E-05
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	1290.00		0.00000004	78	91	4.42E-05	25550	1.58E-04
Iron	275000.00		0.00000004	78	91	9.43E-03	25550	3.36E-02
Lead	453.00		0.00000004	78	91	1.55E-05	25550	5.53E-05
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	20700.00		0.00000004	78	91	7.10E-04	25550	2.53E-03
Mercury (inorganic)	0.19	5.02E-04	0.00000004	78	91	8.18E-05	25550	2.91E-04
Nickel	142.00		0.00000004	78	91	4.87E-06	25550	1.73E-05
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	32.90		0.00000004	78	91	1.13E-06	25550	4.02E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	3.17		0.00000004	78	91	1.09E-07	25550	3.87E-07
1,1 - Dichloroethane	34.00	6.18E-03	0.00000004	78	91	1.80E-01	25550	6.41E-01
1,2 - Dichloroethylene (mixed isomers)	1.80	6.05E-03	0.00000004	78	91	9.34E-03	25550	3.33E-02
Ethyl benzene	140.00	4.38E-03	0.00000004	78	91	5.26E-01	25550	1.87E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	3500.00	8.68E-04	0.00000004	78	91	2.61E+00	25550	9.28E+00
Naphthalene	2.70	4.21E-04	0.00000004	78	91	9.74E-04	25550	3.47E-03
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	1200.00	5.54E-03	0.00000004	78	91	5.70E+00	25550	2.03E+01
Toluene	190.00	5.04E-03	0.00000004	78	91	8.21E-01	25550	2.92E+00
1,1,1 - Trichloroethane	2600.00	7.32E-03	0.00000004	78	91	1.63E+01	25550	5.81E+01
Trichloroethylene (TCE)	120.00	6.78E-03	0.00000004	78	91	6.97E-01	25550	2.48E+00
Xylenes (mixed)	580.00	3.75E-03	0.00000004	78	91	1.87E+00	25550	6.65E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.74E-02	1.00	0.037	77%	1.15E-04	0.01	0.011	23%	NA	2.18E-04			0.049
Antimony	4.00E-04	6.17E-04	1.00	1.543	93%	1.89E-06	0.05	0.095	6%	2.00E-04	3.60E-06	0.018	1%	1.655
Arsenic	3.00E-04	3.88E-05	1.00	0.129	91%	3.56E-06	0.90	0.013	9%	NA	2.26E-07			0.143
Barium	7.00E-02	1.92E-03	1.00	0.027	87%	5.89E-06	0.05	0.002	5%	5.00E-03	1.12E-05	0.002	7%	0.031
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	3.12E-05	1.00	0.031	94%	9.54E-07	1.00	0.001	3%	2.00E-04	1.82E-07	0.001	3%	0.033
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	6.70E-04	1.00	0.034	13%	2.05E-05	0.05	0.021	8%	2.00E-05	3.91E-06	0.195	78%	0.249
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	7.58E-03	1.00	0.205	95%	2.32E-04	0.60	0.010	5%	NA	4.42E-05			0.215
Iron	3.00E-01	1.62E+00	1.00	5.388		4.95E-02	0.05	3.300		NA	9.43E-03			8.688
Lead	NA	2.66E-03	0.00			NA	0.00			NA	1.55E-05			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	1.22E-01	1.00	0.869	94%	3.73E-04	0.05	0.053	6%	NA	7.10E-04			0.922
Mercury (inorganic)	3.00E-03	1.12E-06	1.00	0.000	0%	1.71E-07	0.20	0.000	0%	3.00E-04	8.18E-05	0.273	100%	0.273
Nickel	2.00E-02	8.35E-04	1.00	0.042	62%	2.56E-05	0.05	0.026	38%	NA	4.87E-06			0.067
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.93E-04	1.00	0.028	77%	5.92E-06	0.10	0.008	23%	NA	1.13E-06			0.036
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	1.86E-05	1.00			7.42E-06	0.80			NA	1.09E-07			
1,1 - Dichloroethane	1.00E-01	2.00E-04	1.00	0.002	5%	3.06E-05	0.90	0.000	1%	5.00E+00	1.80E-01	0.036	94%	0.038
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	1.06E-05	1.00	0.001	4%	1.62E-06	0.90	0.000	1%	3.50E-01	9.34E-03	0.027	95%	0.028
Ethyl benzene	1.00E-01	8.23E-04	1.00	0.008	2%	1.26E-04	0.85	0.001	0%	1.00E+00	5.26E-01	0.526	98%	0.536
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	2.06E-02	1.00	0.034	1%	6.30E-03	0.90	0.012	0%	1.00E+00	2.61E+00	2.605	98%	2.651
Naphthalene	2.00E-02	1.59E-05	1.00	0.001	2%	2.43E-06	0.80	0.000	0%	3.00E-02	9.74E-04	0.032	97%	0.033
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	7.05E-03	1.00	0.705	85%	1.08E-03	0.90	0.120	15%	NA	5.70E+00			0.825
Toluene	2.00E-01	1.12E-03	1.00	0.006	1%	1.71E-04	0.90	0.001	0%	1.00E+00	8.21E-01	0.821	99%	0.827
1,1,1 - Trichloroethane	2.00E-02	1.53E-02	1.00	0.764	12%	2.34E-03	0.90	0.130	2%	3.00E+00	1.63E+01	5.436	86%	6.330
Trichloroethylene (TCE)	NA	7.05E-04	1.00			1.08E-04	0.90			NA	6.97E-01			
Xylenes (mixed)	2.00E+00	3.41E-03	1.00	0.002	0%	5.22E-04	0.90	0.000	0%	3.00E-01	1.87E+00	6.222	100%	6.224

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 29.855

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.33E-04	1.00			4.08E-07	0.01			NA	7.78E-04			
Antimony	NA	2.20E-06	1.00			6.73E-09	0.05			NA	1.28E-05			
Arsenic	1.50E+00	1.38E-07	1.00	2.07E-07	89%	1.27E-08	0.90	2.12E-08	9%	4.00E-03	8.06E-07	3.22E-09	1%	2.32E-07
Barium	NA	6.85E-06	1.00			2.10E-08	0.05			NA	3.99E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	1.11E-07	1.00			3.40E-09	1.00			1.80E-03	6.47E-07	1.16E-09	100%	1.16E-09
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.39E-06	1.00			7.31E-08	0.05			1.20E-02	1.39E-05	1.67E-07	100%	1.67E-07
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.70E-05	1.00			8.27E-07	0.60			NA	1.58E-04			
Iron	NA	5.76E-03	1.00			1.76E-04	0.05			NA	3.36E-02			
Lead	NA	9.48E-06	0.00			NA	0.00			NA	5.53E-05			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	4.33E-04	1.00			1.33E-06	0.05			NA	2.53E-03			
Mercury (inorganic)	NA	3.98E-09	1.00			6.09E-10	0.20			NA	2.91E-04			
Nickel	NA	2.97E-06	1.00			9.10E-08	0.05			4.80E-04	1.73E-05	8.32E-09	100%	8.32E-09
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	6.89E-07	1.00			2.11E-08	0.10			NA	4.02E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	6.64E-08	1.00	4.84E-07	67%	2.64E-08	0.80	2.41E-07	33%	1.70E-03	3.87E-07	6.58E-10	0%	7.26E-07
1,1 - Dichloroethane	5.70E-03	7.12E-07	1.00	4.06E-09	0%	1.09E-07	0.90	6.90E-10	0%	1.60E-06	6.41E-01	1.03E-06	100%	1.03E-06
1,2 - Dichloroethylene (mixed isomers)	NA	3.77E-08	1.00			5.77E-09	0.90			NA	3.33E-02			
Ethyl benzene	NA	2.93E-06	1.00			4.49E-07	0.85			NA	1.87E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	7.33E-05	1.00			2.24E-05	0.90			NA	9.28E+00			
Naphthalene	NA	5.65E-08	1.00			8.65E-09	0.80			NA	3.47E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	2.51E-05	1.00	1.31E-06	10%	3.85E-06	0.90	2.22E-07	2%	5.80E-07	2.03E+01	1.18E-05	89%	1.33E-05
Toluene	NA	3.98E-06	1.00			6.09E-07	0.90			NA	2.92E+00			
1,1,1 - Trichloroethane	NA	5.44E-05	1.00			8.33E-06	0.90			NA	5.81E+01			
Trichloroethylene (TCE)	1.10E-02	2.51E-06	1.00	2.76E-08	1%	3.85E-07	0.90	4.70E-09	0%	1.70E-06	2.48E+00	4.22E-06	99%	4.25E-06
Xylenes (mixed)	NA	1.21E-05	1.00			1.86E-06	0.90			NA	6.65E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-05

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	6830	480	1.00E-06	1.00	78	70	91	4.01E-02	25550	1.43E-04
Antimony	2.3	480	1.00E-06	1.00	78	70	91	1.35E-05	25550	4.81E-08
Arsenic	11.4	480	1.00E-06	1.00	78	70	91	6.70E-05	25550	2.39E-07
Barium	306	480	1.00E-06	1.00	78	70	91	1.80E-03	25550	6.41E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	22.6	480	1.00E-06	1.00	78	70	91	1.33E-04	25550	4.73E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	1900	480	1.00E-06	1.00	78	70	91	1.12E-02	25550	3.98E-05
Iron	38100	480	1.00E-06	1.00	78	70	91	2.24E-01	25550	7.98E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	5950	480	1.00E-06	1.00	78	70	91	3.50E-02	25550	1.25E-04
Mercury (inorganic)	0.12	480	1.00E-06	1.00	78	70	91	7.05E-07	25550	2.51E-09
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	26.1	480	1.00E-06	1.00	78	70	91	1.53E-04	25550	5.46E-07
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	60.7	480	1.00E-06	1.00	78	70	91	3.57E-04	25550	1.27E-06
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14	480	1.00E-06	1.00	78	70	91	8.23E-05	25550	2.93E-07
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	160	480	1.00E-06	1.00	78	70	91	9.40E-04	25550	3.35E-06

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	1.1	480	1.00E-06	1.00	78	70	91	6.47E-06	25550	2.30E-08
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	130	480	1.00E-06	1.00	78	70	91	7.64E-04	25550	2.72E-06
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96	480	1.00E-06	1.00	78	70	91	5.64E-04	25550	2.01E-06
Xylenes (mixed)	28	480	1.00E-06	1.00	78	70	91	1.65E-04	25550	5.86E-07

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	6830.00	4900	1.00E-06	0.30	0.001	78	70	91	1.23E-04	25550	4.38E-07
Antimony	2.30	4900	1.00E-06	0.30	0.001	78	70	91	4.14E-08	25550	1.47E-10
Arsenic	11.40	4900	1.00E-06	0.30	0.030	78	70	91	6.16E-06	25550	2.19E-08
Barium	306.00	4900	1.00E-06	0.30	0.001	78	70	91	5.51E-06	25550	1.96E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	22.60	4900	1.00E-06	0.30	0.010	78	70	91	4.07E-06	25550	1.45E-08
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	1900.00	4900	1.00E-06	0.30	0.010	78	70	91	3.42E-04	25550	1.22E-06
Iron	38100.00	4900	1.00E-06	0.30	0.010	78	70	91	6.86E-03	25550	2.44E-05
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	5950.00	4900	1.00E-06	0.30	0.001	78	70	91	1.07E-04	25550	3.81E-07
Mercury (inorganic)	0.12	4900	1.00E-06	0.30	0.050	78	70	91	1.08E-07	25550	3.85E-10
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	26.10	4900	1.00E-06	0.30	0.010	78	70	91	4.70E-06	25550	1.67E-08
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	60.70	4900	1.00E-06	0.30	0.130	78	70	91	1.42E-04	25550	5.06E-07
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14.00	4900	1.00E-06	0.30	0.050	78	70	91	1.26E-05	25550	4.49E-08
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	160.00	4900	1.00E-06	0.30	0.130	78	70	91	3.74E-04	25550	1.33E-06

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	1.10	4900	1.00E-06	0.30	0.050	78	70	91	9.90E-07	25550	3.53E-09
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	130.00	4900	1.00E-06	0.30	0.100	78	70	91	2.34E-04	25550	8.33E-07
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96.00	4900	1.00E-06	0.30	0.050	78	70	91	8.64E-05	25550	3.08E-07
Xylenes (mixed)	28.00	4900	1.00E-06	0.30	0.050	78	70	91	2.52E-05	25550	8.98E-08

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	6830.00		0.00000004	78	91	2.34E-04	25550	8.34E-04
Antimony	2.30		0.00000004	78	91	7.89E-08	25550	2.81E-07
Arsenic	11.40		0.00000004	78	91	3.91E-07	25550	1.39E-06
Barium	306.00		0.00000004	78	91	1.05E-05	25550	3.74E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	22.60		0.00000004	78	91	7.75E-07	25550	2.76E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	1900.00		0.00000004	78	91	6.51E-05	25550	2.32E-04
Iron	38100.00		0.00000004	78	91	1.31E-03	25550	4.65E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	5950.00		0.00000004	78	91	2.04E-04	25550	7.27E-04
Mercury (inorganic)	0.12	5.02E-04	0.00000004	78	91	5.17E-05	25550	1.84E-04
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	26.10		0.00000004	78	91	8.95E-07	25550	3.19E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	60.70		0.00000004	78	91	2.08E-06	25550	7.41E-06
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	14.00	6.05E-03	0.00000004	78	91	7.26E-02	25550	2.59E-01
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	160.00	8.79E-06	0.00000004	78	91	1.21E-03	25550	4.32E-03
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	1.10	4.21E-04	0.00000004	78	91	3.97E-04	25550	1.41E-03
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	130.00	5.93E-06	0.00000004	78	91	6.65E-04	25550	2.37E-03
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	96.00	6.78E-03	0.00000004	78	91	5.58E-01	25550	1.99E+00
Xylenes (mixed)	28.00	3.75E-03	0.00000004	78	91	9.01E-02	25550	3.21E-01

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	4.01E-02	1.00	0.040	77%	1.23E-04	0.01	0.012	23%	NA	2.34E-04			0.052
Antimony	4.00E-04	1.35E-05	1.00	0.034	93%	4.14E-08	0.05	0.002	6%	2.00E-04	7.89E-08	0.000	1%	0.036
Arsenic	3.00E-04	6.70E-05	1.00	0.223	91%	6.16E-06	0.90	0.023	9%	NA	3.91E-07			0.246
Barium	7.00E-02	1.80E-03	1.00	0.026	87%	5.51E-06	0.05	0.002	5%	5.00E-03	1.05E-05	0.002	7%	0.029
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	1.33E-04	1.00	0.007	13%	4.07E-06	0.05	0.004	8%	2.00E-05	7.75E-07	0.039	78%	0.049
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.12E-02	1.00	0.302	95%	3.42E-04	0.60	0.015	5%	NA	6.51E-05			0.317
Iron	3.00E-01	2.24E-01	1.00	0.746		6.86E-03	0.05	0.457		NA	1.31E-03			1.204
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	3.50E-02	1.00	0.250	94%	1.07E-04	0.05	0.015	6%	NA	2.04E-04			0.265
Mercury (inorganic)	3.00E-03	7.05E-07	1.00	0.000	0%	1.08E-07	0.20	0.000	0%	3.00E-04	5.17E-05	0.172	100%	0.173
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.53E-04	1.00	0.022	77%	4.70E-06	0.10	0.007	23%	NA	8.95E-07			0.029
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	3.57E-04	1.00			1.42E-04	0.80			NA	2.08E-06			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	8.23E-05	1.00	0.009	4%	1.26E-05	0.90	0.002	1%	3.50E-01	7.26E-02	0.207	95%	0.218
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	9.40E-04	0.80	0.019	60%	3.74E-04	0.80	0.012	37%	1.40E+00	1.21E-03	0.001	3%	0.031
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	6.47E-06	1.00	0.000	2%	9.90E-07	0.80	0.000	0%	3.00E-02	3.97E-04	0.013	97%	0.014
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	7.64E-04	0.80	0.020	66%	2.34E-04	0.80	0.010	32%	1.10E+00	6.65E-04	0.001	2%	0.031
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	5.64E-04	1.00			8.64E-05	0.90			NA	5.58E-01			
Xylenes (mixed)	2.00E+00	1.65E-04	1.00	0.000	0%	2.52E-05	0.90	0.000	0%	3.00E-01	9.01E-02	0.300	100%	0.300

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.

Chronic toxicity values, if available, were utilized as surrogate values:

SCREENING HI = 2.995

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.43E-04	1.00			4.38E-07	0.01			NA	8.34E-04			
Antimony	NA	4.81E-08	1.00			1.47E-10	0.05			NA	2.81E-07			
Arsenic	1.50E+00	2.39E-07	1.00	3.58E-07	89%	2.19E-08	0.90	3.65E-08	9%	4.00E-03	1.39E-06	5.57E-09	1%	4.00E-07
Barium	NA	6.41E-06	1.00			1.96E-08	0.05			NA	3.74E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	4.73E-07	1.00			1.45E-08	0.05			1.20E-02	2.76E-06	3.31E-08	100%	3.31E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.98E-05	1.00			1.22E-06	0.60			NA	2.32E-04			
Iron	NA	7.98E-04	1.00			2.44E-05	0.05			NA	4.65E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	1.25E-04	1.00			3.81E-07	0.05			NA	7.27E-04			
Mercury (inorganic)	NA	2.51E-09	1.00			3.85E-10	0.20			NA	1.84E-04			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.46E-07	1.00			1.67E-08	0.10			NA	3.19E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	1.27E-06	1.00	9.28E-06	67%	5.06E-07	0.80	4.62E-06	33%	1.70E-03	7.41E-06	1.26E-08	0%	1.39E-05
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	2.93E-07	1.00			4.49E-08	0.90			NA	2.59E-01			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	3.35E-06	0.80			1.33E-06	0.80			NA	4.32E-03			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	2.30E-08	1.00			3.53E-09	0.80			NA	1.41E-03			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	2.72E-06	0.80			8.33E-07	0.80			NA	2.37E-03			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	2.01E-06	1.00	2.21E-08	1%	3.08E-07	0.90	3.76E-09	0%	1.70E-06	1.99E+00	3.38E-06	99%	3.40E-06
Xylenes (mixed)	NA	5.86E-07	1.00			8.98E-08	0.90			NA	3.21E-01			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-05

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	4580	480	1.00E-06	1.00	78	70	91	2.69E-02	25550	9.59E-05
Antimony	2.3	480	1.00E-06	1.00	78	70	91	1.35E-05	25550	4.81E-08
Arsenic	9.4	480	1.00E-06	1.00	78	70	91	5.52E-05	25550	1.97E-07
Barium	197	480	1.00E-06	1.00	78	70	91	1.16E-03	25550	4.12E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	12.8	480	1.00E-06	1.00	78	70	91	7.52E-05	25550	2.68E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	43.1	480	1.00E-06	1.00	78	70	91	2.53E-04	25550	9.02E-07
Iron	12300	480	1.00E-06	1.00	78	70	91	7.23E-02	25550	2.57E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1560	480	1.00E-06	1.00	78	70	91	9.17E-03	25550	3.27E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	24.6	480	1.00E-06	1.00	78	70	91	1.45E-04	25550	5.15E-07
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	0.759	480	1.00E-06	1.00	78	70	91	4.46E-06	25550	1.59E-08
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	4580.00	4900	1.00E-06	0.30	0.001	78	70	91	8.24E-05	25550	2.94E-07
Antimony	2.30	4900	1.00E-06	0.30	0.001	78	70	91	4.14E-08	25550	1.47E-10
Arsenic	9.40	4900	1.00E-06	0.30	0.030	78	70	91	5.08E-06	25550	1.81E-08
Barium	197.00	4900	1.00E-06	0.30	0.001	78	70	91	3.55E-06	25550	1.26E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	12.80	4900	1.00E-06	0.30	0.010	78	70	91	2.30E-06	25550	8.21E-09
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	43.10	4900	1.00E-06	0.30	0.010	78	70	91	7.76E-06	25550	2.76E-08
Iron	12300.00	4900	1.00E-06	0.30	0.010	78	70	91	2.21E-03	25550	7.89E-06
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1560.00	4900	1.00E-06	0.30	0.001	78	70	91	2.81E-05	25550	1.00E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	24.60	4900	1.00E-06	0.30	0.010	78	70	91	4.43E-06	25550	1.58E-08
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.76	4900	1.00E-06	0.30	0.130	78	70	91	1.78E-06	25550	6.33E-09
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	4580.00		0.00000004	78	91	1.57E-04	25550	5.59E-04
Antimony	2.30		0.00000004	78	91	7.89E-08	25550	2.81E-07
Arsenic	9.40		0.00000004	78	91	3.22E-07	25550	1.15E-06
Barium	197.00		0.00000004	78	91	6.75E-06	25550	2.41E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	12.80		0.00000004	78	91	4.39E-07	25550	1.56E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	43.10		0.00000004	78	91	1.48E-06	25550	5.26E-06
Iron	12300.00		0.00000004	78	91	4.22E-04	25550	1.50E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	1560.00		0.00000004	78	91	5.35E-05	25550	1.90E-04
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	24.60		0.00000004	78	91	8.43E-07	25550	3.00E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.76		0.00000004	78	91	2.60E-08	25550	9.27E-08
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.69E-02	1.00	0.027	77%	8.24E-05	0.01	0.008	23%	NA	1.57E-04			0.035
Antimony	4.00E-04	1.35E-05	1.00	0.034	93%	4.14E-08	0.05	0.002	6%	2.00E-04	7.89E-08	0.000	1%	0.036
Arsenic	3.00E-04	5.52E-05	1.00	0.184	91%	5.08E-06	0.90	0.019	9%	NA	3.22E-07			0.203
Barium	7.00E-02	1.16E-03	1.00	0.017	87%	3.55E-06	0.05	0.001	5%	5.00E-03	6.75E-06	0.001	7%	0.019
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	7.52E-05	1.00	0.004	13%	2.30E-06	0.05	0.002	8%	2.00E-05	4.39E-07	0.022	78%	0.028
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	2.53E-04	1.00	0.007	95%	7.76E-06	0.60	0.000	5%	NA	1.48E-06			0.007
Iron	3.00E-01	7.23E-02	1.00	0.241		2.21E-03	0.05	0.148		NA	4.22E-04			0.389
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	9.17E-03	1.00	0.065	94%	2.81E-05	0.05	0.004	6%	NA	5.35E-05			0.070
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.45E-04	1.00	0.021	77%	4.43E-06	0.10	0.006	23%	NA	8.43E-07			0.027
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	4.46E-06	1.00			1.78E-06	0.80			NA	2.60E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.814

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	9.59E-05	1.00			2.94E-07	0.01			NA	5.59E-04			
Antimony	NA	4.81E-08	1.00			1.47E-10	0.05			NA	2.81E-07			
Arsenic	1.50E+00	1.97E-07	1.00	2.95E-07	89%	1.81E-08	0.90	3.01E-08	9%	4.00E-03	1.15E-06	4.59E-09	1%	3.30E-07
Barium	NA	4.12E-06	1.00			1.26E-08	0.05			NA	2.41E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	2.68E-07	1.00			8.21E-09	0.05			1.20E-02	1.56E-06	1.88E-08	100%	1.88E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	9.02E-07	1.00			2.76E-08	0.60			NA	5.26E-06			
Iron	NA	2.57E-04	1.00			7.89E-06	0.05			NA	1.50E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	3.27E-05	1.00			1.00E-07	0.05			NA	1.90E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	5.15E-07	1.00			1.58E-08	0.10			NA	3.00E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	1.59E-08	1.00	1.16E-07	67%	6.33E-09	0.80	5.77E-08	33%	1.70E-03	9.27E-08	1.58E-10	0%	1.74E-07
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 5E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	3960	480	1.00E-06	1.00	78	70	91	2.33E-02	25550	8.29E-05
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3	480	1.00E-06	1.00	78	70	91	1.76E-05	25550	6.28E-08
Barium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	7.8	480	1.00E-06	1.00	78	70	91	4.58E-05	25550	1.63E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	11.5	480	1.00E-06	1.00	78	70	91	6.76E-05	25550	2.41E-07
Iron	9910	480	1.00E-06	1.00	78	70	91	5.82E-02	25550	2.07E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	747	480	1.00E-06	1.00	78	70	91	4.39E-03	25550	1.56E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	0.4	480	1.00E-06	1.00	78	70	91	2.35E-06	25550	8.37E-09
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	3960.00	4900	1.00E-06	0.30	0.001	78	70	91	7.13E-05	25550	2.54E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3.00	4900	1.00E-06	0.30	0.030	78	70	91	1.62E-06	25550	5.77E-09
Barium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	7.80	4900	1.00E-06	0.30	0.010	78	70	91	1.40E-06	25550	5.00E-09
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	11.50	4900	1.00E-06	0.30	0.010	78	70	91	2.07E-06	25550	7.37E-09
Iron	9910.00	4900	1.00E-06	0.30	0.010	78	70	91	1.78E-03	25550	6.35E-06
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	747.00	4900	1.00E-06	0.30	0.001	78	70	91	1.34E-05	25550	4.79E-08
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.40	4900	1.00E-06	0.30	0.130	78	70	91	9.36E-07	25550	3.33E-09
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	3960.00		0.00000004	78	91	1.36E-04	25550	4.84E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	3.00		0.00000004	78	91	1.03E-07	25550	3.66E-07
Barium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	7.80		0.00000004	78	91	2.67E-07	25550	9.52E-07
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	11.50		0.00000004	78	91	3.94E-07	25550	1.40E-06
Iron	9910.00		0.00000004	78	91	3.40E-04	25550	1.21E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	747.00		0.00000004	78	91	2.56E-05	25550	9.12E-05
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.40		0.00000004	78	91	1.37E-08	25550	4.88E-08
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.33E-02	1.00	0.023	77%	7.13E-05	0.01	0.007	23%	NA	1.36E-04			0.030
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	1.76E-05	1.00	0.059	91%	1.62E-06	0.90	0.006	9%	NA	1.03E-07			0.065
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	4.58E-05	1.00	0.002	13%	1.40E-06	0.05	0.001	8%	2.00E-05	2.67E-07	0.013	78%	0.017
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	6.76E-05	1.00	0.002	95%	2.07E-06	0.60	0.000	5%	NA	3.94E-07			0.002
Iron	3.00E-01	5.82E-02	1.00	0.194		1.78E-03	0.05	0.119		NA	3.40E-04			0.313
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	4.39E-03	1.00	0.031	94%	1.34E-05	0.05	0.002	6%	NA	2.56E-05			0.033
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	2.35E-06	1.00			9.36E-07	0.80			NA	1.37E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.461

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	8.29E-05	1.00			2.54E-07	0.01			NA	4.84E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	6.28E-08	1.00	9.42E-08	89%	5.77E-09	0.90	9.62E-09	9%	4.00E-03	3.66E-07	1.47E-09	1%	1.05E-07
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	1.63E-07	1.00			5.00E-09	0.05			1.20E-02	9.52E-07	1.14E-08	100%	1.14E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	2.41E-07	1.00			7.37E-09	0.60			NA	1.40E-06			
Iron	NA	2.07E-04	1.00			6.35E-06	0.05			NA	1.21E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	1.56E-05	1.00			4.79E-08	0.05			NA	9.12E-05			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	8.37E-09	1.00	6.11E-08	67%	3.33E-09	0.80	3.04E-08	33%	1.70E-03	4.88E-08	8.30E-11	0%	9.16E-08
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 2E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	5420	480	1.00E-06	1.00	78	70	91	3.19E-02	25550	1.13E-04
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	6	480	1.00E-06	1.00	78	70	91	3.53E-05	25550	1.26E-07
Barium	129	480	1.00E-06	1.00	78	70	91	7.58E-04	25550	2.70E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	4.3	480	1.00E-06	1.00	78	70	91	2.53E-05	25550	9.00E-08
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	43.2	480	1.00E-06	1.00	78	70	91	2.54E-04	25550	9.04E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	937	480	1.00E-06	1.00	78	70	91	5.51E-03	25550	1.96E-05
Iron	30100	480	1.00E-06	1.00	78	70	91	1.77E-01	25550	6.30E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1960	480	1.00E-06	1.00	78	70	91	1.15E-02	25550	4.10E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	21.4	480	1.00E-06	1.00	78	70	91	1.26E-04	25550	4.48E-07
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	1.59	480	1.00E-06	1.00	78	70	91	9.35E-06	25550	3.33E-08
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	5420.00	4900	1.00E-06	0.30	0.001	78	70	91	9.76E-05	25550	3.47E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	6.00	4900	1.00E-06	0.30	0.030	78	70	91	3.24E-06	25550	1.15E-08
Barium	129.00	4900	1.00E-06	0.30	0.001	78	70	91	2.32E-06	25550	8.27E-09
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	4.30	4900	1.00E-06	0.30	0.010	78	70	91	7.74E-07	25550	2.76E-09
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	43.20	4900	1.00E-06	0.30	0.010	78	70	91	7.78E-06	25550	2.77E-08
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	937.00	4900	1.00E-06	0.30	0.010	78	70	91	1.69E-04	25550	6.01E-07
Iron	30100.00	4900	1.00E-06	0.30	0.010	78	70	91	5.42E-03	25550	1.93E-05
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1960.00	4900	1.00E-06	0.30	0.001	78	70	91	3.53E-05	25550	1.26E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	21.40	4900	1.00E-06	0.30	0.010	78	70	91	3.85E-06	25550	1.37E-08
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	1.59	4900	1.00E-06	0.30	0.130	78	70	91	3.72E-06	25550	1.33E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	5420.00		0.00000004	78	91	1.86E-04	25550	6.62E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	6.00		0.00000004	78	91	2.06E-07	25550	7.33E-07
Barium	129.00		0.00000004	78	91	4.42E-06	25550	1.58E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	4.30		0.00000004	78	91	1.47E-07	25550	5.25E-07
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	43.20		0.00000004	78	91	1.48E-06	25550	5.28E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	937.00		0.00000004	78	91	3.21E-05	25550	1.14E-04
Iron	30100.00		0.00000004	78	91	1.03E-03	25550	3.68E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	1960.00		0.00000004	78	91	6.72E-05	25550	2.39E-04
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	21.40		0.00000004	78	91	7.34E-07	25550	2.61E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	1.59		0.00000004	78	91	5.45E-08	25550	1.94E-07
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.19E-02	1.00	0.032	77%	9.76E-05	0.01	0.010	23%	NA	1.86E-04			0.042
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	3.53E-05	1.00	0.118	91%	3.24E-06	0.90	0.012	9%	NA	2.06E-07			0.130
Barium	7.00E-02	7.58E-04	1.00	0.011	87%	2.32E-06	0.05	0.001	5%	5.00E-03	4.42E-06	0.001	7%	0.012
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	2.53E-05	1.00	0.025	94%	7.74E-07	1.00	0.001	3%	2.00E-04	1.47E-07	0.001	3%	0.027
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	2.54E-04	1.00	0.013	13%	7.78E-06	0.05	0.008	8%	2.00E-05	1.48E-06	0.074	78%	0.095
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	5.51E-03	1.00	0.149	95%	1.69E-04	0.60	0.008	5%	NA	3.21E-05			0.156
Iron	3.00E-01	1.77E-01	1.00	0.590		5.42E-03	0.05	0.361		NA	1.03E-03			0.951
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	1.15E-02	1.00	0.082	94%	3.53E-05	0.05	0.005	6%	NA	6.72E-05			0.087
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.26E-04	1.00	0.018	77%	3.85E-06	0.10	0.006	23%	NA	7.34E-07			0.023
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	9.35E-06	1.00			3.72E-06	0.80			NA	5.45E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.

Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 1.523

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.13E-04	1.00			3.47E-07	0.01			NA	6.62E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	1.26E-07	1.00	1.88E-07	89%	1.15E-08	0.90	1.92E-08	9%	4.00E-03	7.33E-07	2.93E-09	1%	2.11E-07
Barium	NA	2.70E-06	1.00			8.27E-09	0.05			NA	1.58E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	9.00E-08	1.00			2.76E-09	1.00			1.80E-03	5.25E-07	9.45E-10	100%	9.45E-10
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	9.04E-07	1.00			2.77E-08	0.05			1.20E-02	5.28E-06	6.33E-08	100%	6.33E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	1.96E-05	1.00			6.01E-07	0.60			NA	1.14E-04			
Iron	NA	6.30E-04	1.00			1.93E-05	0.05			NA	3.68E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	4.10E-05	1.00			1.26E-07	0.05			NA	2.39E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	4.48E-07	1.00			1.37E-08	0.10			NA	2.61E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	3.33E-08	1.00	2.43E-07	67%	1.33E-08	0.80	1.21E-07	33%	1.70E-03	1.94E-07	3.30E-10	0%	3.64E-07
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 6E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	4620	480	1.00E-06	1.00	78	70	91	2.72E-02	25550	9.67E-05
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3.5	480	1.00E-06	1.00	78	70	91	2.06E-05	25550	7.33E-08
Barium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	28.3	480	1.00E-06	1.00	78	70	91	1.66E-04	25550	5.92E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	176	480	1.00E-06	1.00	78	70	91	1.03E-03	25550	3.68E-06
Iron	14500	480	1.00E-06	1.00	78	70	91	8.52E-02	25550	3.04E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	387	480	1.00E-06	1.00	78	70	91	2.27E-03	25550	8.10E-06
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	23.4	480	1.00E-06	1.00	78	70	91	1.38E-04	25550	4.90E-07
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	4.15	480	1.00E-06	1.00	78	70	91	2.44E-05	25550	8.69E-08
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	4620.00	4900	1.00E-06	0.30	0.001	78	70	91	8.32E-05	25550	2.96E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	3.50	4900	1.00E-06	0.30	0.030	78	70	91	1.89E-06	25550	6.73E-09
Barium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	28.30	4900	1.00E-06	0.30	0.010	78	70	91	5.09E-06	25550	1.81E-08
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	176.00	4900	1.00E-06	0.30	0.010	78	70	91	3.17E-05	25550	1.13E-07
Iron	14500.00	4900	1.00E-06	0.30	0.010	78	70	91	2.61E-03	25550	9.30E-06
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	387.00	4900	1.00E-06	0.30	0.001	78	70	91	6.97E-06	25550	2.48E-08
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	23.40	4900	1.00E-06	0.30	0.010	78	70	91	4.21E-06	25550	1.50E-08
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	4.15	4900	1.00E-06	0.30	0.130	78	70	91	9.71E-06	25550	3.46E-08
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	4620.00		0.00000004	78	91	1.58E-04	25550	5.64E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	3.50		0.00000004	78	91	1.20E-07	25550	4.27E-07
Barium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	28.30		0.00000004	78	91	9.70E-07	25550	3.46E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	176.00		0.00000004	78	91	6.03E-06	25550	2.15E-05
Iron	14500.00		0.00000004	78	91	4.97E-04	25550	1.77E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	387.00		0.00000004	78	91	1.33E-05	25550	4.73E-05
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	23.40		0.00000004	78	91	8.02E-07	25550	2.86E-06
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	4.15		0.00000004	78	91	1.42E-07	25550	5.07E-07
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	2.72E-02	1.00	0.027	77%	8.32E-05	0.01	0.008	23%	NA	1.58E-04			0.035
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.06E-05	1.00	0.069	91%	1.89E-06	0.90	0.007	9%	NA	1.20E-07			0.076
Barium	7.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	5.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	1.66E-04	1.00	0.008	13%	5.09E-06	0.05	0.005	8%	2.00E-05	9.70E-07	0.049	78%	0.062
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.03E-03	1.00	0.028	95%	3.17E-05	0.60	0.001	5%	NA	6.03E-06			0.029
Iron	3.00E-01	8.52E-02	1.00	0.284		2.61E-03	0.05	0.174		NA	4.97E-04			0.458
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	2.27E-03	1.00	0.016	94%	6.97E-06	0.05	0.001	6%	NA	1.33E-05			0.017
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	1.38E-04	1.00	0.020	77%	4.21E-06	0.10	0.006	23%	NA	8.02E-07			0.026
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	2.44E-05	1.00			9.71E-06	0.80			NA	1.42E-07			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.703

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	9.67E-05	1.00			2.96E-07	0.01			NA	5.64E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	7.33E-08	1.00	1.10E-07	89%	6.73E-09	0.90	1.12E-08	9%	4.00E-03	4.27E-07	1.71E-09	1%	1.23E-07
Barium	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	5.92E-07	1.00			1.81E-08	0.05			1.20E-02	3.46E-06	4.15E-08	100%	4.15E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	3.68E-06	1.00			1.13E-07	0.60			NA	2.15E-05			
Iron	NA	3.04E-04	1.00			9.30E-06	0.05			NA	1.77E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	8.10E-06	1.00			2.48E-08	0.05			NA	4.73E-05			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	4.90E-07	1.00			1.50E-08	0.10			NA	2.86E-06			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	8.69E-08	1.00	6.34E-07	67%	3.46E-08	0.80	3.16E-07	33%	1.70E-03	5.07E-07	8.62E-10	0%	9.51E-07
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 1E-06

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum	5920	480	1.00E-06	1.00	78	70	91	3.48E-02	25550	1.24E-04
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	4.8	480	1.00E-06	1.00	78	70	91	2.82E-05	25550	1.00E-07
Barium	173	480	1.00E-06	1.00	78	70	91	1.02E-03	25550	3.62E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	18.2	480	1.00E-06	1.00	78	70	91	1.07E-04	25550	3.81E-07
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper	26.2	480	1.00E-06	1.00	78	70	91	1.54E-04	25550	5.48E-07
Iron	16200	480	1.00E-06	1.00	78	70	91	9.52E-02	25550	3.39E-04
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1610	480	1.00E-06	1.00	78	70	91	9.46E-03	25550	3.37E-05
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	0.491	480	1.00E-06	1.00	78	70	91	2.89E-06	25550	1.03E-08
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	5920.00	4900	1.00E-06	0.30	0.001	78	70	91	1.07E-04	25550	3.80E-07
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	4.80	4900	1.00E-06	0.30	0.030	78	70	91	2.59E-06	25550	9.23E-09
Barium	173.00	4900	1.00E-06	0.30	0.001	78	70	91	3.11E-06	25550	1.11E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	18.20	4900	1.00E-06	0.30	0.010	78	70	91	3.28E-06	25550	1.17E-08
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	26.20	4900	1.00E-06	0.30	0.010	78	70	91	4.72E-06	25550	1.68E-08
Iron	16200.00	4900	1.00E-06	0.30	0.010	78	70	91	2.92E-03	25550	1.04E-05
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	1610.00	4900	1.00E-06	0.30	0.001	78	70	91	2.90E-05	25550	1.03E-07
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.49	4900	1.00E-06	0.30	0.130	78	70	91	1.15E-06	25550	4.09E-09
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	5920.00		0.00000004	78	91	2.03E-04	25550	7.23E-04
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	4.80		0.00000004	78	91	1.65E-07	25550	5.86E-07
Barium	173.00		0.00000004	78	91	5.93E-06	25550	2.11E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	18.20		0.00000004	78	91	6.24E-07	25550	2.22E-06
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	26.20		0.00000004	78	91	8.98E-07	25550	3.20E-06
Iron	16200.00		0.00000004	78	91	5.55E-04	25550	1.98E-03
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	1610.00		0.00000004	78	91	5.52E-05	25550	1.97E-04
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.49		0.00000004	78	91	1.68E-08	25550	6.00E-08
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	3.48E-02	1.00	0.035	77%	1.07E-04	0.01	0.011	23%	NA	2.03E-04			0.045
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	2.82E-05	1.00	0.094	91%	2.59E-06	0.90	0.010	9%	NA	1.65E-07			0.104
Barium	7.00E-02	1.02E-03	1.00	0.015	87%	3.11E-06	0.05	0.001	5%	5.00E-03	5.93E-06	0.001	7%	0.017
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	1.07E-04	1.00	0.005	13%	3.28E-06	0.05	0.003	8%	2.00E-05	6.24E-07	0.031	78%	0.040
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	1.54E-04	1.00	0.004	95%	4.72E-06	0.60	0.000	5%	NA	8.98E-07			0.004
Iron	3.00E-01	9.52E-02	1.00	0.317		2.92E-03	0.05	0.194		NA	5.55E-04			0.512
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	9.46E-03	1.00	0.068	94%	2.90E-05	0.05	0.004	6%	NA	5.52E-05			0.072
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	2.89E-06	1.00			1.15E-06	0.80			NA	1.68E-08			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.793

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	1.24E-04	1.00			3.80E-07	0.01			NA	7.23E-04			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	1.00E-07	1.00	1.51E-07	89%	9.23E-09	0.90	1.54E-08	9%	4.00E-03	5.86E-07	2.34E-09	1%	1.68E-07
Barium	NA	3.62E-06	1.00			1.11E-08	0.05			NA	2.11E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	3.81E-07	1.00			1.17E-08	0.05			1.20E-02	2.22E-06	2.67E-08	100%	2.67E-08
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	5.48E-07	1.00			1.68E-08	0.60			NA	3.20E-06			
Iron	NA	3.39E-04	1.00			1.04E-05	0.05			NA	1.98E-03			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	3.37E-05	1.00			1.03E-07	0.05			NA	1.97E-04			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	1.03E-08	1.00	7.50E-08	67%	4.09E-09	0.80	3.73E-08	33%	1.70E-03	6.00E-08	1.02E-10	0%	1.12E-07
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 3E-07

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics										
Aluminum		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Antimony		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Arsenic		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Barium	261	480	1.00E-06	1.00	78	70	91	1.53E-03	25550	5.46E-06
Beryllium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cadmium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Calcium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium III		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Cobalt		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Copper		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Iron		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Lead		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Magnesium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Manganese		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Mercury (inorganic)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Nickel		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Potassium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Selenium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Sodium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Thallium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Vanadium		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Zinc		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Organics										
Benzo(a)pyrene Equivalents	0.236	480	1.00E-06	1.00	78	70	91	1.39E-06	25550	4.94E-09
1,1 - Dichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Intake (mg/kg-day) = (CsxIRxCFxFIxEF)/(BWxAT)

Major Construction Table 1. Exposure Calculation for Subchronic Surface Soil Ingestior

Chemical	Cs (mg/kg)	IR (mg soil/d)	CF (kg/mg)	FI	EF (d/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Pyrene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Toluene		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)		480	1.00E-06	1.00	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Inorganics											
Aluminum	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Antimony	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Arsenic	0.00	4900	1.00E-06	0.30	0.030	78	70	91	0.00E+00	25550	0.00E+00
Barium	261.00	4900	1.00E-06	0.30	0.001	78	70	91	4.70E-06	25550	1.67E-08
Beryllium	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Cadmium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Calcium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Chromium III	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Chromium VI	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Cobalt	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Copper	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Iron	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Lead	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Magnesium	0.00	4900	1.00E-06	0.30	0.000	78	70	91	0.00E+00	25550	0.00E+00
Manganese	0.00	4900	1.00E-06	0.30	0.001	78	70	91	0.00E+00	25550	0.00E+00
Mercury (inorganic)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Nickel	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Potassium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Selenium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Sodium	0.00	4900	1.00E-06	0.30	NA	78	70	91	NA	25550	NA
Thallium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Vanadium	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Zinc	0.00	4900	1.00E-06	0.30	0.010	78	70	91	0.00E+00	25550	0.00E+00
Organics											
Benzo(a)pyrene Equivalents	0.24	4900	1.00E-06	0.30	0.130	78	70	91	5.52E-07	25550	1.97E-09
1,1 - Dichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	4900	1.00E-06	0.30	0.130	78	70	91	0.00E+00	25550	0.00E+00

Dose (mg/kg-day) = (CsxSAXCFxAFxABSxEF)/(BWxAT)

Major Construction Worker Table 2. Exposure Calculation for Subchronic Dermal Contact with Surface Soil

Chemical	Cs (mg/kg)	SA (cm2)	CF (kg/mg)	AF (mg/cm2)	ABS	EF (day/yr)	BW (kg)	AT (days)	Noncarcin Intake (mg/kg-d)	AT (days) (Carcin)	Carcin Intake (mg/kg-d)
Methyl ethyl ketone (2-butanone)	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Pyrene	0.00	4900	1.00E-06	0.30	0.100	78	70	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Toluene	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	4900	1.00E-06	0.30	0.050	78	70	91	0.00E+00	25550	0.00E+00

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Inorganics				
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium III				
Chromium VI				
Cobalt				
Copper				
Iron				
Lead				
Magnesium				
Manganese				
Mercury (inorganic)				
Nickel				
Potassium				
Selenium				
Sodium				
Thallium				
Vanadium				
Zinc				
Organics				
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0
1,1 - Dichloroethane	5.30E+01	5.10E+03	5.60E-03	2083
1,2 - Dichloroethylene (mixed isomers)	3.60E+01	3.50E+03	4.10E-03	1091
Ethyl benzene	2.00E+02	1.70E+02	7.90E-03	197
Fluoranthene	4.91E+04	2.06E-01	1.61E-05	51

$$Csat\ (mg/kg) = (S/B) \times [(Kd \times B) + Pw + (H' \times Pa)]$$

Calculation of Soil Saturation Limit

Chemical	Koc (l/kg)	S (mg/l)	H (atm-m3/ mol)	Csat (mg/kg)
Methyl ethyl ketone (2-butanone)	4.50E+00	2.70E+05	2.70E-05	33132
Naphthalene	1.19E+03	7.15E+00	4.83E-04	43
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0
Pyrene	6.80E+04	1.40E-01	1.10E-05	48
Tetrachloroethylene (PCE)	2.70E+02	2.00E+02	1.80E-02	318
Toluene	1.40E+02	5.30E+02	6.60E-03	451
1,1,1 - Trichloroethane	1.40E+02	1.30E+03	1.70E-02	1212
Trichloroethylene (TCE)	9.40E+01	1.10E+03	1.00E-02	712
Xylenes (mixed)	2.50E+02	1.77E+02	6.73E-03	248

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Inorganics							
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium III							
Chromium VI							
Cobalt							
Copper							
Iron							
Lead							
Magnesium							
Manganese							
Mercury (inorganic)	3.07E-02	6.30E-06	1.46E-05		5.20E+01	1.14E-02	1.99E+03
Nickel							
Potassium							
Selenium							
Sodium							
Thallium							
Vanadium							
Zinc							
Organics							
Benzo(a)pyrene Equivalents	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
1,1 - Dichloroethane	7.40E-02	1.10E-05	2.22E-03	5.30E+01	2.65E-01	5.60E-03	1.62E+02
1,2 - Dichloroethylene (mixed isomers)	7.40E-02	1.10E-05	2.13E-03	3.60E+01	1.80E-01	4.10E-03	1.65E+02
Ethyl benzene	7.50E-02	7.80E-06	1.11E-03	2.00E+02	1.00E+00	7.90E-03	2.28E+02
Fluoranthene	3.02E-02	6.35E-06	4.49E-09	4.91E+04	2.45E+02	1.61E-05	1.14E+05

VF (m3/kg) = (Q/C) x [(3.14 x Da x T)^0.5/(2 x B x Da)] x 10-4 m2/cm2

Calculation of the Volatilization Factor (VF)

Chemical	Di (cm2/s)	Dw (cm2/s)	Da (cm2/s)	Koc (cm3/g)	Kd (cm3/g)	Henry's (atm-m3/ mol)	Worker VF (m3/kg)
Methyl ethyl ketone (2-butanone)	9.00E-02	9.80E-06	4.38E-05	4.50E+00	2.25E-02	2.70E-05	1.15E+03
Naphthalene	5.90E-02	7.50E-06	1.03E-05	1.19E+03	5.96E+00	4.83E-04	2.38E+03
2-Nitroaniline	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	#DIV/0!
Pyrene	2.70E-02	7.20E-06	2.04E-09	6.80E+04	3.40E+02	1.10E-05	1.69E+05
Tetrachloroethylene (PCE)	7.20E-02	8.20E-06	1.78E-03	2.70E+02	1.35E+00	1.80E-02	1.81E+02
Toluene	8.70E-02	8.60E-06	1.47E-03	1.40E+02	7.00E-01	6.60E-03	1.98E+02
1,1,1 - Trichloroethane	7.80E-02	8.80E-06	3.11E-03	1.40E+02	7.00E-01	1.70E-02	1.37E+02
Trichloroethylene (TCE)	7.90E-02	9.10E-06	2.66E-03	9.40E+01	4.70E-01	1.00E-02	1.48E+02
Xylenes (mixed)	7.80E-02	8.73E-06	8.18E-04	2.50E+02	1.25E+00	6.73E-03	2.66E+02

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Inorganics								
Aluminum	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Antimony	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Arsenic	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Barium	261.00		0.00000004	78	91	8.95E-06	25550	3.19E-05
Beryllium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cadmium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Calcium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium III	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Chromium VI	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Cobalt	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Copper	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Iron	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Lead	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Magnesium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Manganese	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Mercury (inorganic)	0.00	5.02E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Nickel	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Potassium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Selenium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Sodium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Thallium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Vanadium	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Zinc	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00
Organics								
Benzo(a)pyrene Equivalents	0.24		0.00000004	78	91	8.09E-09	25550	2.88E-08
1,1 - Dichloroethane	0.00	6.18E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	0.00	6.05E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Ethyl benzene	0.00	4.38E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Fluoranthene	0.00	8.79E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Methyl ethyl ketone (2-butanone)	0.00	8.68E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
Naphthalene	0.00	4.21E-04	0.00000004	78	91	0.00E+00	25550	0.00E+00
2-Nitroaniline	0.00		0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker 'Table 3. Calculation of subchronic average air concentratior

Chemical	Cs (mg/kg)	1/VF (kg/m3)	1/PEF (kg/m3)	EF (day/yr)	AT (days) (Noncar)	Noncarcin Air Conc (mg/m3)	AT (days) (Carcin)	Carcin Air Conc (ug/m3)
Pyrene	0.00	5.93E-06	0.00000004	78	91	0.00E+00	25550	0.00E+00
Tetrachloroethylene (PCE)	0.00	5.54E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Toluene	0.00	5.04E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
1,1,1 - Trichloroethane	0.00	7.32E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Trichloroethylene (TCE)	0.00	6.78E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00
Xylenes (mixed)	0.00	3.75E-03	0.00000004	78	91	0.00E+00	25550	0.00E+00

Major Construction Worker Table 4. Subchronic Noncancer Assessment

Chemical	Oral SubRfD (mg/kg-d)	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF(a)	Soil Ingestion HQ	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact HQ	% Total	Inhalation SubRfC (mg/m3)	Estimated Air Conc (mg/m3)	Inhalation HQ	% Total	Combined Pathway HQ
Inorganics														
Aluminum	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Antimony	4.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Arsenic	3.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Barium	7.00E-02	1.53E-03	1.00	0.022	87%	4.70E-06	0.05	0.001	5%	5.00E-03	8.95E-06	0.002	7%	0.025
Beryllium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.01	0.000	#DIV/0!	NA	0.00E+00			0.000
Cadmium	1.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	1.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Chromium VI	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	2.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Cobalt	6.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.50	0.000	#DIV/0!	3.00E-05	0.00E+00	0.000	#DIV/0!	0.000
Copper	3.70E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.60	0.000	#DIV/0!	NA	0.00E+00			0.000
Iron	3.00E-01	0.00E+00	1.00	0.000		0.00E+00	0.05	0.000		NA	0.00E+00			0.000
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	1.40E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Mercury (inorganic)	3.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.20	0.000	#DIV/0!	3.00E-04	0.00E+00	0.000	#DIV/0!	0.000
Nickel	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.05	0.000	#DIV/0!	NA	0.00E+00			0.000
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	5.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	8.00E-04	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Vanadium	7.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.10	0.000	#DIV/0!	NA	0.00E+00			0.000
Zinc	3.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.30	0.000	#DIV/0!	NA	0.00E+00			0.000
Organics														
Benzo(a)pyrene Equivalents	NA	1.39E-06	1.00			5.52E-07	0.80			NA	8.09E-09			
1,1 - Dichloroethane	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	5.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,2 - Dichloroethylene (mixed isomers)	9.00E-03	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.50E-01	0.00E+00	0.000	#DIV/0!	0.000
Ethyl benzene	1.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.85	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Fluoranthene	4.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.40E+00	0.00E+00	0.000	#DIV/0!	0.000
Methyl ethyl ketone (2-butanone)	6.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Naphthalene	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	3.00E-02	0.00E+00	0.000	#DIV/0!	0.000
2-Nitroaniline	5.70E-05	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	1.00	0.000	#DIV/0!	2.00E-03	0.00E+00	0.000	#DIV/0!	0.000
Pyrene	3.00E-02	0.00E+00	0.80	0.000	#DIV/0!	0.00E+00	0.80	0.000	#DIV/0!	1.10E+00	0.00E+00	0.000	#DIV/0!	0.000
Tetrachloroethylene (PCE)	1.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	NA	0.00E+00			0.000
Toluene	2.00E-01	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	1.00E+00	0.00E+00	0.000	#DIV/0!	0.000
1,1,1 - Trichloroethane	2.00E-02	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E+00	0.00E+00	0.000	#DIV/0!	0.000
Trichloroethylene (TCE)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Xylenes (mixed)	2.00E+00	0.00E+00	1.00	0.000	#DIV/0!	0.00E+00	0.90	0.000	#DIV/0!	3.00E-01	0.00E+00	0.000	#DIV/0!	0.000

Subchronic toxicity values were not available for Al, Cd, Co, dibenzofuran, di(ethylhexyl)phthalate, ethylbenzene, styrene, pyrene, pentachlorophenol, tetrachloroethylene, and 1,1,1 trichloroethane.
Chronic toxicity values, if available, were utilized as surrogate values.

SCREENING HI = 0.025

Major Construction Worker Table 5. Subchronic Cancer Assessment

Chemical	Oral CSF (mg/kg-d)-1	Soil Ingestion (mg/kg/d)	Soil Ingestion AAF	Soil Ingestion ECR	% Total	Dermal Contact (mg/kg/d)	Absorb Dose AF(b)	Dermal Contact ECR	% Total	Inhalation CSF (ug/m3)	Estimated Air Conc (ug/m3)	Inhalation ECR	% Total	Combined Pathway Total
Inorganics														
Aluminum	NA	0.00E+00	1.00			0.00E+00	0.01			NA	0.00E+00			
Antimony	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Arsenic	1.50E+00	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	4.00E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Barium	NA	5.46E-06	1.00			1.67E-08	0.05			NA	3.19E-05			
Beryllium	NA	0.00E+00	1.00			0.00E+00	0.01			2.40E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cadmium	NA	0.00E+00	1.00			0.00E+00	1.00			1.80E-03	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Calcium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Chromium III	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Chromium VI	NA	0.00E+00	1.00			0.00E+00	0.05			1.20E-02	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Cobalt	NA	0.00E+00	1.00			0.00E+00	0.50			NA	0.00E+00			
Copper	NA	0.00E+00	1.00			0.00E+00	0.60			NA	0.00E+00			
Iron	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Lead	NA	0.00E+00	0.00			NA	0.00			NA	0.00E+00			
Magnesium	NA	0.00E+00	0.00			0.00E+00	0.00			NA	0.00E+00			
Manganese	NA	0.00E+00	1.00			0.00E+00	0.05			NA	0.00E+00			
Mercury (inorganic)	NA	0.00E+00	1.00			0.00E+00	0.20			NA	0.00E+00			
Nickel	NA	0.00E+00	1.00			0.00E+00	0.05			4.80E-04	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Potassium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Selenium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Sodium	NA	0.00E+00	NA			NA	NA			NA	0.00E+00			
Thallium	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Vanadium	NA	0.00E+00	1.00			0.00E+00	0.10			NA	0.00E+00			
Zinc	NA	0.00E+00	1.00			0.00E+00	0.30			NA	0.00E+00			
Organics														
Benzo(a)pyrene Equivalents	7.30E+00	4.94E-09	1.00	3.61E-08	67%	1.97E-09	0.80	1.79E-08	33%	1.70E-03	2.88E-08	4.90E-11	0%	5.41E-08
1,1 - Dichloroethane	5.70E-03	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.60E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
1,2 - Dichloroethylene (mixed isomers)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Ethyl benzene	NA	0.00E+00	1.00			0.00E+00	0.85			NA	0.00E+00			
Fluoranthene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Methyl ethyl ketone (2-butanone)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Naphthalene	NA	0.00E+00	1.00			0.00E+00	0.80			NA	0.00E+00			
2-Nitroaniline	NA	0.00E+00	1.00			0.00E+00	1.00			NA	0.00E+00			
Pyrene	NA	0.00E+00	0.80			0.00E+00	0.80			NA	0.00E+00			
Tetrachloroethylene (PCE)	5.20E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	5.80E-07	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Toluene	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
1,1,1 - Trichloroethane	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			
Trichloroethylene (TCE)	1.10E-02	0.00E+00	1.00	0.00E+00	#DIV/0!	0.00E+00	0.90	0.00E+00	#DIV/0!	1.70E-06	0.00E+00	0.00E+00	#DIV/0!	0.00E+00
Xylenes (mixed)	NA	0.00E+00	1.00			0.00E+00	0.90			NA	0.00E+00			

ECR = Excess Cancer Risk

TOTAL ECR = 5E-08