GEO/08-167
Final

U.S. Army Corps of Engineers
Louisville District

Sampling and Analysis Plan
Former Hanna City Air Force Station
Remedial Investigation/Feasibility Study/Proposed Plan/ Record of Decision Project
Hanna City, Peoria County, Illinois

Prepared for
U.S. Army Corps of Engineers
Louisville District Contract No. W912QR-04-D-0030
Delivery Order 0019

Prepared by
GEO Consultants, LLC
199 Kentucky Avenue
Kevil, Kentucky 42053

September 2008

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Louisville District
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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

GEO Consultants, LLC (GEO) has completed the Final Sampling and Analysis Plan for the Former Hanna City Air Force Station Remedial Investigation/Feasibility Study/Proposed Plan/Record of Decision Project, Hanna City, Peoria County, Illinois. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project as defined in GEO's Corporate Quality Control Plan. During the independent technical review, compliance with established policy, principles and procedures, using justified and valid assumptions, was verified. This included review of technical scope, assumptions, technical methods, procedures, and materials used in analyses, appropriateness of data, reasonableness of results, including whether the product meets the customer's needs consistent with the law and existing Corps policy.

for 9/29/08

Craig Rightmire, P.G. Date
Independent Technical Review Team Member

9/29/08

Tom Early, Ph.D, P.G. Date
Independent Technical Review Team Member

9/29/08

Kim Morris Date
Quality Program Manager

Significant concerns and the explanation of the resolution are as follows:

None

As noted above, all concerns resulting from the independent technical review of the project have been considered.

9/29/08

Todd Calhoun, P.G. Date
Project Manager

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ACRONYMS and ABBREVIATIONS

ADR	Automatic Data Review
AOPC	Area of Potential Concern
bgs	below ground surface
CELRL	U.S. Army Corps of Engineers, Louisville District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	chemicals of potential concern
DI	deionized (water)
DO	dissolved oxygen
DoD	U.S. Department of Defense
DQO	Data Quality Objective
EB	equipment blank
EPA	U.S. Environmental Protection Agency
EU	exposure unit
FAA	Federal Aviation Administration
FCR	Field Change Request
FD	field duplicate
FS	Feasibility Study
FSP	Field Sampling Plan
GEO	GEO Consultants, LLC
HCAFS	Former Hanna City Air Force Station
ID	identification
IDoC	Illinois Department of Corrections
IDW	investigation-derived waste
IEPA	Illinois Environmental Protection Agency
ITR	Independent Technical Review
LCS	laboratory control sample
LIMS	Laboratory Information Management System
LQSMS	Louisville Quality Systems Manual Supplement
MDL	method detection limit
NELAP	National Environmental Laboratory Accreditation Program
NTU	nephelometric turbidity units
ORP	oxidation/reduction potential
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbons
Parsons	Parsons Engineering Science
PCB	polychlorinated biphenyl
PP	Proposed Plan
PPE	personal protective equipment
PRG	Preliminary Remediation Goal
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCP	Quality Control Plan
QSM	Quality Systems Manual
RI	Remedial Investigation
ROD	Record of Decision
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan

SI	Site Investigation
SOP	standard operating procedure
SOW	Scope of Work
SSHP	Site-Specific Safety and Health Plan
SSI	Supplemental Site Investigation
TACO	Tiered Approach to Corrective Action Objectives
TSS	total suspended solids
TtEC	TetraTech EC, Inc.
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
VSP	Visual Sampling Plan
WP	Work Plan

1. INTRODUCTION

1.1 PROJECT OBJECTIVES, TASKS AND SCHEDULE

The overall objective of the project described in this document is to provide data to complete a Remedial Investigation (RI) at the Former Hanna City Air Force Station (HCAFS), Hanna City, Peoria County, Illinois (Figures 1-1 and 1-2) all figures are provided in Appendix A) to collect data necessary to adequately characterize five Areas of Potential Concern (AOPC) (i.e., Three Coal Areas, Main Entrance, Vehicle Wash Rack, Maintenance Building, and Paint Shed). Upon completion of the RI, which will include a Human Health Risk Assessment and an Ecological Risk Assessment, the data will be used for the purpose of: (1) determining the need for developing a Feasibility Study (FS) to ensure appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected; (2) preparing a Proposed Plan describing the remedial alternatives analyzed, proposing a preferred remedial action alternative, and summarizing the information relied upon to select the preferred alternative; and (3) preparing a Record of Decision listing all facts, analyses of facts, and site-specific policy determinations considered in the course of carrying out activities in a level of detail appropriate to the site situation for the remedial alternative selected in the proposed plan.

The work will be completed in compliance with the project Scope of Work (SOW), dated 05 February 2008, [U.S. Army Corps of Engineers (USACE) 2008], this Sampling and Analysis Plan (SAP), a Work Plan (WP), and a Site-Specific Safety and Health Plan (SSHP) under contract to USACE, Louisville District (CELRL), Contract No. W912QR-04-D-0030, Delivery Order 0019. The regulatory agency involved in this project is the Illinois Environmental Protection Agency (IEPA) and the property owner is represented by the Illinois Department of Corrections (IDoC) and Federal Aviation Administration (FAA). The executing agency for this project is USACE, CELRL.

GEO Consultants, LLC (GEO) will complete the RI in conformance with 40 Code of Federal Regulations (CFR) 300.430 *Remedial Investigation/Feasibility Study and Selection of Remedy Code* and U.S. Environmental Protection Agency (EPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, EPA/540/G-89/0004, OSWER Directive 9355.3-01, October 1988.

The RI includes the following activities.

- Surface soil sampling at four of the AOPCs: Main Entrance, Vehicle Wash Rack, Maintenance Building, and Paint Shed.
- Subsurface soil sampling at four of the AOPCs: Coal Area A, Coal Area B, Coal Area C, and Vehicle Wash Rack.
- Groundwater sampling at five of the AOPCs: Coal Area A, Coal Area B, Coal Area C, Vehicle Wash Rack, and Paint Shed.

Samples will be collected during a multiple sampling events in accordance with Section 3 of this document. Surface soil samples were collected on August 25, 2008 under agreement prior to finalization of this SAP. Subsurface soil and groundwater samples will be collected at a later date pending modification to this Task Order.

1.2 REPORT ORGANIZATION

This Plan is organized as follows:

- Project objectives including site location map, tasks and schedule (Section 1).
- Site background information including a summary of prior investigations (Section 2).
- Field Sampling Plan (FSP) (Section 3) which describes the overall approach for the field investigation (e.g., sampling locations), field procedures (e.g., surface soil, subsurface soil, and groundwater sample collection), field quality control measures.
- Quality Assurance Project Plan (QAPP) (Section 4) which primarily focuses on quality control procedures to be followed in the laboratory to ensure that the quality of data generated by this investigation will be acceptable for use in risk screening.
- List of references used in the preparation of this document (Section 5).

Other documents associated with this project include:

- Quality Control Plan (QCP) (GEO 2008a), which describes the policies and procedures necessary to ensure proper execution of this task.
- Site-Specific Safety and Health Plan (SSHP) (GEO 2008b), which describes procedures for protecting workers and the environment during field work to be conducted as part of this investigation.
- Work Plan (WP) (GEO 2008c), which describes the proposed schedule, the names and qualifications of contractor personnel, the description of all activities to accomplish the tasks, and services required from the government.

2. SITE BACKGROUND

2.1 SITE DESCRIPTION

The HCAFS is a 42.89-acre parcel located approximately ten miles west of the city of Peoria in Peoria County, Illinois (Figures 1-1 and 1-2), in Section 4, of Township 8 North, Range 6 East of the Logan Township. The site is accessed from Peoria, Illinois by traveling west on State Highway 116, through Hanna City, Illinois, then north onto the site access road.

The HCAFS was used by the United States Air Force as a radar tracking and navigation facility from 1952 to 1968. The property was quitclaimed to the State of Illinois in November 1969. Currently the property is occupied by The State of Illinois, Department of Corrections as a minimum security prison (referred to as the Hanna City Work Camp) and by the FAA as a navigation facility (USACE 2008).

A discussion of site history is presented in Section 2.2; a description of topography, geology and hydrogeology at the HCAFS follows in Section 2.3; previous investigations are summarized in Section 2.4.

2.2 SITE HISTORY

The U.S. Government acquired the property in 1959 for use as a United States Air Force (USAF) Station. The USAF used the facility as a radar tracking and investigation facility from 1952 to 1968. In 1968, the property was declared excess to the needs of the Air Force. The property was then surplused to the General Services Administration in 1969, and the entire site was assigned to the Department of Health, Education, and Welfare. In November 1969 the property was disposed of into three separate tracts through quitclaim deeds as follows:

- Tract 1, 38.456 acres (including 30 buildings), was quitclaimed to the State of Illinois. Currently, the IDoC Hanna City Work Camp occupies Tract 1 and uses the facility as a minimum security prison [TetraTech EC, Inc. (TtEC) Final Supplemental Site Investigation (SSI), Former Hanna City Air Force Station, Hanna City, Peoria County, Illinois, March 2008 (TtEC 2008)]. A recent article posted on a local website (http://centralillinoisproud.com/) indicated that the Illinois Senate passed a bill that would transfer the facility to Peoria County for use as special place for inmates with mental illness or a minimum security work release facility. The article indicated that the facility has been closed since 2002.
- Tract 2, 3.364 acres (including a water supply well, water treatment plant and lagoon, and Buildings 201, 203, 207, and 208) was quitclaimed to the Village of Hanna City to be used as a water supply system. Tract 2 was operated as a water supply well and water treatment facility by the Village of Hanna City until 1987, when the water supply well was closed by IEPA due to elevated levels of naturally occurring radon. No operations are presently ongoing at Tract 2. As a result of previous investigations, the lagoon has been categorized as having Potentially Responsible Party issues under CERCLA Section 9607(a)(3) and therefore will not be part of this RI.
- Tract 3, consisting of 1.03 fee acres and containing the radar tower and three related buildings (Buildings 402, 404, and 409) was transferred to the FAA. The FAA currently uses this tract of land as a navigation facility (TtEC 2008).

2.3 SITE PHYSICAL CHARACTERISTICS

2.3.1 Topography

The site lies on relatively flat ground with elevations ranging from approximately 740 to 758 feet above mean seal level (Figure 2-1).

2.3.2 Regional Geology

The HCAFS lies in the Illinoisan Till Plain physiographic province. The Illinoisan and Wisconsin glacial stages formed most of the present surface materials and landforms in the area. The underlying geology is Pennsylvanian bedrock overlain by glacial deposits, which are overlain by loess (windblown silt). The Pennsylvanian age Modesto Formation bedrock in the vicinity of the site consists of shales, sandstones, and limestones with occasional thin seams of coal. This bedrock formation is approximately 180 feet thick and has low permeability. The glacial deposits in the area are part of the Glasford Formation and consist of glacial outwash. These deposits are comprised of unsorted calcareous pebbly silt and clay with some localized lenses of sand and gravel and are approximately 40 to 50 feet in thickness. The loess deposits are divided into two layers. The bottom layer is the Roxana silt and consists of pinkish brown leached silt, which ranges up to five feet in thickness. The top layer is the Peoria loess and ranges up to 15 feet in thickness. It consists of tan silts with small amounts of clay and minor amounts of sand. The two layers combined range up to 20 feet in thickness. (TtEC 2008)

2.3.3 Site-Specific Geology

The shallow unconsolidated stratigraphy of the site can be divided into two main units: loess deposits and glacial till. The loess deposits comprise the uppermost 15 to 20 feet of the site sediments and consist of tan to brown to gray mottled silt and very fine sand with some clay. Rootlets are present within the upper ten feet of the loess. The clays generally possess low to medium plasticity. Occasional thin sand lenses are also present within the loess deposits.

The loess deposits are underlain by glacial till deposits. The glacial till consists of brown to gray, moist to dry, very dense and hard clay and silt with minor amounts of gravel. The till-loess contact surface slopes gently (approximately 0.17 feet/foot) to the southeast, paralleling the surface topography. The thickness of the glacial till is unknown.

During the initial Site Investigation (SI) performed by Parsons Engineering Science (Parsons) in 1992, a total of ten soil samples were collected for analysis of grain size. Eight of the samples were from the loess deposits and two samples were from the glacial till. Laboratory analyses of the soils indicated that the loess deposits consist primarily of silt and clay (greater than 98 percent) with minor amounts of fine sand (1 to 2 percent). The glacial till consists primarily of silty clay (greater than 75 percent) with small amounts of sand (1 to 22 percent) and traces of gravel (up to 2 percent). The bulk density of the soils ranged from 0.57 grams per cubic centimeter (g/cm^3) to 1.96 g/cm^3 and averaged 1.29 g/cm^3. Specific gravity of the soils ranged from 2.43 g/cm^3 to 2.81 g/cm^3 and averaged 2.7 g/cm^3. (TtEC 2008)

2.3.4 Site-Specific Hydrogeology

The water table at the site ranged in depth from 4 to 10 feet below ground surface (bgs) during the SI conducted by Parsons Engineering Science (Parsons) and 0.7 to 5 feet bgs during the SSI conducted by TtEC. The site is located on a gentle, north-south trending ridge that forms a shallow groundwater divide. Shallow groundwater flow on the eastern portion of the site is towards the southeast and on the western portion of the site to the southwest, mimicking the surface topography. Groundwater gradients across the site averaged 0.095 feet/foot. Groundwater appears to be slightly mounded in the vicinity of the

abandoned tile field. The loess deposits have a low permeability and yield very little water. During the probe sampling conducted during the SSI, recharge was observed to be adequate to yield sufficient water for sampling. (TtEC 2008)

Based on topography of the site, surface water targets are limited to the sewage disposal ponds located on the eastern side of the property and a small pond located approximately 0.5-mile to the west-northwest of the site.

2.4 SUMMARY OF PREVIOUS INVESTIGATIONS AT HCAFS

Following is a summary of investigations and studies performed at the site. This information was adapted from TtEC 2008 as the individual reports prepared prior to the SSI were not made available for review at the time of preparation of this report; limited details exist.

2.4.1 Preliminary Assessment

In 1992, USACE, Chicago District conducted a Preliminary Assessment (PA) of the HCAFS consisting of site reconnaissance and interviews with former and current site personnel. Twelve areas of potential concern were identified that required further study. The PA report was not available for review while preparing this WP. It was referenced in TtEC (2008).

2.4.2 Underground storage tank removal

Five underground storage tanks (USTs) have been historically present at the former HCAFS: a UST near Bldg. 202 (referred to as the Control Bldg by IDoC), a UST near the Maintenance Building (Bldg. 206), a UST near Bldg. 305 (referred to as Housing Unit #3 by IDoC), a UST near Bldg. 307 (referred to as the Motor Pool by IDoC) in the Vehicle Wash Rack AOPC, and a UST within the property currently used by the FAA (see Figure 1-2 for locations). The following describes the status of each of the USTs according to available documentation obtained from the IEPA's LUST program for the Hanna City Work Camp and the FAA (both are under LPC #1430405005). Of these five tanks, only the UST near Bldg. 202 and the UST near Bldg. 307 may have been onsite at the time of the property was transferred from DoD (IDoC 1992). All four tanks listed under the Hanna City Work Camp were removed in 1993 and 1997, and the UST within the FAA property was removed by FAA in 2003.

The following summarizes information available regarding each of the former USTs.

- The 1500 gal gasoline UST near Bldg 202 (called the "Control Building" by IDoC, Figure 1-2 and Figure 2-1) may have been installed by DoD (IDoC 1992). This tank was removed by a contractor (Crawford, Murphy and Tilly, Springfield, IL) working for the State of Illinois' Capital Development Board (CDB) in 1993 (Beling 1998a). Soil samples were collected from the walls and the floor of the UST excavation in accordance with IEPA requirements and analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) (Beling 1998a). None of these chemicals were detected (detection limit 1 ug/kg) in the soil samples. Furthermore, the UST passed an integrity test immediately before the UST was removed (Beling 1998a), indicating that leaks from this UST were unlikely. Thus, the site for this UST is assumed to be closed.
- The 2000 gasoline UST near Bldg 307 (also called the "Motor Pool", in the vicinity of the Vehicle Wash Rack AOPC, see Figure 1-2 and 2-2) may have been installed by DoD (IDoC 1992). This tank was removed in 1993 by Crawford, Murphy and Till for the CDB (Beling 1998a). The last use date was believed to be December 31, 1983 (Beling 1997). After the UST was removed, soil samples were collected in October 1993 from the walls and the floor

of the UST excavation in accordance with IEPA requirements and analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) (data in Beling 1998a). One soil sample at 2 ft below the tank invert contained benzene at 46 ug/kg, which was greater than the TACO criterion of 30 ug/kg (data in Beling 1998a). After additional soil was excavated, soil samples were collected again in March 1994 (presumably right after over-excavation). One of the soil samples collected at 5 ft below the tank invert did not contain any detectable levels of BTEX compounds, but the other soil sample collected at 6 ft below the tank invert contained elevated BTEX levels (benzene 7.5 mg/kg; toluene 33 mg/kg; ethylbenzene 89 mg/kg and xylene 160 mg/kg; data in Beling 1998a). No further action occurred until November 1997 when a new contractor (Beling Consultants) working for CDB installed 20-ft deep monitoring wells in and approximately 50 ft from the former tank basin to determine whether groundwater had been impacted by the residual soil contamination (Beling 1998b, well map reproduced in Figure 2-2). The following is a summary of results from soil and groundwater sampling at this former UST location from 1997-1998 reported by Beling (1998b) and Beling (1999):

- Boring logs show that the soils in the vicinity of the former UST consist of clays down to 20 ft.
- Soil samples for BTEX analysis were collected from the boreholes prior to monitoring well installation. BTEX was only detected in samples from the borehole drilled within the former tank basin (MP-B-1-97, see Figure 2-2 for location). The soil sample collected from 10-15 ft bgs at MP-B-1-97 had benzene at 4.8 mg/kg, ethylbenzene at 6.1 mg/kg, toluene at 13.6 mg/kg and xylene at 36.0 mg/kg.
- The hydraulic conductivity was measured in one of the monitoring wells (MP-MW-4-97) at 7 x 10^{-5} cm/sec.
- The wells were sampled for BTEX analysis every three months from April 1998 to January 1999. Groundwater samples from the monitoring well within the former tank basin (MP-MW-2-97, Figure 2-1) contained benzene during all four quarterly samples (maximum of 1.21 mg/L). None of the BTEX compounds were detected in any of the groundwater samples collected form the other wells (detection limit of 0.002 mg/L), except for one sample from MP-MW-4-97 (~50 ft south of MP-MW-2-97) at one sampling event, when a benzene concentration of 0.01 mg/L was measured.

The monitoring results suggest that groundwater contamination from benzene is limited to within a 50-ft radius around the former tank basin. However, because of the detection (0.01 mg/L) in MP-MW-4-97 that exceeded the TACO criterion, IEPA re-classified the former UST site from Low Priority to High Priority (IEPA 1999). A Corrective Action Plan was submitted to IEPA in September 2000, where the proposed action consisted of institutional controls through deed restrictions prohibiting the placement of water supply wells within 30 radial feet from the groundwater benzene source (i.e., MP-MW-2-97, the monitoring well located within the former UST basin). IEPA rejected this plan in February 2001 because the plan did not address residual soil contamination in the former tank basin (IEPA 2001); IEPA's primary concern was the risk associated with ingestion and inhalation pathways from the residual soil contamination. No other plans or reports have been submitted to date since 2001. Thus, the former site of the UST near Bldg 307 is not closed. According to the last use date of December 31, 1983 found in Beling (1997), the UST was in use after the property was transferred from DoD and is therefore ineligible for funding from the Formerly Used Defense Sites (FUDS) program because of beneficial use by IDoC. This former UST location is not specifically being investigated in this RI.

- The 2000 gal gasohol UST near Bldg 206 (the Maintenance Building, see Figure 1-2 and 2-1) was installed by IDoC (IDoC 1992). This tank was removed by a contractor (Crawford, Murphy and Tilly, Springfield, IL) working for the CDB in 1993 (Beling 1998). Soil samples were collected from the walls and the floor of the UST excavation in accordance with IEPA requirements and analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) (Beling 1998). None of these chemicals were detected (detection limit 1 ug/kg) in the soil samples. Furthermore, the UST passed an integrity test immediately before the UST was removed (Beling 1998a), indicating that leaks from this UST were unlikely. Thus, the site for this UST is assumed to be closed.
- The former 500 gal diesel UST near Bldg 305 (Housing Unit #3, Figure 2-3) was installed by IDoC (IDoC 1992). This tank was upgraded in 1993, then removed in 1997 (Beling 1997). A surface spill associated with the tank's pipeline occurred in 1993 (Beling 1997); the spill was reported to IEPA and was assigned Incident No. 931687. Note that the same incident number was subsequently used in documentation related to the Motor Pool/Bldg 307 UST. The spill area was over-excavated to remove soil contaminated by the surface spill (Beling 1997). In 1997, groundwater monitoring wells were installed in and within 100 ft of the surface spill area. Hydraulic conductivity was measured at 8.84×10^{-4} cm/sec. One round of groundwater samples were collected for BTEX and PAH analyses; all results were below TACO criteria (Beling 1998c). Soil samples were collected from the boreholes and analyzed for BTEX and PAH compounds; all results were either below detection limits or TACO criteria. IEPA approved "No Further Remediation" for this former UST site (IEPA 1998) although the incident remains open in IEPA LUST database because of the Motor Pool/Bldg 307 UST's unresolved status.
- There is no evidence that the former 9725 gal diesel UST in the property owned by FAA was installed by DoD. This tank was abandoned in-place in the 1970s by back-filling with clean sand (Parsons 2005). The UST was removed by FAA in June 2003 but soil samples collected from the tank excavation contained PAHs that exceeded cleanup criteria. These findings were reported to the Illinois Emergency Management Agency (IEMA) and was assigned incident #20031028. A site investigation was conducted by Parsons in December 2004 wherein soil samples were collected from 20-ft boreholes in and around the former UST location and 20-ft deep groundwater monitoring wells were installed (Parsons 2005). A hydraulic conductivity of 2.25×10^{-5} cm/sec was determined through a slug test in one of the monitoring wells. PAHs and BTEX compounds were detected in some of the soil and groundwater samples collected during the December 2004 site investigation but concentrations did not exceed TACO criteria (note: the groundwater data were compared with TACO Class II criteria). IEPA approved "No Further Remediation" for this former UST site in May 2006 (IEPA 2006).
- Out of the five former UST locations, only the former UST near Bldg. 307 in the vicinity of the Vehicle Wash Rack AOC has not achieved closure. Because of beneficial use by IDoC according to the last use data found in Beling (1997), the former UST site is ineligible for funding under Department of Defense's (DoD's) Defense Environmental Restoration Program - Formerly Used Defense Sites program; the tank site is therefore considered as "no DoD action identified (NDAI)" sites.

2.4.3 Site Inspection and Supplemental Site Inspection

Parsons performed a SI in 1996 at specific areas at the HCAFS and one background area (TtEC 2008). The areas include the seven AOPCs being investigated for this project (i.e., three Coal Ash Storage Areas (A, B, and C), Main Entrance, Vehicle Wash Rack, Maintenance Building, and Paint Shed), the

Tile Field, the Septic Tank, and the Lagoon (see Figure 1-2 for area locations; the Lagoon is within the Former Village of Hanna City Water Supply). Soil and groundwater samples were collected from the areas using a direct push probe. Soil samples were analyzed for volatile organic compounds (VOCs), metals, PAHs, pesticides, polychlorinated biphenyls (PCBs), and basic soil parameters (percent solids, pH, moisture content, ash content, organic carbon content, bulk density and specific gravity). Groundwater samples were analyzed for VOCs, PAHs, pesticides, PCBs, and metals (total and soluble).

In response to IEPA's request for additional sampling, Tetra Tech EC (TtEC) conducted a SSI in April 2006 (TtEC 2008). Soil and groundwater samples were collected from the same areas sampled during the SI, with the exception of the Lagoon, where further investigations and activities were halted in 2002 due to Potentially Responsible Party issues stemming from its use by the Village of Hanna City as part of water supply plant operations. Soil and groundwater samples were analyzed for the same suite of compounds as the SI samples, with the exception of pesticides.

The analytical results from the SI and SSI were compared to IEPA's Tiered Approach to Cleanup Objectives (TACO, IAC Section 742) criteria. The major findings from the SI and SSI are as follows (complete data tables are included in Appendix B).

- Of the pesticides analyzed during the SI, only 4,4-DDD and 4,4,-DDT were detected and only in one surface sample at levels significantly below the TACO Tier 1 Residential criteria. No pesticides were detected in any of the groundwater samples. Thus, pesticides can be ruled out as chemicals of potential concern (COPC) for the HCAFS.
- PCBs were not detected in any of the groundwater and soil samples collected during the SI and SSI; detection limits for the analytical methods used were below TACO Tier 1 criteria. Thus, PCBs can be ruled out as COPCs for the HCAFS.
- A number of VOCs were detected in the soil and groundwater samples collected during the SI and SSI but all measured concentrations were below the TACO Tier 1 residential criteria. Thus, VOCs can be ruled out as COPCs for the HCAFS. Note that although benzene was measured in 1998-1999 at a maximum of 1.2 mg/L in MP-MW-2-97 within the former UST location near Bldg 307 (Beling 1999), benzene was not detected in any of the groundwater samples collected during the SI and SSI. The groundwater samples closest to MP-MW-2-97 were collected from the Vehicle Wash Rack AOPC 200 to 300 ft west of MP-MW-2-97.
- PAHs were detected in the soil and groundwater samples collected during the SI and SSI. None of the groundwater detections exceeded the TACO Class I groundwater criteria. However, a number of PAHs exceeded the TACO residential soil criteria for surface and subsurface soils (Table 2-1 and 2-2 respectively), mostly in the surface soil samples (0-0.5 ft bgs, Table 2-1). The PAHs with the lowest Tier 1 residential criteria are benzo(a)pyrene (see maps in Figure 2-4) and dibenzo(a,h)anthracene; the criteria were exceeded most frequently for these two compounds. PAHs are COPCs at the HCAFS because of the TACO residential criteria exceedances. Note that some of the elevated benzo(a)pyrene concentrations were measured in the vicinity of the Paint Shed, Coal Area C, and the Maintenance Building (Figure 2-4). This is also the area where a 2000 gal gasohol UST was removed in 1993 and a stock pile of contaminated soil was located, according to a map (reproduced in Figure 2-1, see Section 2.4.2) from a report describing UST removals at the Hanna City Work Camp (Beling 1998a). The report does not provide information about the source for the contaminated soil stock but other features on this map suggest that the soil might have been associated with UST removals in 1993 at the Hanna City Work Camp (see Section 2.4.2).

- Of the metals measured in the surface and subsurface soil samples (Tables 2-3 and 2-4 respectively), only arsenic exceeded the TACO Tier 1 residential soil criteria (Table 2-4). These exceedances were observed in two soil subsurface soil samples collected in Coal Area Storage-A (Figure 2-5). The construction worker inhalation criterion for mercury was exceeded in one surface soil samples (Table 2-3). Concentrations of arsenic in unfiltered groundwater did not exceed the TACO Tier 1 Class I groundwater criteria (Table 2-5). Metals in unfiltered groundwater samples that exceeded TACO groundwater criteria include iron, lead, manganese, and vanadium. Filtered groundwater samples analyzed during the SI show significantly reduced aluminum concentrations when compared with the associated unfiltered groundwater samples (Table 2-6). Iron, lead, manganese and vanadium in these filtered groundwater samples are below the TACO Class I groundwater criteria (with the exception of manganese in the filtered sample from Coal Area C). Since aluminum is typically associated with suspended particulates (e.g., clay minerals), the comparative results in Table 2-6 suggest that the elevated levels of iron, lead, manganese and vanadium are likely associated with particulates in the groundwater samples. Parsons (2002) also makes a similar observation. Given the soil and groundwater results from the SI and SSI, metals are considered to be COPCs at the HCAFS.
- All analytes were below TACO residential soil and Class I groundwater criteria in soil and groundwater samples collected from the Tile Field/Septic Tank. Thus, this area is no longer considered an AOPC.

In addition to collecting soil and groundwater samples, a metal detector and surface radiation survey in the Magnetron Tube Disposal Area was also conducted as part of the SI (see Figure 1-2 for location of this area). Two small anomalies were identified by the metal detector survey and may correspond to a buried metal object the size of a drum. In the areas where the anomalies were detected, hand shovels were used to excavate to a depth of approximately 4 feet below ground level. No buried objects were found. Furthermore, a surface radiation survey in this area registered dose rates that were either zero millirem/hour or within site background levels.

3. FIELD SAMPLING PLAN

This section of the SAP describes the field procedures to be used during the RI field activities at the HCAFS. Field activities included in the RI are summarized below. Sections 3.1 through 3.6 contain procedures for the field activities. Specifically, these are:

- surface soil sampling at seven AOPCs (Main Entrance, Vehicle Wash Rack, Maintenance Building, Paint Shed, Coal Area A, Coal Area B, Coal Area C) (Section 3.1)
- subsurface soil sampling at four AOPCs (Coal Area A, Coal Area B, Coal Area C, Vehicle Wash Rack) (Section 3.2)
- groundwater sampling from temporary monitoring wells at five AOPCs (Coal Area A, Coal Area B, Coal Area C, Vehicle Wash Rack, Paint Shed) (Section 3.3)
- decontamination of sampling equipment and tools (Section 3.4)
- field quality control procedures and documentation (Section 3.5)
- waste management (Section 3.6)

A summary of the field investigations conducted by TtEC and others at the HCAFS was presented in Section 2.4. The following sections detail the approach to be implemented by GEO for completion of the assigned tasks. The objective of the RI field sampling is to collect samples to provide data that will supplement information gathered during the SI and SSI. The combined data set will be used to support a baseline risk assessment for site AOPCs to identify areas that will require remediation.

Samples will be analyzed by laboratories [primary and Quality Assurance (QA)] holding current DoD Quality Systems Manual (QSM) and National Environmental Laboratory Accreditation Program (NELAP) certifications in accordance with DoD QSM, CELRL Louisville Quality Systems Manual Supplement (LQSMS), and USACE (EM) 200-1-6, Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects. Empirical Laboratories, Nashville, Tennessee and CT Laboratories, Baraboo, Wisconsin have been designated as the primary and QA laboratories, respectively.

3.1 SAMPLING PROGRAM DESIGN

Sampling locations were selected based on a review of historical data collected during the 1996 SI and 2006 SSI and the need to create adequate spatial distribution within each established exposure unit with the use of Visual Sampling Plan (VSP).

3.1.1 Data Quality Objectives for sample placement

The objective of being able to define the extent of contamination associated with past activities at each AOPC is achieved by defining a sample area where contaminant releases were likely to have occurred at each AOPC.

The objective of obtaining a reasonable estimate for an exposure concentration at each AOPC to be used for risk assessment is achieved by collecting at least 8 samples (per Pro-UCL guidance) and defining the sample areas at each AOPC such that sample areal extent corresponds to a reasonable exposure zone for site receptors (e.g., 0.5-acres for a resident receptor).

3.1.2 Technical Approach for Field Investigation and Data Quality Objectives

The objective of the RI field sampling is to collect samples to provide data that will supplement information gathered during the SI and SSI. The combined data set will be used to support a baseline risk

assessment for site AOPCs to identify areas that will require remediation. The definition of exposure units for the site is described below, followed by an abbreviated data quality objectives process.

Exposure units (EU) are defined as the likely area in which a receptor will be affected by a potential contaminant in a given medium. For quantifying risks to residential and correctional facility receptors, Coal Storage Area A, Coal Storage Area B, Vehicle Wash Rack, and the Main Entrance will each be considered as an EU, while the Maintenance Building, Coal Storage Area C and the Paint Shed will be considered as one EU due to their proximity to each other. To obtain representative samples from each EU to supplement data from the SI and SSI, sampling zones were defined in the AOPCs (Figure 3-2), where the shape of the sampling zones with buildings (Vehicle Wash Rack, Paint Shed and Maintenance Building) were defined based on the probable area where any contaminant release would have taken place (i.e., ~100 ft from building perimeters) and where soils are exposed (i.e., unpaved). Note that the sampling zone in the Vehicle Wash Rack does not include the former UST site (Figure 1-2) because, as mentioned previously, there is evidence that the UST was used after the property was transferred from DoD. It is therefore not eligible for FUDS program funding and excluded from this RI. A square 0.5-acre zone was defined as the sampling zone for the Coal Storage Areas and Main Entrance.

For groundwater, the entire site will be considered as one EU for all site receptors; groundwater samples will be collected from the Vehicle Wash Rack and Paint Shed AOPCs. The RI groundwater results will be combined with the groundwater data from the SI and SSI from the Coal Areas, Vehicle Wash Rack and Paint Shed AOPCs to arrive at exposure estimates for the groundwater pathway.

3.2 SURFACE SOIL SAMPLING

Surface soils samples will be collected from the following AOPCs and analyzed for PAHs: Main Entrance, Vehicle Wash Rack, Maintenance Building, Paint Shed, Coal Area A, Coal Area B, and Coal Area C. Additionally, samples will also be collected from Coal Area A and analyzed for mercury and pH. An approximately one-square foot area of the ground cover will be removed with a stainless steel spade or shovel to expose the native soils and replaced once the sample has been collected and the location coordinates recorded.

Once the soil has been exposed and all organic material removed, the area will be scanned with a 10.6 electron volt (eV) photoionization detector (PID) and the readings recorded in the field logbook. A decontaminated stainless steel spade, trowel, or hand auger will then be used to collect from a depth of 0 to 0.5 feet below the top of the exposed soil, the volume of soil needed to adequately fill the sample container(s). The excavated or cored soils will be placed in a decontaminated stainless steel bowl or tray, scanned with a 10.6 eV PID, and mixed to create a homogeneous sample. Excess soil will be returned to the sample area and the sod removed prior to sampling replaced. Upon completion of sampling activities at each location, the coordinates will be recorded with a handheld Global Positioning System unit with sub-foot accuracy and marked with a pin-flag.

Proposed surface soil sampling locations are provided in Figure 3-2. Table 3-1 provides the chemicals of potential concern (COPC) for surface soil at each AOPC included in this RI, a summary of samples collected to date, and the proposed number for this RI. Table 3-2 provides a summary of the number and types of samples to be collected for PAH and mercury laboratory analysis.

Table 3-1. AOPCs and associated data points for surface soil samples.

AOPC	COPCs[1]	Number of Data Points SI/SSI	RI	Total
Coal Area Storage A	PAH	1	7	8
	mercury	3	7	10
Coal Area Storage B	PAH	1	7	8
Coal Area Storage C	PAH	1	7	8
Main Entrance	PAH	2	6	8
Vehicle Wash Rack	PAH	3	6	9
Maintenance Building	PAH	3	6	9
Paint Shed	PAH	3	5	8

[1] COPCs based on SI and SSI

Table 3-2. Summary of surface soil sample collection for laboratory analysis.

Surface soil sampling procedure	COPCs	Number of field samples	Number of QA samples	Number of Quality Control (QC) Field Samples[1] Field duplicate	Matrix spike/matrix spike duplicate
Stainless steel or disposable or hand auger	PAH	44	2	4	2
	mercury	7	1	1	1
	pH[2]	1	1	1	-

[1] Equipment blanks are not included in this table. See Section 3.5.2 for more details regarding field QC samples, including equipment blanks.
[2] One sample for pH analysis will be collected at one boring location from each AOPC where metals are a COPC.

3.3 SUBSURFACE SOIL SAMPLING

Subsurface soil samples will be collected from the following AOPCs and analyzed for the specific parameters: Coal Area A, Coal Area B, Coal Area C (arsenic and pH) and Vehicle Wash Area (PAHs). Samples will be collected with the use of direct push drilling equipment using samplers fitted with new clean acetate liners capable of collecting continuous soil cores up to five-feet in length with a minimum outside diameter of 1.85 inches.

Prior to the initiation of sampling activities, the ground cover will be removed. Decontaminated sampling equipment as described above will be mechanically advanced to a maximum depth of 5 feet bgs. Based on a review of historical data collected during the SI and SSI, the target depths for sample collection will be 2 to 3 and 4 to 5 feet bgs. Once the samplers have been advanced to their maximum designed capacities, the tooling will be removed and the acetate liner extracted and capped on both end. A new acetate liner will be used for each sample location. Upon completion of the borings, the acetate liners will be cut open and the soil core exposed. The entire soil core length will be scanned with a 10.6 eV PID and the readings recorded in the field logbook. The soil from the desired sampling intervals will then be placed in a decontaminated bowl or tray and mixed to create a homogeneous sample prior to placing in the sample container(s). Upon completion of the boring, granulated or chipped bentonite will be placed in the bore hole by gravity methods to a depth of approximately 0.5- to 1-foot bgs. The ground cover removed prior to advancement of the sampling equipment will then be replaced over the boring location to restore the ground surface. Note that due to the proposed installation of temporary monitoring wells and collection of groundwater samples in the Vehicle Wash Area, these borings will be abandoned as detailed in Section 3.3.3.

Proposed subsurface soil sampling locations are provided in Figure 3-3. Table 3-3 provides the COPCs for subsurface soil at each AOPC included in this RI, a summary of samples collected to date, and the proposed number for this RI. Table 3-4 provides a summary of the number and types of samples to be collected for arsenic and PAHs laboratory analysis, respectively.

Tables 3-5 and 3-6 provide Human Health Risk Screening Levels for PAHs and metals in soils, respectively; Tables 3-7 and 3-8 provide EPA Ecological Soil Screening Levels for PAHs and metals, respectively.

Table 3-3. AOPCs and associated data points for subsurface soil samples.

		Number of Data Points		
AOPC	**COPCs[1]**	**SI/SSI**	**RI**	**Total**
Coal Area Storage A	arsenic	3	14	17
Coal Area Storage B	arsenic	3	14	17
Coal Area Storage C	arsenic	3	14	17
Vehicle Wash Rack	PAH	2	12	14

[1] COPCs based on SI and SSI
Samples for pH analysis will be collected at the AOPCs where arsenic is a COPC
Subsurface samples will be collected from 2-3 and 3-4 feet bgs at all subsurface soil AOPCs.
NS = not scheduled for sampling

Table 3-4. Summary of subsurface soil sample collection for laboratory analysis.

				Number of QC Field Samples[1]	
Surface soil sampling procedure	**COPCs**	**Number of field samples**	**Number of QA samples**	**Field duplicate**	**Matrix spike/matrix spike duplicate**
Direct push drilling equipment	arsenic	42	2	4	2
	pH[2]	3	1	1	-
	PAH	12	1	1	1

[1] Equipment blanks are not included in this table. See Section 3.5.2 for more details regarding field QC samples, including equipment blanks.
[2] One sample for pH analysis will be collected from one interval at one boring location from each AOPC where arsenic is a COPC.

Table 3-5. Human Health Risk Screening Levels for PAHs in soils.

Chemical	Residential: Ingestion[1] (mg/Kg)	Residential: Inhalation[1] (mg/Kg)	Soil Component of GW Pathway (Class I)[1] (mg/Kg)	Industrial/ Commercial: Ingestion[2] (mg/Kg)	Industrial/ Commercial: Inhalation[2] (mg/Kg)	Construction Worker: Ingestion[2] (mg/Kg)	Construction Worker: Inhalation[2] (mg/Kg)	Region 9 Residential PRG[3] (mg/Kg)
Acenaphthene	4,700	---	570	120,000	---	120,000	---	3,400
Acenaphthylene[4]	2,300	---	85	61,000	---	61,000	--	NA
Anthracene	23,000	---	12,000	610,000	---	610,000	---	17,000
Benzo(a)anthracene	0.9	---	2	8	---	170	---	0.15
Benzo(a)pyrene	0.09	---	8	0.8	---	17	---	0.015
Benzo(b)fluoranthene	0.9	---	5	8	---	170	---	0.15
Benzo(g,h,i)perylene[4]	2,300	---	27,000	61,000	---	61,000	---	NA
Benzo(k)fluoranthene	9	---	49	78	---	1,700	---	1.5
Chrysene	88	---	160	780	---	17,000	---	15
Dibenzo(a,h)anthracene	0.09	---	2	0.8	---	17	---	0.015
Fluoranthene	3,100	---	4,300	82,000	---	82,000	---	2,300
Fluorene	3,100	---	560	82,000	---	82,000	---	2,300
Indeno(1,2,3-cd)pyrene	0.9	---	14	8	---	170	---	0.15
Naphthalene	1,600	170,000	12	41,000	270	4,100	1.8	150
Phenanthrene[4]	2,300	---	200	61,000	---	61,000	---	NA
Pyrene	2,300	---	4,200	61,000	---	61,000	---	1,700

[1] TACO Appendix B, Table A Tier 1 Soil Remediation Objectives for Residential Properties; included in Appendix D of this report.
[2] TACO Appendix B, Table B Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties; included in Appendix D of this report.
[3] EPA Region 9 Preliminary Remediation Goals (PRG) http://epa-prgs.ornl.gov/chemicals/download.shtml; included in Appendix D of this report.
[4] Non-TACO Chemicals Soil Remediation Objectives for Residential Properties; included in Appendix D of this report.

Table 3-6. Human Health Risk Screening Levels for metals in soils.

Chemical	Residential: Ingestion[1] (mg/Kg)	Residential: Inhalation[1] (mg/Kg)	Soil Component of GW Pathway (Class I)[2] (mg/Kg)	Industrial/ Commercial: Ingestion[3] (mg/Kg)	Industrial/ Commercial: Inhalation[3] (mg/Kg)	Construction Worker: Ingestion[3] (mg/Kg)	Construction Worker: Inhalation[3] (mg/Kg)	Region 9 Residential PRG[4] (mg/Kg)
Aluminum	NA	---	NA	---	---	---	---	77,000
Antimony	31	---	5	820	---	82	---	31
Arsenic	13	750	25	13	1,200	61	25,000	0.39
Barium	5500	690,000	260	140,000	910,000	14,000	870,000	15,000
Beryllium	160	1,300	1.1	4,100	2,100	410	44,000	160
Cadmium	78	1,800	1	2,000	2,800	200	59,000	70
Calcium	Nutrient	---	---	Nutrient	---	Nutrient	---	NA
Chromium	230	270	21	6,100	420	4,100	690	230
Cobalt	4,700	---	---	120,000	---	12,000	---	NA
Copper	2,900	---	330	82,000	---	8,200	---	3,100
Iron	NA	---	---	---	---	---	---	55,000
Lead	400	---	23	800	---	700	---	400
Magnesium	325,000	---	---	Nutrient	---	730,000	---	NA
Manganese	1,600	69,000	---	41,000	91,000	4,100	8,700	1,800
Mercury	23	10	0.01	610	16	61	0.1	23
Nickel	1,600	13,000	20	41,000	21,000	4,100	440,000	1,600
Potassium	Nutrient	---	---	Nutrient	---	Nutrient	---	NA
Selenium	390	---	1.3	10,000	---	1000	---	390
Silver	390	---	0.24	10,000	---	1000	---	390
Sodium	Nutrient	---	---	Nutrient	---	Nutrient	---	NA
Thallium	6.3	---	1.6	160	---	160	---	5.1
Vanadium	550	---	980	14,000	---	1400	---	390
Zinc	23,000	---	1,000	610,000	---	61,000	---	23,000

[1] TACO Appendix B, Table A Tier 1 Soil Remediation Objectives for Residential Properties; included in Appendix D of this report.
[2] TACO Appendix B, Table C pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater); included in Appendix D of this report. For the purposes of completing this table, the lowest concentration was used.
[3] TACO Appendix B, Table B Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties; included in Appendix D of this report.
[4] EPA Region 9 Preliminary Remediation Goals (PRG) http://epa-prgs.ornl.gov/chemicals/download.shtml; included in Appendix D of this report.

Table 3-7. EPA Ecological Soil Screening Levels for PAHs.

Chemical	Plants	Soil Invertebrates	Wildlife Avian	Wildlife Mammalian
		(mg/Kg dry weight in soil)		
Low Molecular Weight PAHs	*NA*	29	*NA*	100
Acenaphthene				
Acenaphthylene				
Anthracene				
Fluorene				
Naphthalene				
Phenathrene				
High Molecular Weight PAHs	*NA*	18	*NA*	1.1
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthene				
Benzo(g,h,i)perylene				
Benzo(k)fluoranthene				
Chyrsene				
Dibenzo(a,h)anthracene				
Fluoranthene				
Indeno(1,2,3-cd)pyrene				
Pyrene				

NA = Not available. Data were insufficient to derive Eco-SSL
Source: http://www.epa.gov/ecotox/ecossl/
Units in µg/Kg dry weight in soil

Table 3-8. EPA Ecological Soil Screening Levels for metals.

Chemical	Plants	Soil Invertebrates	Wildlife Avian	Wildlife Mammalian	pH
		(mg/Kg dry weight in soil)			
Aluminum					<5.5
Antimony	*NA*	78	*NA*	0.27	
Arsenic	18	NA	43	46	
Barium	*NA*	330	*NA*	2000	
Beryllium	*NA*	40	*NA*	21	
Cadmium	32	140	0.77	0.36	
Chromium^{+3}	*ND*	*ND*	26	34	
Chromium^{+6}	*ND*	*ND*	*NA*	130	
Cobalt	13	*NA*	120	230	
Copper	70	80	28	49	
Lead	120	1700	11	56	
Manganese	220	450	4300	4000	
Nickel	38	280	210	130	
Selenium	0.52	4.1	1.2	0.63	
Silver	560	*NA*	4.2	14	
Vanadium	*NA*	*NA*	7.8	280	
Zinc	160	120	46	49	

Note: arsenic is the only chemical of potential concern for soils included in this RI
NA = Not available. Data were insufficient to derive Eco-SSL
ND = Not enough data to derive Eco-SSL
Source: http://www.epa.gov/ecotox/ecossl/
Units in µg/Kg dry weight in soil

3.4 GROUNDWATER SAMPLING FROM TEMPORARY MONITORING WELLS

3.4.1 Temporary monitoring well installation

When possible, as in the case of the Vehicle Wash Rack area, temporary monitoring wells will be installed in the same borings used to collect the subsurface soil samples. If no existing bore hole exists, as in the case of the Paint Shed area, and upon completion of soil sampling activities decontaminated tooling fitted with an expendable drive point will be mechanically advanced to the desired depth after removing the ground cover. Borings will be advanced until sufficient groundwater is encountered to allow for sample collection or to a depth not to exceed 20 feet bgs. Upon reaching final depth, a 1-inch Schedule 40 polyvinyl chloride (PVC) temporary well (casing and screen) will be placed inside the tooling and lowered to the bottom of the boring; screens will be 0.010-slot and no more than 5-feet in length. Sufficient pressure will then be applied to the well string while removing the tooling to dislodge the drive point and expose the screen. Once the temporary wells are in place and the tooling removed, filter pack sand will be placed in the annulus by gravity method to cover the screened interval and then topped with a minimum 6-inch lift of granulated or chipped bentonite for an annular seal and hydrated if above the static water table. Water levels will be measured upon completion of installation relative to ground surface and recorded in the field logbook.

Prior to sampling the temporary monitoring wells, water level and depth to bottom of the well will be measured relative to ground surface and recorded in the field log book. Once deemed appropriate for sampling, dedicated ¼-inch diameter Teflon-lined polyethylene tubing will be placed in the temporary well to a depth in the center of or slightly above the center of the screened interval. The well will then be

purged with a peristaltic pump until a minimum of three well volumes has been removed. Purge rate will not exceed 500 mL/minute and will be reduced accordingly if drawdown is suspected in the well to a rate less than or equal to the rate of recharge. If the purge rate cannot be lowered sufficiently to prevent purging the wells dry, the tubing will be lowered to the bottom of the well and all water vacated. Purge water will be temporarily stored in carboys and transferred to Department of Transportation (DOT)-approved drums upon completion of purging activities. At the completion of purging, tubing will remain dedicated to the well and left in place until the sampling event.

3.4.2 Groundwater sampling

Groundwater samples will be collected from the following AOPCs and analyzed for TSS as well as the specific parameters: Vehicle Wash Rack (metals) and Paint Shed (lead). Proposed sample locations are provided in Figure 3-3. Table 3-9 provides the COPCs for groundwater at each AOPC included in this RI, a summary of samples collected to date, and the proposed number for this RI. Due to the high silt content in historical samples, both unfiltered and filtered (0.45 µm) samples will be collected to demonstrate that high metals are associated with high TSS (undrinkable) groundwater. Samples will be collected a minimum of 24-hours after initial purging using a peristaltic pump with dedicated tubing and low-flow (minimal drawdown) sampling protocol.

Advantages to low-flow purging include samples which are representative of the mobile load of contaminants present (dissolved and colloid-associated); minimal disturbance of the sampling point thereby minimizing sampling artifacts; less operator variability, greater operator control; reduced stress on the formation (minimal drawdown); less mixing of stagnant casing water with formation water; reduced need for filtration and, therefore, less time required for sampling; smaller purging volume which decreases waste disposal costs and sampling time; better sample consistency, reduced artificial sample variability (EPA *Ground Water Issue Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures*, EPA/540/S-95/504, April 1996).

Some disadvantages of low-flow purging are higher initial capital costs; greater set-up time in the field; need to transport additional equipment to and from the site; increased training needs; resistance to change on the part of sampling practitioners; and concern that new data will indicate a change in conditions and trigger an action (EPA 1996),

Upon completion of vacating the stagnate water in the tubing, parameter stabilization measurements will commence. Standard water quality field parameters (i.e., temperature, pH, specific conductance) will be monitored at five minute intervals until stable values are obtained utilizing a Hydrolab® Quanta water quality meter calibrated to the manufacturer's guidelines. Parameters will be considered stable when variations in temperature, pH, and specific conductance do not exceed ± 0.5°C, ± 0.1 SU, and ± 0.3% respectively for three consecutive readings at five-minute intervals. Although not included in stabilization parameters, Dissolved Oxygen (DO), Oxygen Reduction Potential (ORP), and turbidity readings will also be collected. All data will be recorded in the field logbook. These parameters also will be measured using a Hydrolab® Quanta following manufacturer's procedures. The Hydrolab® is equipped with a flow cell and pH, DO, ORP, temperature, specific conductance, and turbidity probes. The specifications on the probes are as follows:

- pH: Range: 0 to 14 pH units; Accuracy: ± 0.2 units; Resolution: 0.01 units.
- DO: Range: 0 to 50 mg/L; Accuracy: ± 0.2 mg/L for 20mg/L; Resolution: 0.01 mg/L.
- ORP: Range: -999 to 999 mV; Accuracy: ± 20 mV; Resolution: 1 mV.
- Temperature: Range: -5ºC to 50ºC; Accuracy: ± 0.2ºC; Resolution: 0.01ºC.

- Specific conductance: Range: 0 to 100 mS/cm; Accuracy: ± 1% of reading ± 1 count; Resolution 4 digits.
- Turbidity: Range: 0 to 1000 nephelometric turbidity units (NTU); Accuracy: ± 5% of reading ± 1 NTU; Resolution: 0.1 NTU < 100 NTU/1 NTU ≥ 100 NTU.

After field parameter measurements are complete, samples for off-site laboratory analysis will be collected (refer to Tables 3-10 and 3-11 for number of samples). Table 3-12 provides Human Health Risk Screening Levels for metals in groundwater. Table 3-13 provides EPA Region 5 Ecological Soil Screening Levels. Sample containers and preservation are in Table 3-14. Samples will be collected at a flow rate of ≤ 200 mL/minute.

Due to the use of dedicated groundwater sampling equipment, no decontamination will be required.

Table 3-9. AOPCs and associated data points for groundwater samples.

		Number of Data Points		
AOPC	**COPCs[1]**	**SI/SSI**	**RI**	**Total**
Coal Area Storage A	metals	3	1	4
Coal Area Storage B	metals	3	1	4
Coal Area Storage C	metals	3	1	4
Vehicle Wash Rack	metals	3	3	6
Paint Shed	lead	3	4	7

[1] COPCs based on SI and SSI
NS = not scheduled for sampling

Table 3-10. Summary of groundwater sample collection at the Vehicle Wash Rack for metals and TSS analysis.

			Number of QC Field Samples[1]	
Groundwater sampling procedure	**Number of field samples[2]**	**Number of QA samples**	**Field duplicate**	**Matrix spike/matrix spike duplicate**
Low-flow or minimum/no purge sampling from monitoring wells	7/7	1/1	1/1	1/1

[1] Equipment blanks are not included in this table. See Section 3.5.2 for more details regarding field QC samples, including equipment blanks.
[2] Filtered (0.45 µm) and unfiltered samples will be collected for metals analysis.

Table 3-11. Summary of groundwater sample collection at the Paint Shed for lead and TSS analysis.

			Number of QC Field Samples[a]	
Groundwater sampling procedure	**Number of field samples[2]**	**Number of QA samples**	**Field duplicate**	**Matrix spike/matrix spike duplicate**
Low-flow or minimum/no purge sampling from monitoring wells	3/3	1/1	1/1	1/1

[a] Equipment blanks are not included in this table. See Section 3.5.2 for more details regarding field QC samples, including equipment blanks.
[2] Filtered (0.45 µm) and unfiltered samples will be collected for metals analysis.

Table 3-12. Human Health Risk Screening Levels for metals in groundwater.

Analyte	TACO Class I Groundwater Criteria, Table E (µg/L)[1]	Maximum Contaminant Level[2] or Maximum Nutrient[3] (µg/L)
Aluminum	None	None
Antimony	6	6
Arsenic	50	10
Barium	2000	2000
Beryllium	4	4
Cadmium	5	5
Calcium	None	500,000
Chromium	100	100
Cobalt	1000	None
Copper	650	1300
Iron	5000	5000
Lead	7.5	15
Magnesium	None	200,000
Manganese	150	None
Mercury	2	2
Nickel	100	None
Potassium	None	1,000,000
Selenium	50	50
Silver	50	None
Sodium	None	1,000,000
Thallium	2	2
Vanadium	49	None
Zinc	5000	None

[1] TACO Appendix A, Table E; included in Appendix D of this report
[2] Source: http://www.epa.gov/safewater/contaminants/index.html#inorganic
[3] Essential nutrient screening concentrations for water are calculated as Recommended Daily Allowance ÷ 2 /day, where 2 L/day is a Resident Adult drinking water ingestion rate.

3.4.3 Temporary monitoring well abandonment

Upon completion of sampling activities the temporary monitoring wells will be abandoned in place and terminated a minimum of 2-feet bgs. A tremmie line will be placed into the bottom of the well and the monitoring wells will be pressure grouted by tremmie methods with a high-solids bentonite grout to approximately 0.5-foot bgs. When possible, the upper sections of casing above the annular seal will be unscrewed; otherwise the area around the monitoring wells will be excavated to allow for the casing to be cut. The grout will be allowed to cure for a minimum of 24-hours. After this time, the borings will be checked for settlement and topped with granular or chipped bentonite to approximately 0.5-foot bgs. The ground cover removed prior to surface soil sampling or monitoring well installation will then be replaced to restore the area.

Table 3-13. EPA Region 5 RCRA Ecological Screening Levels for metals in groundwater.

Chemical	Water (µg/L)
Aluminum	*NA*
Antimony (Total)	80
Arsenic (Total)	148
Barium (Total)	220
Beryllium (Total)	3.6
Cadmium (Total)	0.15
Calcium	*NA*
Chromium (Total)	42
Cobalt (Total)	24
Copper (Total)	1.58
Iron	NA
Lead (Total)	1.17
Magnesium	*NA*
Manganese	*NA*
Mercury (Total)	0.0013
Nickel (Total)	28.9
Potassium	*NA*
Selenium (Total)	5
Silver (Total)	0.12
Sodium	*NA*
Thallium (Total)	10
Vanadium (Total)	12
Zinc (Total)	65.7

NA = Chemical not included in EPA Region 5 Ecological Screening Levels
Source: http://www.epa.gov/reg5rcra/ca/ESL.pdf
RCRA = Resource Conservation and Recovery Act

3.5 DECONTAMINATION OF SAMPLING EQUIPMENT

Non-disposable soil sampling equipment (e.g., direct push samplers, stainless steel spatulas and bowls) will be cleaned between sampling locations using Liquinox® (or equivalent) and potable water, followed by a potable water rinse. Cleaned tools will be wrapped in aluminum foil if they will not be used immediately. Cleaning of soil sampling tools will be performed in a designated area at the site. Decontamination water will be collected and disposed of following procedures found in Section 3.6.

Due to the use of disposable groundwater sampling equipment, no decontamination of such will be performed.

3.6 FIELD QUALITY CONTROL PROCEDURES AND DOCUMENTATION

3.6.1 Field Instrument Calibration and Maintenance

The GEO Project Manager or his designee will be responsible for ensuring that instrumentation for measuring DO, pH, and ORP are of the proper type, accuracy, and measurement range for the test being performed.

All field measurement instruments must be calibrated according to the manufacturer's instructions prior to the commencement of the day's sampling activities. Calibration information shall be documented on instrument calibration and maintenance log sheets or in the designated field logbook. Information to be

recorded includes the date, the operator, and the calibration standards (concentration, manufacturer, lot number, expiration date, etc.). All project personnel using measuring equipment or instruments in the field shall be trained in the calibration and usage of the equipment, and are personally responsible for ensuring that the equipment has been properly calibrated prior to its use. In addition, all field instruments must undergo response verification checks at the end of the day's activities and at any other time that the user suspects or detects anomalies in the data being generated. The checks consist of exposing the instrument to a known source of analyte (e.g., the calibration solution), and verifying a response. If an unacceptable instrument response is obtained during the check (i.e., not within specifications), the data shall be labeled suspect, the problem documented in the site logbook, and appropriate corrective action taken. Any field equipment found to be out of calibration shall be recalibrated. When instrumentation is found to be out of calibration or damaged, an evaluation shall be made to ascertain the validity of previous test results since the last calibration check. If it is necessary to ensure the acceptability of suspect items, the originally required tests shall be repeated (if possible), using properly calibrated equipment. Any field instrument consistently found to be out of calibration shall be repaired or replaced.

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented on instrument calibration and maintenance forms and in a designated field logbook, and shall be undertaken only by personnel who have the appropriate skills and/or training in the type of maintenance required.

3.6.2 Field QC Samples

Equipment blanks (EB) shall be collected by pouring/pumping deionized (DI) water over and/or through either decontaminated equipment or disposable equipment, and collecting the rinseate. Equipment blanks will be collected at the rate of one per day. Analysis of field EBs will be identical to analysis of the associated environmental samples.

A **temperature blank** will be sent with each cooler of samples to verify that the cooler temperature has been maintained at 4°C. A vial shall be filled with either potable or DI water, and labeled with "Cooler Temperature Blank" and the date. The laboratory shall record the temperature of the blank water on the chain of custody immediately upon cooler arrival.

Field duplicate (FD) samples will be analyzed by the primary off-site laboratory to evaluate the reproducibility of the sampling procedures. FD samples will be collected at a rate of one duplicate for up to every 10 environmental samples of the same matrix (see Tables 3-2, 3-4, 3-10, and 3-11). The duplicate samples will be collected from the same location and at the same time as the original environmental sample; however, the duplicate samples will be "coded" with an unique sample identifier in such a manner that the laboratory will not be able to determine of which original field sample they are duplicated (i.e., "blind" duplicates). An explanation of the duplicate "coding" is provided in Section 3.5.10, and duplicate samples will be noted in the field logbook. Preservation and analysis of duplicate samples will be identical to those for the environmental samples.

Split Samples. Samples that are split off primary samples (normally 5% of primary) are called QA samples, and are to be analyzed by a separate certified laboratory. Split samples will be collected at a rate of one duplicate for up to every 20 environmental samples of the same matrix (see Tables 3-2, 3-4, 3-10, and 3-11).

3.6.3 Field Logbooks

Documentation in field logbooks is an important record for reconstructing field and sample handling activities. The logbooks will become part of the project file at the completion of the field activities. Any deviation from accepted practices and procedures and corrective actions will be documented in the logbook. All field logbooks will be bound with consecutively numbered pages. The following guidelines regarding logbook use will be followed. Additionally, Sediment/Soil Data Sheets, Monitoring Well Data Sheets and Equipment Calibration Forms (Appendix B) will be utilized in the field to capture at minimum the following information: weather conditions, persons on site, purge information, instrument calibration and readings, and sample collection information.

- Entries will be legibly written using indelible ink of sufficient detail such that independent readers can reconstruct activities.
- The GEO Project Manager or his designee will be responsible for keeping track of the logbooks used for this project.
- Logbook corrections will be made by drawing a single line through the original entry (such that the latter can still be read) and writing the correction beside it. The correction will be initialed and dated.
- Pages will not be removed from the logbooks.
- Observations will be recorded in the logbook as soon as possible.
- The first entry for each day shall be made on a new, previously blank page.
- Each page will be signed and dated, and all entries will include the time when the information was recorded.

Photographs may be taken during sample acquisition activities; these will be taken using a digital camera. In addition, the following information shall be recorded in the logbook for each photograph.

- Date, time, location and direction of photograph
- Description of photograph taken

Prior to taking photographs, the date and time setting on the digital camera shall be verified to be correct in order to correlate photograph digital files with field notes.

GEO shall hold all project records for seven years.

3.6.4 Field Performance Audits

GEO will ensure quality in the field work by following the USACE three-phase control process (Section 3.3.4. of USACE EM-200-1-3), where the three phases consist of the preparatory phase, initial phase, and follow-up phase. The Project Quality Control (QC) Manager, or designee (e.g. Project Manager), will conduct inspections for all three phases. The preparatory phase inspection will be performed before field activities are initiated and will consist of: (1) conducting an inventory of equipment and supplies needed for soil and groundwater sampling, and (2) making sure that all field personnel have the required training and are cognizant of sampling and documentation procedures for the project. An initial phase inspection will occur when the field activities are initiated, and will consist of inspecting documentation and field supplies to ensure compliance with project requirements. Follow-up phase inspections will be conducted on an “as-needed” basis to ensure continued compliance with project requirements. Periodically, general procedures and sample documentation will be checked by the Project QC Manager or designee.

The GEO Project Manager and Field Operations Manager will ensure that all field personnel are cognizant of project sampling and documentation procedures, and any other pertinent requirements. Equipment and supplies will be inventoried, and field instrumentation will be checked to ensure that all are in working order.

Surveillance of field program activities will be conducted by the GEO Project Manager or his designee. USACE and/or IEPA personnel may accompany GEO personnel into the field to perform an inspection of the field program, to verify that sampling is being correctly implemented according to all project documents. All deficiencies noted during the audit shall be identified by USACE and/or IEPA to the GEO Project Manager, with a recommended corrective action for compliance. Additional inspections may be warranted to ensure that corrective actions of major deficiencies/problems identified in an initial inspection have been implemented.

3.6.5 Corrective Actions

Any deviations from the specified procedures within approved project plans due to unexpected site-specific conditions shall warrant corrective action. All errors, deficiencies, or other problems shall be brought to the immediate attention of the Project Manager, who in turn shall contact the Project QC Manager (or designee if applicable), USACE and IEPA. Corrective actions are most effective if discrepancies are recognized and resolved at the lowest level since, at these levels, the actions tend to be most immediate. Procedures have been established to ensure that conditions adverse to data quality are promptly investigated, evaluated and corrected. Typically, the required steps for review and implementation of a change are as follows:

- Identify the problem
- Determine the cause of the problem
- Develop a corrective action to eliminate the problem, in consultation with the personnel who identified the problem and who will implement the change
- Complete the required form describing the change and its rationale (see below for form requirements)
- Obtain all required written approvals
- Implement the corrective action
- Verify that the change has eliminated the problem.

3.6.6 Changes in the Field Program

During the field investigation, all changes to the survey and/or sampling program must be documented on a Field Change Request (FCR) form. FCRs shall be numbered serially, starting with the number “01”. Copies of the FCR must be maintained by the field team and by the Project Manager in the project management files. FCR forms shall include an explanation of the problem and a proposed solution. Each FCR must be approved by the necessary personnel (e.g., GEO Project Manager, USACE, IEPA) before implementation of the change occurs. At a minimum, copies of the approved FCR form will be distributed to USACE, IEPA, and the following GEO personnel: the Project Manager and the Project QC Manager and other field staff as applicable, and the project files. The Project Manager shall be responsible for the controlling, tracking, implementing, and distributing of all identified changes/FCR forms.

3.6.7 Sample custody, handling, and holding times

Table 3-14 summarizes the sample containerization, preservation and holding times for soil and groundwater samples to be collected during the RI field activities at the HCAFS. More details regarding sample handling are shown below.

3.6.8 Documentation of Custody, Sample Packaging and Shipping

Sample custody shall be strictly maintained and carefully documented each time the sample material is collected, transported, received, prepared, and analyzed. Custody procedures are necessary to ensure the integrity of the samples, and samples collected during the field investigation must be traceable from the time the samples are collected until they are disposed of and/or stored, and their derived data are used in the final report. Sample custody is defined as (1) being in the sampler's possession; (2) being in the sampler's view, after being in the sampler's possession; (3) being locked in a secured container, after being in the sampler's possession; and (4) being placed in a designated secure area.

Field custody procedures shall be implemented for each sample collected. The field sampler shall be responsible for the care and custody of the samples until they are properly transferred or dispatched. To assure the integrity of the samples, the samples are to be maintained in a designated, secure area and/or be custody sealed in the appropriate containers prior to shipment.

Each environmental sample will be properly identified and individually labeled. Appendix B includes an example of a sample label (see Section 3.5.10 for sample labeling details). Completed sample labels will be covered by wide clear tape, unless labels are waterproof and indelible ink is used to write label information. Samples (and associated chain-of-custody form) will be placed in coolers with packing materials that would prevent bottle breakage during shipment (e.g., bubble wrap) and with enough ice to maintain temperature at approximately 4°C. Ice will be double-bagged and cooler drains taped shut to prevent leakage. Coolers will be wrapped with strapping tape in such a manner that the tape goes completely around each cooler in two places. Signed and dated custody seals will be affixed to the coolers such that these will be broken if the coolers are opened. Packed coolers will be shipped for next-day delivery to the primary and QA laboratories (contacts and shipping information for these laboratories shown in Table 4-1 of this document).

Chain-of-custody forms (examples provided in Appendix B) will accompany the associated samples from time of collection to receipt by the analytical laboratory. Completed chain-of- custody forms shall become part of project records and will be held by GEO for seven years. The field chain-of-custody procedures shall follow requirements in *Appendix F, Sample Documentation and Shipment Instructions* of USACE EM 200-1-3 (USACE, 2001). A summary of these requirements is as follows:

- A chain-of-custody form is completed by the field investigator(s) during preparation of samples for shipment. The completed chain-of-custody form shall accompany the associated samples from time of collection to receipt by the analytical laboratory.

- The chain-of-custody shall be completed using indelible ink, and shall contain the name and contact information of the field investigator who is assuming responsibility for the samples, the USACE contract number, project name, and project location. The chain-of-custody record shall be placed in a plastic bag and attached to the inside of the cooler lid.

- Sample information in a chain-of-custody form must match associated sample container labels.

- Chain-of-custody adhesive seals signed and dated by the field investigator shall be used on containers and/or shipping coolers prior to sample shipment such that if a sealed container or cooler is opened, the seal would be broken.

3.6.9 Sample Labeling

Consistent labeling practices ensure accurate sample handling and tracking. Hence, all samples shall be labeled using indelible ink with the following information:

- Site name
- Sample number
- Sample description (location, depth, etc)
- Sampling data and time
- Initials of sampler
- Method of sample preservation, if any
- Type of analyses to be performed (e.g., "8270C SIM")

Example sample container labels are provided in Appendix B. Note that labels are provided directly from the bottle supplier/manufacturer so variations may exist between the examples and the actual labels used. However, all information provided above will be included.

3.6.10 Sample Numbering System

A sample numbering system shall be used to identify each sample collected and submitted for analysis to assist in the tracking of samples and to facilitate retrieval of analytical results. The sample identification numbers for each sampling effort shall be used on sample labels, chain-of-custody forms, field logbooks, field sheets and all other applicable documentation. A listing of all sample identification numbers shall be recorded in the field logbook. QC samples shall be disguised using the same numbering system selected for the field samples.

The sample number shall consist of four distinct fields:

XXXX #### tt YYMM

where,

XXXX = site location designation

HCCA = Hanna City Coal Area A
HCCB = Hanna City Coal Area B
HCCC = Hanna City Coal Area C
HCME = Hanna City Main Entrance
HCVW = Hanna City Vehicle Wash Rack
HCMB = Hanna City Maintenance Building
HCPS = Hanna City Paint Shed

= unique four digit sample number specific to the sampling location. The following prefixes will be used followed by the sampling location number designation.

SS = surface soil
SB = subsurface soil
GW = groundwater

tt = sample Type:

01 = primary sample
02 = duplicate (QC) sample
03 = QA sample

YYMM = year/month (0808)

Example:

HCVWSS01010808: surface soil sample collected at Hanna City Vehicle Wash Rack (HCVW) from surface soil location SS-01 (SS01), primary sample (01), August 2008 (0808).

HCVWSB01010808: subsurface soil sample collected at Hanna City Vehicle Wash Rack (HCVW) from soil boring SB-01 (SB01), primary sample (01), August 2008 (0808).

HCVWGW01010808: groundwater sample collected at Hanna City Vehicle Wash Rack (HCVW) from groundwater sampling location GW-01 (GW01), primary sample (01), August 2008 (0808).

HCVWSS01020808: surface soil sample collected at Hanna City Vehicle Wash Rack (HCVW) from surface soil location SS-01 (SS01), QC sample (02), August 2008 (0808).

HCVWSS01030808: surface soil sample collected at Hanna City Vehicle Wash Rack (HCVW) from surface soil location SS-01 (SS01), QA sample (03), August 2008 (0808).

HCEB01020802: Hanna City equipment blank (EB) sample (HCEB) collected from the first piece of sampling equipment (01), QC sample (02), August 2008 (0808).

Each sample collected shall be assigned a unique sample number. Sample numbers shall change when the location changes. Sample numbers shall not change because different analyses are requested. For example, water samples collected at the same location, date, and time for all analyses shall all have the same sample number, although the various sample aliquots should be collected in different containers.

3.6.11 Holding Times and Turnaround Time

Each analytical method has a specified holding time for the field samples (see Table 3-14 as defined in the specific method procedure. The laboratory shall be required to analyze samples within the maximum holding times as provided by the specific method and will strive to have all reporting completed within 15 business days.

Table 3-14. Sample containers, preservation and holding times.

Sample Medium	Analytes/Method	Container	Preservation	Holding Time
Soil	PAHs (8270C SIM)	4 oz. glass	Cooled to 4° C	14 days collection to extraction 40 days extraction to analysis
Soil	Metals (6010B/7471A)	4 oz. glass	Cooled to 4° C	6 months collection to analysis
Soil	pH (9045D)	4 oz. glass	Cooled to 4° C	Immediately upon receipt
Groundwater (filtered and unfiltered)	Metals (6010B/7470A)	250-mL HDPE	Cooled to 4° C, HNO_3 to pH < 2	6 months collection to analysis 28 days collection to analysis (mercury)
Groundwater	TSS (160.2)	250-mL HDPE	Cooled to 4° C,	Immediate upon receipt and check-in
Groundwater (for EBs only)	PAHs (8270C SIM)	1-L Amber Glass	Cooled to 4° C,	7 days from collection to extraction 40 days from extraction to analysis

3.7 WASTE MANAGEMENT

The anticipated types of Investigative Derived Waste (IDW) to be generated by groundwater and soil sampling include personnel protective equipment (PPE), plastic sheeting, disposable sampling equipment, excess soil, decontamination water, and purged groundwater. All IDW will be stored on-site in DOT-approved steel drums and with secondary containment. One 55-gallon drum will be used for PPE, plastic sheeting, and disposable sampling equipment, while separate drums (estimated to be a maximum of two 55-gallon drums) will be used for water (decontamination water and purged groundwater) and soil. PPE, plastic sheeting, and disposable sampling equipment will be considered to be under the same waste classification as the groundwater or soil with which it came into contact. IDW drums will be temporarily stored on-site in secondary containment within a secured area pending characterization. Upon receipt and review of analytical data, IDW will be classified as non-hazardous or hazardous and picked up by a waste disposal company to be hired by GEO within 90 days of generation. Waste disposal manifest sheets will be included with the RI report.

4. QUALITY ASSURANCE PROJECT PLAN

This section of the SAP constitutes the QAPP for the HCAFS field investigation. The objectives of this QAPP are (1) to describe the QA and QC activities to be implemented during laboratory analyses, (2) to ensure the integrity of the work to be performed and (3) to ensure that the data obtained will be of the appropriate type and quality for its intended use. This plan has been prepared and reviewed in accordance with:

- the CELRL SOW for the HCAFS RI/FS project dated 05 February 2008
- USACE (EM) 200-1-3, Requirements for the preparation of sampling and analysis plans (USACE, 2001)
- USACE (EM) 200-1-6, Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects, (USACE, 1997)
- DoD QSM for Environmental Laboratories. v.3, January 2006
- CELRL Louisville Quality System Manual Supplement (LQSMS). v.1, March 2007.
- EPA, Region 5. 2000, *Instructions on the Preparation of a Superfund Division Quality Assurance Project Plan, Based on EPA QA/R-5*. Revision 0
- EPA. 2000. *Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW, Final*. EPA/600/R-00/007

A QAPP typically addresses the following elements:

- Project organization and responsibilities
- DQOs
- Sample Custody Requirements
- Investigation Program Requirements
- Calibration and Preventative Maintenance
- QC Sample Requirements
- Performance and Systems Audits
- Nonconformance/Corrective Actions
- Data Reduction
- Data Management and Reporting
- Data Assessment, including Data Review and Data Validation

Overall project organization and responsibilities have been presented in the QCP and in Table 4-1 below. Sample custody requirements were presented in Section 3.5.8. The remaining elements listed above are addressed in the following subsections.

The laboratories performing the analyses are: Empirical Laboratories, LLC (primary laboratory), Nashville, Tennessee and CT Laboratories (QA laboratory), Baraboo, Wisconsin. Empirical Laboratories

and CT Laboratories have been accredited as being in compliance with standards set forth by the National Environmental Laboratory Accreditation Conference. Self-declaration forms of QSM compliance and NELAP certification for Empirical Laboratories and CT Laboratories can be found in Appendix C.

Table 4-1. Project team members.

Area of Responsibility	Principal	Organization
Illinois state regulatory oversight	Christopher Hill, P.E.	IEPA Federal Facilities Unit, Bureau of Land Christopher.Hill@illinois.gov
Project Manager	Walter Perro	USACE/CELRL Louisville, KY Walter.D.Perro@usace.army.mil
Technical Manager	David Brancato, N.D., Ph.D., RPIH	USACE/CELRL Louisville, KY David.J.Brancato@usace.army.mil
Contractor Project Manager and Field Team Leader	Todd Calhoun, P.G.	GEO Kevil, KY calhount@geoconsultantsllc.com
Contractor Quality Program Manager	Kim Morris	GEO Kevil, KY morrisk@geoconsultantsllc.com
Data Analysis and Report Writing	Tom Early, Ph.D. Olivia R. West, Ph.D., P.E. Craig Rightmire, P.G. Nic Korte, CHMM	GEO Oak Ridge, TN and Grand Junction, CO earlyt@geoconsultantsllc.com westor@geconsultantsllc.com rightmirec@geoconsultantsllc.com korten@geoconsultantsllc.com
Data Management and Graphics	Barry Kinsall	GEO Kevil, KY kinsallb@geoconsultantsllc.com
Health and Safety Coordinator	Randy Hansen	SAIC St. Louis, MI RANDY.C.HANSEN@saic.com
Primary Laboratory Analysis	Marcia McGinnity	Empirical Laboratories 227 French Landing Drive, Suite 550 Nashville, TN 37228 MMcGinnity@EmpirLabs.com
Secondary Laboratory	Pat Letterer	CT Laboratories 1230 Lange Court Baraboo, WI 53913 pletterer@ctlaboratories.com

4.1.1 DATA QUALITY OBJECTIVES

4.1.1.1 Data Use Background

DQOs are qualitative and quantitative statements that specify the required quality of data to support future decisions. This section addresses only analytical data quality. Data from environmental samples will be collected by GEO during the course of the project from various locations at the site as described in the SOW and FSP (Section 3 of this document).

The DQO process provides a logical basis for linking the QC procedures and requirements to the intended use of the data, primarily through the decision makers' acceptable limits on decision error. Definitive data will be provided by the subcontract laboratory using the specific analytical methods listed in the SOW and in this QAPP according to QSM and LQSMS requirements. These analytical methods include specific QC element requirements that will yield data of sufficient quality to support the project design as defined in the SOW.

4.1.1.2 Measurement Quality Objectives for Chemical Data Measurement

The overall QC objective for this project is to develop and implement procedures that will provide data of known and documented quality. Specific QC elements of definitive data include determination and documentation of calibrations, detection limits, method blanks, matrix spike recoveries, and split sample comparisons. Quality objectives for these parameters are determined based on the specific requirements of the analytical procedure chosen as well as guidelines presented in the QSM and LQSMS. The QA/QC efforts in this section focus on controlling measurement error and on providing a basis for estimating uncertainty in the data. Measurement error is evaluated through DQOs for precision, accuracy, representativeness, comparability, and completeness as follows:

Precision is the measurement of agreement in repeated tests of the same or identical samples, under prescribed conditions. Analytical precision can be expressed in terms of Standard Deviation, Relative Standard Deviation and/or Relative Percent Difference (RPD). The precision of analytical environmental samples has two components - laboratory precision and sampling precision. Laboratory precision is determined by replicate measurements of laboratory duplicates and by analysis of reference materials. The objectives for laboratory precision for Methods 8270 and 6010/7470 are specified in Table B-3 and Table B-6, respectively, of the QSM Appendix DoD-B. The precision of the field sampling effort is determined by the analysis of FD samples. Field duplicate analysis will be performed at a rate of 10 percent (i.e., one FD for up to every 10 environmental samples), and acceptance criteria for these duplicates shall be an RPD of 50 percent.

Accuracy is the degree of agreement of a measured sample result or average of results with an accepted reference or true value. It is the quantitative measurement of the bias of a system, and is expressed in terms of percent recovery (%R). Measurements of accuracy for the laboratory include surrogate spike, laboratory control spike, matrix spike/matrix spike duplicate samples. The laboratory must meet or exceed control limit objectives, as stated in the QSM.

Representativeness is the degree to which the results of the analyses accurately and precisely represent a characteristic of a population, a process condition, or an environmental condition. In this case, representativeness is the degree to which the data reflect the contaminants present and their concentration magnitudes in the sampled project areas. Representativeness of data will be ensured through the selection of sampling locations and implementation of approved sampling procedures. Results from environmental field duplicate sample analyses can be used to assess representativeness, in addition to precision.

Comparability is the degree of confidence with which results from two or more data sets, or two or more laboratories, may be compared. To achieve comparability, standard environmental methodologies will be employed in the field and in the laboratory, including:

- Using identified standard methods for both sampling and analysis phases of this project (QSM Tables B-3 and B-6).
- Ensuring traceability of all analytical standards and/or source materials.
- Verifying all calibrations with an independently prepared standard from a source other than that used for calibration.
- Using standard reporting units and reporting formats including the reporting of QC data.
- The assessment/validation of all analytical results, including the use of data qualifiers in all cases where appropriate.
- The requirement that validation qualifiers be provided at all times with the associated analytical result.

These steps will ensure that the data will be used appropriately both for this project and by future users.

Completeness is defined as the percentage of samples that meet or exceed all of the criteria for accuracy, precision and detection limits within a defined time period or event. It is the measure of the number of data "points" which are judged to be valid, usable results. The objective for completeness for this field investigation is 95 percent.

Sensitivity. GEO shall ensure that the laboratory method detection limits (MDLs) for the analysis methods are below the TACO Tier 1 screening criteria. The laboratory shall establish MDLs in accordance with QSM and LQSMS requirements.

4.1.2 Laboratory Analytical Procedures and requirements

The laboratory analytical procedures to be used for the HCAFS RI were presented in Table 3-15. The methods to be employed during the sample analyses, and the corresponding detection limits and analytical requirements, will be performed in accordance with the QSM Table B-3 for Method 8270 and Table B-6 for Methods 6010B/7470A.

4.1.3 Preventative Maintenance

To minimize the potential for instrument failure and other system malfunctions, a preventive maintenance program for laboratory and field instruments is required. The laboratory is responsible for the maintenance of their analytical equipment, in accordance with manufacturers' specifications. Analytical personnel will be responsible for ensuring that instrumentation is functioning properly and within specific guidelines/specifications prior to starting any analysis. Maintenance, performed by either laboratory personnel for routine replacements or the manufacturer's service personnel for major instrumentation checks, will be conducted according to manufacturer's recommendations and procedures.

All maintenance performed on the laboratory instruments shall be documented in maintenance logbooks. The date, initials of the person performing the maintenance, and the type of maintenance performed will be recorded. In addition, receipts from major maintenance performed by the manufacturer's service personnel will be kept by the laboratory. In the event of instrument failure, the laboratory will make every effort to analyze the samples within holding times by alternate means. If sufficient instrumentation is not available at the laboratory to perform the required analyses in the

required holding times, the laboratory manager for the project must notify GEO immediately by telephone or electronic mail. Based on the results of this discussion, efforts may then be made to secure analytical services from an equivalent, approved laboratory. Under these circumstances, the laboratory shall be required to assist GEO in identifying an equivalent, USACE-certified laboratory which is capable of doing the required analyses.

Field equipment shall be maintained at its proper functional status in accordance to manufacturer manual specifications. A check of the equipment shall be performed before field activities begin, and any potential spare parts (e.g., batteries, connectors, etc.) and maintenance tools will be brought on site, to minimize equipment downtime during the field activities. Visual checks of the equipment will be conducted on a daily basis. Routine preventive maintenance shall be performed to assure proper operation of the equipment. Any maintenance performed on field equipment will be documented on instrument calibration and maintenance forms or in a designated field logbook, and shall be undertaken only by personnel who have the appropriate skills and/or training in the type of maintenance required.

4.1.4 Calibration Procedures and Frequency

Personnel at the laboratory will be responsible for ensuring that laboratory analytical instrumentation are of the proper range, type and accuracy for the test being performed, and that all of the equipment is calibrated at their required frequencies, according to specific protocols/procedures as specified in QSM Section 5.9, QSM Appendix D, and QSM Appendix DoD-B. Specific quality control/method-specific calibration requirements pertinent to Method 8270 and Method 6010B/7470A may be found in QSM Appendix DoD-B Table B-3 and B-6, respectively.

Laboratory equipment shall be calibrated using certified/nationally-recognized standards and according to the applicable methodologies and the laboratory standard operating procedures (SOPs) as documented in their QAPPs. Laboratories will also adhere to the calibration requirements specified in the QSM. Stock standards shall be dated when received, and the preparation of all standard solutions shall be documented in a standard preparation logbook. Information to be recorded includes the standard prepared, the source and concentration of the standard, the standard lot number, the date prepared, and the initials of the preparer. The SOPs also specify the appropriate operations to follow during calibration or when any instrument is found to be out of calibration.

4.1.5 Laboratory QC samples

This section presents the type and quantities of QC samples to be used for analysis of the HCAFS samples. QC samples are designed to monitor general sampling techniques, laboratory performance of analyses, and possible matrix effects on the analytes. Laboratory QC requirements may, depending on analytical method, include the following:

- Method blank
- matrix spike/matrix spike duplicate
- Laboratory control sample (LCS)
- Surrogate compounds
- Internal standards
- Interference check sample (ICS)
- Laboratory duplicate sample

Descriptions of these QC samples are provided below. Frequencies, criteria, and corrective actions for the required laboratory QC samples are determined by the applicable method, as outlined in QSM Section 5.9, QSM Appendix D, QSM Appendix DoD-B, and QSM Table B-3 for 8270 and Table B-6 for 6010B/7470A.

Method blank, also known as a preparation blank or a laboratory reagent blank, is analyzed with every batch of samples to ensure that contamination has not occurred during the analytical process. Method blanks consist of a portion of analyte-free water or solid that is processed through the entire sample procedure the same as an environmental sample.

Matrix spike/matrix spike duplicate samples (also known as spike/duplicate samples or laboratory fortified samples) will be used to assess precision and accuracy of the analytical methods. In this procedure, additional volume of an actual field sample is collected at a specific location, and two aliquots are "spiked" by the addition of known amounts of an analyte or analytes and these samples are then analyzed identically to the field samples. A comparison of the resulting concentration to the original sample concentration and among the two "spiked" sample concentrations provides information on the ability of the analytical procedure to generate a correct result from the sample. Matrix spike/matrix spike duplicate requirements for Method 8270C and Methods 6010B/7470A are presented in QSM Table B-3 and B-6, respectively. The sampling team is responsible for collecting the additional volume for matrix spike/matrix spike duplicate analyses.

A **LCS** consists of an analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS is analyzed to provide information on the accuracy of the analytical methods and on the laboratory's performance. LCS samples should be prepared from a stock solution different than the one used to prepare the calibration standards. Compounds specific to Method 8270 and Method 6010B/7470A can be found in QSM Appendix DoD-C Target Analyte Lists, Table C-2 and Table C-10, respectively. LCS limits are specified in QSM Appendix DoD-D Table D-7 for Method 8270 and in Table D-18 for Methods 6010B/7470A.

Surrogates are compounds added to every organic analysis sample at the beginning of the sample preparation to monitor the recovery in regard to sample preparation and analysis. Surrogate recoveries will be used to assess potential matrix interferences.

Internal standards are used to provide instrument correction for variation in instrument performance and injection volumes. Internal standards also establish relative response factors for the analytes.

A **laboratory duplicate sample** will be prepared and analyzed for each batch of samples of similar matrix. These samples serve to demonstrate acceptable method precision (calculated through RPD values) by the laboratory.

The analytical sequence for quality control samples is explicitly provided in QSM Table B-3 for 8270 and Table B-6 for 6010B/7470A.

No deviations from this sequence are permitted. Any such occurrences must be documented on a Corrective Action Form.

4.1.6 Laboratory Custody Procedures

Adequate sample custody in the laboratory is achieved by means of approved laboratory QA/QC documentation. The subcontract laboratories for this project have documented their procedures in their QAPPs. At a minimum, the laboratory procedures include the following elements:

- A designated sample custodian will accept custody of the shipped samples and will verify that the information on the sample labels matches that on the chain-of-custody record(s). Any discrepancies among documentation records will be noted and reported to the laboratory manager for this project;
- The custodian will then check the samples for proper preservation (e.g., pH, temperature) and integrity (e.g., broken bottles). The temperature of the samples shall be checked for each cooler sent. Again, deficiencies in sample preservation or any other inadequacies are recorded and forwarded to the laboratory manager for the project;
- The laboratory custodian will use the sample label number or assign a unique laboratory number to each sample label and will assure that all samples are transferred to the proper analyst or stored in the appropriate secure area. Notification to the appropriate laboratory department personnel that the samples have arrived will be performed;
- Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or returned to the custodian or sample storage area. Internal chain of custody records shall be maintained by the laboratory;
- Data from analyses performed by the laboratory will be maintained in a Laboratory Information Management System (LIMS).

When sample analyses and necessary QC checks have been completed in the laboratory, the unused portion of the sample and the sample container must be disposed properly. All identifying tags, data sheets, and laboratory records shall be retained as part of the permanent documentation. Samples received by the laboratory will be retained until analyses and QC checks are completed.

4.1.7 Laboratory performance and systems audits

The analytical laboratory will be responsible for conducting internal systems and performance audits according to laboratory SOPs, as reviewed and approved by USACE and presented in their QAPPs. The laboratory shall cooperate with USACE or other regulatory agency personnel if requested for documentation regarding internal technical systems and/or performance audits. System audits are inspections of training status, records, QC data, calibrations, and conformance to SOPs without the analysis of check samples. Documents reviewed typically include sample log-in sheets, sample preparation logs, instrument logbooks, QC criteria for spike recoveries, and final report deliverables. In addition, internal systems audits verify that deficiencies from previous audits were corrected. The results of performance evaluation studies (inter-laboratory or agency-requested) are evaluated as part of performance audits. No laboratory audits by GEO personnel will be performed for this project.

4.1.8 Laboratory communications and corrective actions

The laboratories shall communicate with the GEO Project Manager by telephone, email, or facsimile, as necessary, throughout the process of sample scheduling, shipment, analysis and data reporting, to ensure that samples are properly processed. If a problem occurs during sample shipment or receipt (e.g., a cooler or sample container arrives broken, a sample was not preserved correctly, a sample was not listed on the chain-of-custody, temperature exceedances, holding times were exceeded, etc.), the laboratories shall immediately notify GEO for resolution. In addition, if insufficient sample volume is received to perform a specific analysis, the laboratories must contact GEO or CELRL to inform them of the problem. This includes volume requirements for matrix spike and matrix spike duplicate samples. The preservation pH of the aqueous samples (if applicable) must be checked by the laboratories, and the sample pH shall be recorded in the sample receipt and/or analyst logbooks. If the pH is deemed unacceptable by the laboratory personnel the laboratory must notify GEO or CELRL immediately.

The points of contact to be used by the laboratories are as follows:

- Todd Calhoun, GEO Project Manager (270) 462-3882, calhount@geoconsultantsllc.com
- Kim Morris, GEO QC Manager (270) 462-3882, morrisk@geoconsultantsllc.com

The laboratories shall document the communications and the resulting decisions on telephone contact log sheets. Copies of these log sheets must be sent by facsimile to GEO within 24 hours. A copy of all telephone contact log sheets shall also become part of the written narrative of the final data report. An e-mail notification may be used in place of the faxed log sheets; however, the email must be sent within 24 hours of contact. Corrective actions shall be documented and approved by GEO prior to implementation.

If a problem occurs during the laboratory programs, the affected laboratory shall immediately notify the GEO point of contact for resolution. Consultation with the appropriate personnel (e.g., the GEO Project QC Manager) regarding appropriate actions would then follow. All approved corrective actions shall be controlled and documented. The laboratories will follow their corrective action procedures as specified in their QAPP.

4.1.9 Data Reduction/Calculation of Data Quality Indicators

Data transfer and reduction are essential functions in summarizing information to support conclusions. Standard methods and references will be used as guidelines for data handling, reduction, and reporting. All data for the project will be compiled and summarized with an independent verification at each step in the process to prevent transcription/typographical errors. Any computerized entry of data will also undergo verification review.

The laboratory shall be responsible for data reduction and compiling the analytical results/sample concentrations, with the application of data qualifiers when appropriate, and associated QC information. The minimum list of data qualifiers is presented in Section 4.10.6 in the QSM. The laboratory may use other qualifiers as appropriate if these are consistent with DoD and properly defined. The Project Manager at Empirical Laboratories is Marcia McGinnity; and at CT Laboratories is Pat Letterer (see Table 4-1 for contact information). The data package will contain all required elements to perform data validation. Ten percent of all analytical data will be independently validated by CELRL in accordance with procedures prescribed in the LQSMS and the QAPP portion of this document. The analytical laboratory can use their in-house LIMS for data management, but will be required to submit electronic data deliverables in a format compatible with Automatic Data Review (ADR) software. The laboratory shall be responsible for ensuring the correct entry of input data into the LIMS, and all the calculations are reviewed. The initials of the individual entering the data and the laboratory-designated reviewer will accompany all data transfer.

Calculations to be performed typically include the following.

- Linear or quadratic regression lines for calibration curves for standards
- Coefficients of variation for replicate samples
- Spiked sample recoveries
- Standard reference sample concentrations
- Environmental sample concentrations

Procedures used to assess measurement quality objectives will be in accordance with the appropriate analytical methods as specified in QSM Table B-3 for 8270 and Table B-6 for 6010/7470.

4.1.9.1 Precision

Precision of the samples will be evaluated using RPDs, which are calculated as below:

$$RPD = [(Vo – Vd)/0.5\ (Vo + Vd)]\ X\ 100$$

where Vo is the original sample concentration value and Vd is the duplicate sample concentration value.

4.1.9.2 Bias

Bias refers to the systematic or persistent distortion of a measurement process that causes errors above or below the true value. Accuracy is the quantitative measurement of the bias of a system, and is generally assessed through the analysis of spiked samples. It is expressed as percent recovery which is calculated using the following formula:

$$\%R = [(Va – Ve)/Vs)]\ X\ 100$$

Where Va is the concentration value obtained by analyzing the sample with the spike added, Ve is the concentration value obtained by analyzing the sample (without addition of spike) and Vs is the concentration of the spike added to the sample.

Percent bias (%B) is related to percent recovery by the following equation:

$$\%B = (\%R – 100).$$

4.1.9.3 Sample Quantitation Limits

The quantitation limits for the analytical parameters are provided in QSM Table B-3 for 8260. Analytes detected above the MDLs, but below the practical quantitation limits shall be reported as estimated values.

4.1.9.4 Completeness

Completeness is the measure of the amount of valid data (i.e., results that meet or exceed all the criteria objective levels for accuracy, precision, etc.) obtained during the investigation, and is calculated using the following equation:

$$\%C = (Ru / Rp)\ X\ 100$$

Where Ru is the number of usable data results (i.e., all results not considered to be “rejected” and all samples able to be analyzed) and Rp is the number of possible data results (i.e., the total number of field samples collected).

4.1.10 Laboratory Operations Documentation and reporting

4.1.10.1 Laboratory Sample Management Records

The subcontracted laboratories are responsible for generating, controlling and archiving project records in a system from which they could be retrieved if necessary (i.e., the laboratory’s LIMS system). Project records, including communication contact sheets, data packages, logbook copies, and electronic data submittals, shall be stored by the laboratory. The subcontracted laboratories are also required to retain unused sample volume and unused sample containers for a period of 60 calendar days after data

submission. Upon receipt of a laboratory data package, GEO will maintain custody procedures, and the package shall be placed in a secure project file when not being reviewed/utilized. In addition, other project records (such as correspondence, calibration logs, chain of custody forms, field logbooks, reports, etc.) shall also be retained in the secure file.

Sample management records include the documentation accompanying the samples:

- chain-of-custody records
- shipping documents
- records generated by the laboratory which detail the condition of the samples upon receipt (e.g., sample cooler receipt forms)
- telephone conversation records associated with actions taken or quality issues

4.1.10.2 Data Reporting Procedures

The subcontracted/contracted laboratory performing analysis work on this project will submit a hardcopy and electronic data package consistent with Appendix DoD-A of the QSM. The hardcopy laboratory reports shall contain the following elements: cover sheet, table of contents, case narrative, analytical results, sample management records, QA/QC information, and information for third-party review.

Cover Sheet. The cover sheet shall specify the following information:

- title of report (i.e., Test Report, Test Certificate)
- name and location of laboratory (to include a point of contact, phone and facsimile numbers)
- name and location of any subcontractor laboratories, and appropriate test method performed
- contract number
- unique identification of the report (such as serial number)
- client name and address
- project name and site location
- statement of data authenticity and official signature and title of person authorizing report release
- amendments to previously released reports
- previous report and state the reason(s) for re-issuance of the report
- total number of pages

Table of Contents. Laboratory data packages should be organized in a format that allows for easy identification and retrieval of information. An index or table of contents shall be included for this purpose.

Case Narrative. A case narrative shall be included in each report. The purpose of the case narrative is to describe any abnormalities and deviations that may affect the analytical results, and summarize any issues in the data package that need to be highlighted for the data user to help them assess the usability of the data. The case narrative shall provide:

- a table(s) summarizing samples received, providing a correlation between field sample numbers and laboratory sample numbers, and identifying which analytical test methods were performed. If multiple laboratories performed analyses, the name and location of each laboratory should be associated with each sample.
- a list of samples that were received but not analyzed
- a description of extractions or analyses that are performed out of holding times
- a definition of all data qualifiers or flags used
- identification of deviations of any calibration standards or QC sample results from appropriate acceptance limits and a discussion of the associated corrective actions taken by the laboratory
- identification of samples and analytes for which manual integration was necessary
- appropriate notation of any other factors that could affect the sample results [e.g., the presence of multiple phases, sample temperature and sample pH excursions, container type or volume, etc.]
- identification of numerical results outside of limits of quantitation

Analytical Results. The results for each sample shall contain the following information at a minimum:

- project name and site location
- field sample identification (ID) number as written on custody form
- laboratory sample ID number
- matrix
- date sample extracted or prepared
- date and time sample analyzed
- method numbers for all preparation, cleanup, and analysis procedures employed
- analyte or parameter
- method reporting limits and method limits of quantitiation (at or above the low-level standard concentration) adjusted for sample-specific factors (e/g/, aliquot size, dilution/concentration factors, moisture content)
- all samples and analytes for which manual integration occurred, including the cause and justification
- limits of detection or MDLs
- analytical results with correct number of significant figures
- any data qualifiers assigned
- concentration units
- dilution factors
- any dilutions or concentrations for all reported data, and if neat or less diluted results are available, recorded and reported data from both runs

Sample Management Records. These types of records include the documentation accompanying the samples:

- chain-of-custody records
- shipping documents
- records generated by the laboratory which detail the condition of the samples upon receipt at the laboratory (e.g., sample cooler receipt forms)
- telephone conversation records associated with actions taken or quality issues

QA/QC Information. The minimum internal QC data package must include:

- matrix spikes percent recovery
- RPD of required duplicates
- LCS percent recoveries
- in-house LCS control limits, if they exceed DoD limits
- surrogate percent recoveries (organics)
- method blank results
- preparation, analysis, and other batch numbers
- QC acceptance criteria for MS, LCS, surrogates, etc.
- spike concentrations for MS, LCS, surrogates, etc.

Information for Third-Party Review. The information listed below is required if third-party (from outside the laboratory) data validation or verification is to be performed.

- calibration data from the initial calibration curve
- initial calibration verification
- continuing calibration verification(s)
- performance standards analyzed in conjunction with the test method
- preparation, analysis, and other batch numbers
- raw data
- MS, if applicable (includes spike target concentration levels, measured spike concentration, and calculated recoveries)
- RPD of required duplicates
- method blank results
- LCS recoveries
- surrogate recoveries (organics)
- serial dilutions percent difference (inorganics)
- post-digestion spikes recovery (inorganics)
- project action levels, DQOs, Method Quality Objectives, and associated acceptance criteria
- supporting documentation

4.1.10.3 Data Package Format and Contents

The laboratory shall be required to submit hardcopy data reporting packages in accordance with requirements of the QSM.

The results for each sample shall contain the following information: (Information need not be repeated if noted elsewhere in the data package.)

- field sample identification (ID) number as written on custody form
- laboratory sample ID number
- matrix (soil, water, oil, etc.)
- date sample extracted or prepared
- date and time sample analyzed
- method numbers for all preparation, cleanup, and analysis procedures employed
- analyte or parameter
- method reporting limits and method limits of quantitation (at or above the low-level standard concentration) adjusted for sample-specific factors (e.g., aliquot size, dilution/concentration factors, moisture content)
- all samples and analytes for which manual integration occurred, including the cause and justification
- limits of detection or MDLs
- analytical results with correct number of significant figures
- any data qualifiers assigned
- concentration units
- dilution factors
- any dilutions or concentrations for all reported data, and if neat or less diluted results are available, recorded and reported data from both runs
- percent moisture or percent solids (all soils are to be reported on a dry weight basis)
- sample description
- sample preservation or condition at receipt
- date sample received
- sample aliquot analyzed
- final extract volume
- CAS numbers
- statements of the estimated uncertainty of test results
- calibration and tuning information

The minimum internal QC data package must include:

- matrix spikes percent recovery
- RPD of required duplicates
- LCS percent recoveries
- in-house LCS control limits, if they exceed DoD limits (see Appendix DoD-D Section D.7 of the QSM)
- surrogate percent recoveries (organics) method blank results
- preparation, analysis, and other batch numbers
- QC acceptance criteria for matrix spike, LCS, surrogates, etc.
- spike concentrations for matrix spike, LCS, surrogates, etc.
- logbook copies
- electronic data submittals

4.1.10.4 Electronic Deliverables

The laboratory shall be required to submit "error-free" electronic data deliverables in a format that is compatible with ADR software. If errors are present, the laboratory chemist must provide clarification. The laboratory shall use the data qualifier definitions in Section 4.10.6 of the QSM.

4.1.10.5 Data Management Procedures

Electronic data management systems shall be verified by the laboratory to ensure accurate data transfer, reduction, and reporting. All aspects of the data management system shall be fully documented as compliant with EPA Good Automated Laboratory Practices requirements (EPA 2185).

4.1.10.6 Laboratory Turnaround Time

The laboratory will be responsible for analyzing all samples within the maximum holding times as provided by the specific method (see Table 3-15) and will strive to provide electronic data in spreadsheet format within 15 business days of sample receipt.

4.1.10.7 Data Archival/Retention Requirements

GEO will hold all records for a period of seven years from completion of the tasks outlined in the SOW. At the end of this period, GEO will contact USACE to determine disposition of the project records.

The laboratories shall be responsible for generating, controlling, and archiving project records using their in house LIMS. Project records generated by the laboratories shall be stored by the individual subcontractor/contractor laboratory. The subcontracted/contracted laboratories are also required to retain unused sample volume and unused sample containers for a period of 60 calendar days after data submission and dispose of them appropriately after that time.

Upon receipt of a laboratory data package, GEO will maintain custody of the data package, and the package shall be placed in a secure project file when not being reviewed.

4.1.11 Data Assessment

Initially, data assessment will occur at the subcontract/contract laboratory per Section 5.4.7.1 of the QSM. After submittal of the data from the laboratories, the analytical results will undergo data verification at GEO. This review will be the responsibility of Kim Morris, the Project QC Officer, or her designee. Data validation will be performed in accordance with LQSMS Section 4.3.2 The GEO Project Manager, Todd Calhoun, or his designee, will be responsible for the compilation, analysis and reporting of the data.

Upon receipt of the electronic data packages, GEO will provide to USACE the analytical data in a format for use in ADR and Environmental Data Management System software. The environmental services laboratories shall update their ADR software with the project-specific QSM e-QAPP library as provided by GEO.

4.1.11.1 Data QC Review

Data validity will be assessed based on the adequacy of the results to fulfill the requirements of the project-specific QC characteristics. The laboratory will conduct a review of routine QC data and project-specific requirements before releasing the data packages. Non-conforming results will be discussed in the case narrative. Upon receipt of data package reports, GEO, as part of the data verification step, will evaluate the completeness, consistency, and compliance of the data package against the project requirements as outline in this SAP.

4.1.11.2 Data Verification

Upon receipt of a data package report, GEO will evaluate the completeness, consistency and compliance of the report against the project requirements as outlined in this document. EDDs provided by the laboratories will be reviewed using ADR software. In addition to the automated review by ADR, the data verification process will also include checking chain-of-custody forms, sample identifications, sample handling and preservation procedures, and a comparison of analyses requested versus performed. The results of the review will be summarized in a data verification report and provided to USACE, CELRL as an appendix the RI report. Although formal data validation is not required under this SOW, the data verification process will adequately address the impact of data quality issues, if any, on data usability.

4.1.11.3 Project Completeness Assessment

As part of the data verification process, GEO will conduct a project completeness assessment according to the requirements of EM-200-1-6. For example, "completeness" means all required hardcopy and electronic deliverables are present. Table 3-1 in EM-200-1-6 lists the project parameters affecting completeness.

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APPENDICES

APPENDIX A

FIGURES

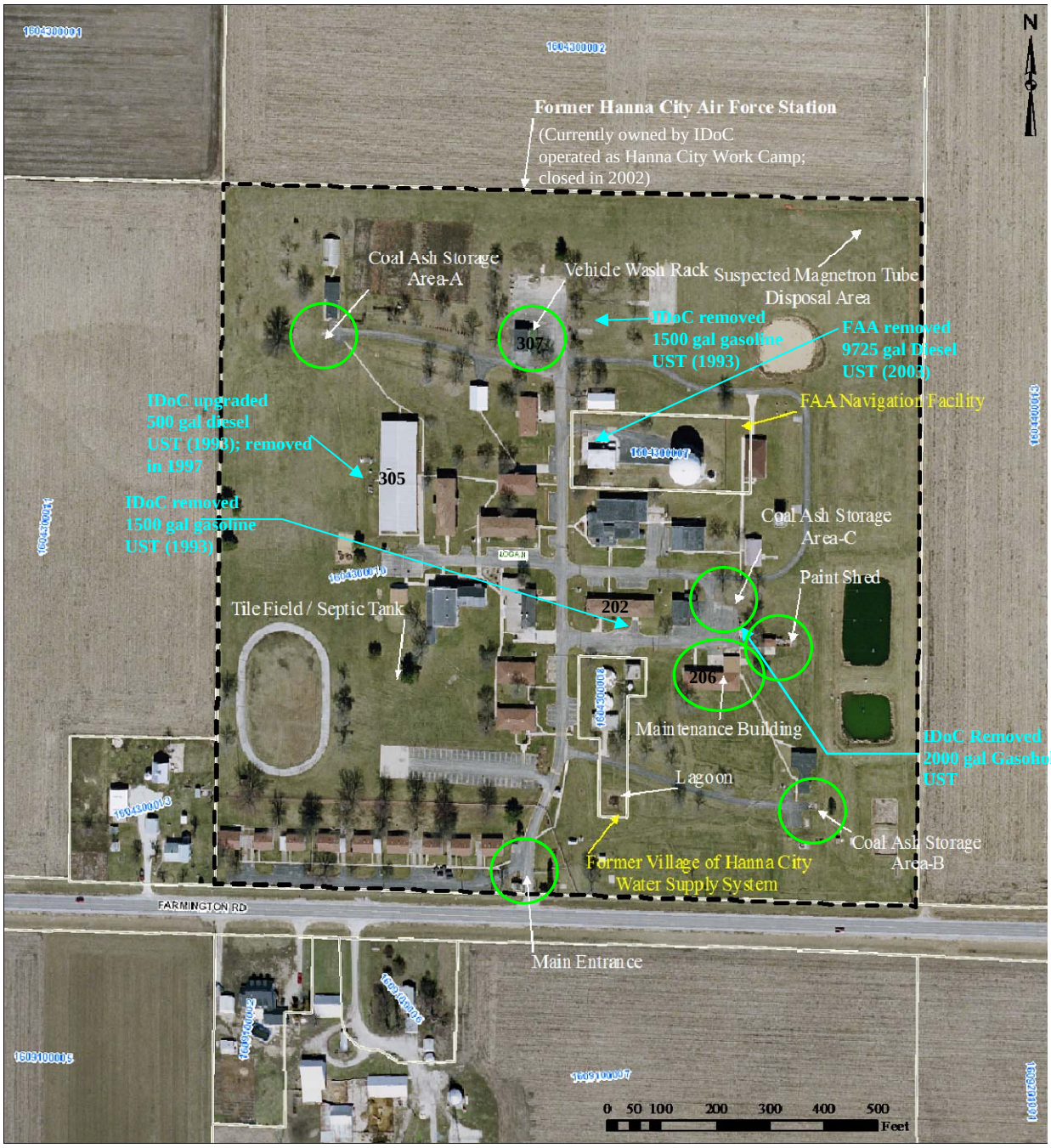
Source: Google Earth.

Figure 1-1 Site location map for former Hanna City Air Force Station

U.S. Army Corps of Engineers
Louisville District

GEO Consultants, LLC
A Geological Engineering and Environmental Services Company
Kevil, Kentucky

Former Hanna City Air Force Station Hanna City, Illinois



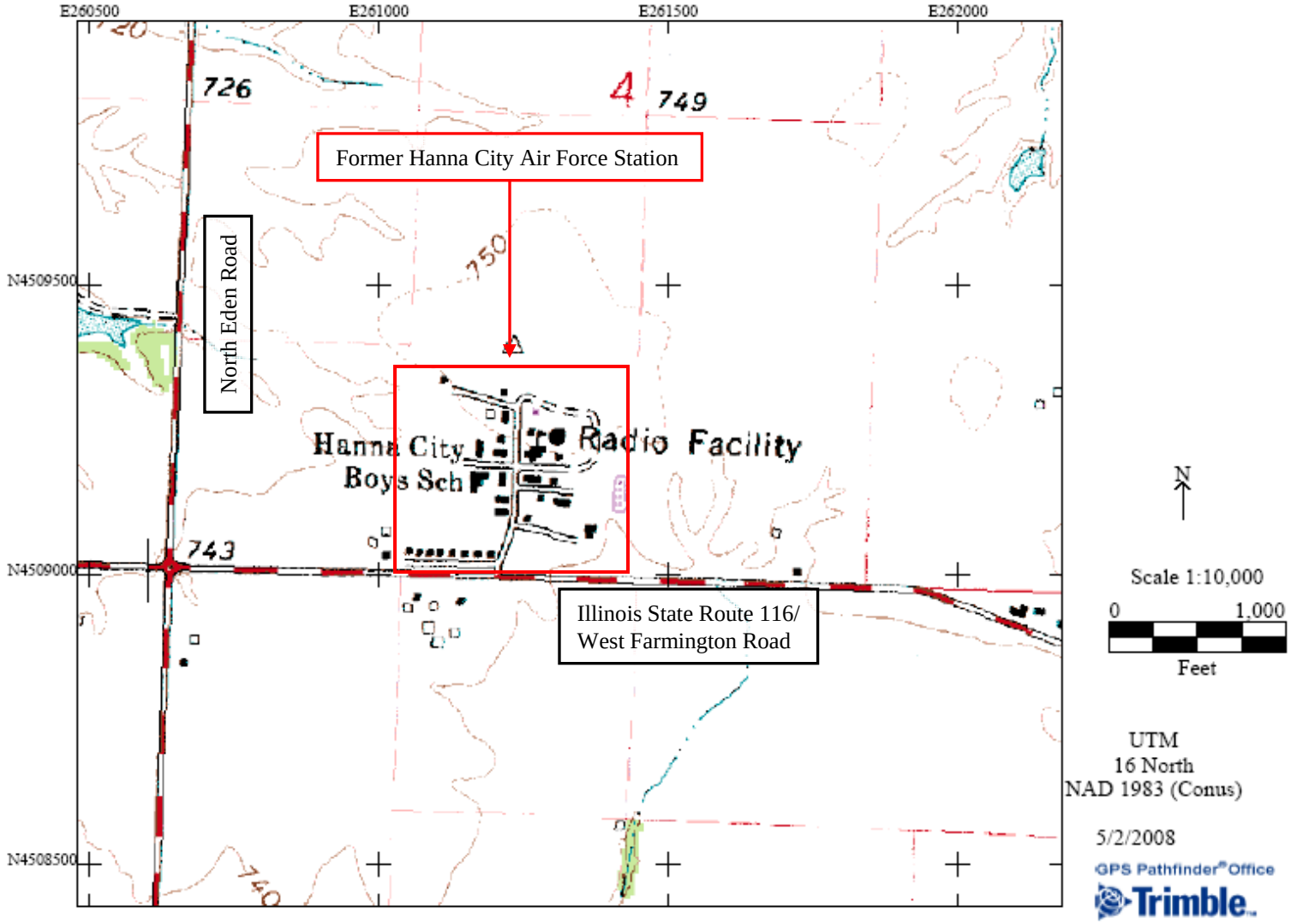
Areas (white text), building numbers (black text) are based on the HCAFS site layout drawing from TtEC (2008).
Former UST locations based on documents from IEPA L.U.S.T. program for LPC#1430405005.
Areas of Potential Concern are the Coal Ash Storage Areas A,B,C; Main Entrance; Vehicle Wash Rack; Maintenance Building and Paint Shed. These areas are marked by bright green circles.

Aerial photo from Peoria County GIS, 2003.

Figure 1-2. Historical and Current Site Layout, Former Hanna City Air Force Station, Hanna City, IL

U.S. Army Corps of Engineers
Louisville District

GEO Consultants, LLC
A Geological Engineering and Environmental Services Company
Kevil, Kentucky



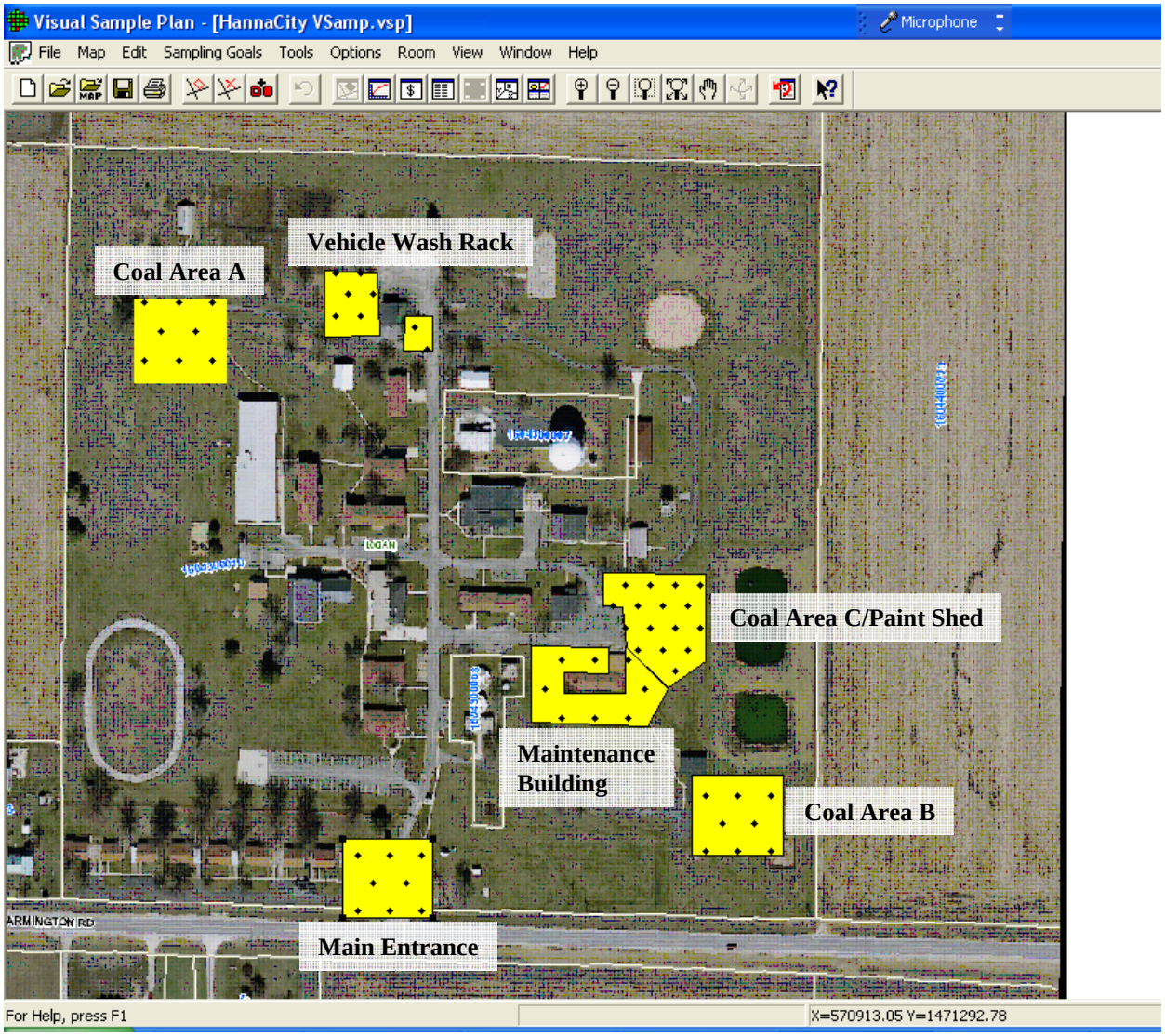
Base map: USGS Hanna City Topographic Quadrangle Map obtained from Illinois State Geological Survey – Illinois Natural Resources Geospatial Data Clearinghouse http://www.isgs.uiuc.edu/nsdihome/ISGSindex.html

Figure 2-1 Topographic map for former Hanna City Air Force Station

U.S. Army Corps of Engineers
Louisville District

GEO Consultants, LLC
A Geological Engineering and Environmental Services Company
Kevil, Kentucky

Former Hanna City Air Force Station Hanna City, Illinois



Aerial photo from Peoria County GIS, 2003.

Figure 3-1 VSP Screen Shot showing Exposure Units/Sample Areas (yellow) and VSP generated sample locations (black diamonds).

U.S. Army Corps of Engineers
Louisville District

GEO Consultants, LLC
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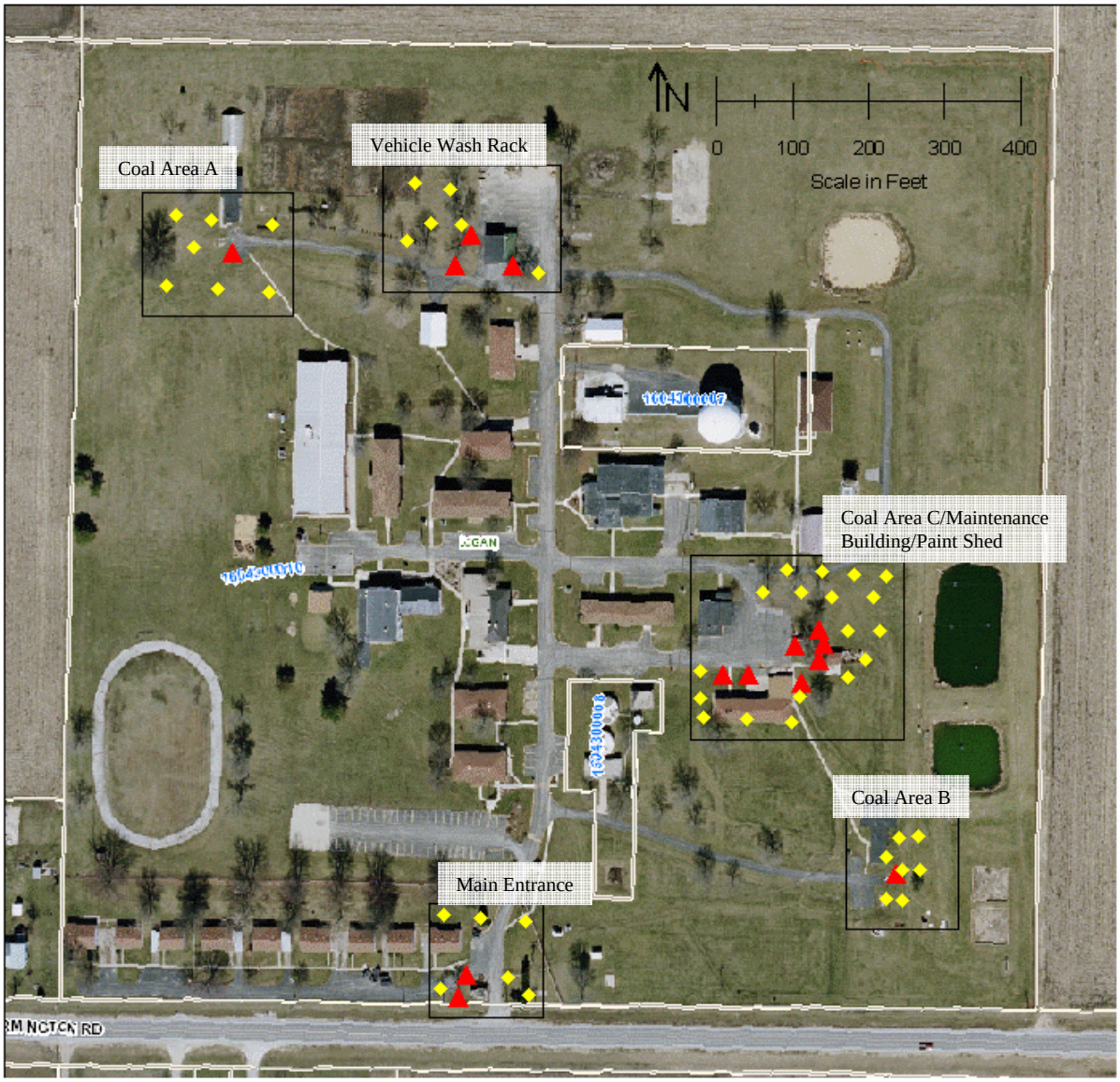
Kevil, Kentucky

- RI subsurface samples to be collected for PAH or metals analyses
- Previous subsurface soil sample locations from SI (1996) and SSI (2006) analyzed for PAHs or metals
- RI groundwater samples to be collected for metals analyses
- Previous groundwater sample locations from SS (2006) analyzed for metals
- Exposure units: risk assessment (areas ranging from 0.5 to 1.5 acres) for subsurface soil

Former Hanna City Air Force Station **Hanna City, Illinois**	**Figure 3-3 Subsurface soil and groundwater sampling locations at the former HCAFS**
U.S. Army Corps of Engineers **Louisville District**	**GEO Consultants, LLC** *A Geological Engineering and Environmental Services Company* Kevil, Kentucky



RI surface samples collected for PAH analyses, August 2008; with concurrence from C. Hill, IEPA.

Previous surface soil sample locations from SI (1996) and SSI (2006) analyzed for PAHs

Exposure units for risk assessment (areas ranging from 0.5 to 1.5 acres)

Former Hanna City Air Force Station **Hanna City, Illinois**	**Figure 3-2 Surface soil sampling locations at the former HCAFS**
U.S. Army Corps of Engineers **Louisville District**	**GEO Consultants, LLC** *A Geological Engineering and Environmental Services Company* Kevil, Kentucky

APPENDIX B

FIELD DOCUMENTS

MONITORING WELL DATA SHEET

WELL NUMBER: _____ FREQUENCY: _____ SAMPLE NUMBER: _____

DATE: _____ ARRIVAL TIME: _____ DEPARTURE TIME: _____

PURGE AMOUNT: _____ PURGE START: _____ PURGE STOP: _____

WELL DEPTH: _____ WATER DEPTH: _____ POINT DATUM: _____

BAROMETER: _____ SAMPLE TIME: _____ COC NUMBER: _____

PROJECT: _____ CONTRACT NO./DELIVERY ORDER: _____

SAMPLED BY: _____

FIELD PARAMETERS

TIME	COND (µmhos/cm)	D.O. (mg/L)	TEMP (°C)	PH (su)	ORP (mv)	TURB (NTU)

EQUIPMENT DECON

DESCRIPTION: _____ TIME: _____

COMMENTS AND OBSERVATIONS: _____

_____

_____

_____

FIELD CONDITIONS: _____ TEMPERATURE: _____

WEATHER CONDITIONS: (circle one) CLOUDY RAINY SUNNY SNOWY

SIGNATURE: _____

QUANTA DAILY CALIBRATION

Hydrolab # GEO-461-1
GEO-461-2
GEO-461-3

By TC JH BG MC JB VM RT JB

Date:_____

pH CALIBRATION

Buffer +/- .1 SU	Lot #	Exp. Date	Vendor	Time	Temp (Celsius)	pH	Adj. To
pH 4							
pH 7							
pH 10							

D.O. AIR CALIBRATION

Solution Temp (C):_____ Local B.P.:_____

% Saturation:_____ % Saturation (fixed): 100%

DO mg/l Reading (+/- 0.2 mg/l) _____@_____Deg Celsius

Does reading meet DO Saturation Values acceptance criteria?_____Yes _____No
If No, Recalibrate or check Operations Manual for maintenance.

CONDUCTIVITY CALIBRATION

Standard Value:
1412 (umhos) 1.412 (mS) Lot #_____ Exp:_____ Manufacturer:_____

Temperature(C):_____ Conductivity(+/- 20 umhos):_____ Adjusted To:_____

TURBIDITY CALIBRATION PERFORMANCE CHECK

4-Beam Turbidity Quick-Cal Cube QCC#:81181

GEO 461-1=75.0 +/- 20%
GEO 461-2=77.9 +/- 20%
GEO 461-3=77.0 +/- 20%

Reading _____NTU

_____Reading is within acceptance criteria of the Quick-Cal Cube for the instrument to be used.
_____Reading is not within acceptance criteria of the Quick-Cal Cube for the instrument to be used. If reading is not within the Quick-Cal Cube acceptance criteria, perform primary calibration according to operational manual.

ORP Calibration

ZoBell Solution:
Lot #: _____ Expiration Date: _____

ZoBell Solution's ORP Value: _____+/- 10 mV @_____Deg C

Reading Prior to Calibration: _____mV @_____Deg C
Reading After Calibration: _____+/- 10 mV @_____Deg C

Comments:

SOIL/SEDIMENT DATA SHEET

LOCATION:_____ DATE:_____

SAMPLE TIME:_____ ARRIVAL TIME:_____ DEPARTURE TIME:_____

SAMPLE NUMBER(S):_____ _____ _____

LCOC NUMBER(S):_____ _____ _____

PROJECT:_____ CHANGE NOTICE:_____

SAMPLED BY:_____

DESCRIPTION OF LOCATION:_____

_____

EQUIPMENT USED:_____

_____

METHOD OF SAMPLING: GRAB / COMPOSITE (CIRCLE ONE)

COMMENTS/OBSERVATIONS:_____

_____

_____

_____

_____

_____

SIGNATURE:_____ DATE:_____

QEC

P.O. Box 1160
Beaver, WV 25813
800-255-3950 • 304-255-3900

Quality Environmental Containers

PROJECT NAME

SAMPLE ID	**SAMPLE DATE**
SAMPLED BY	**SAMPLE TIME**
PRESERVATIVE	_____ **GRAB** _____ **COMPOSITE**

ANALYSIS REQUESTED

ENVIRONMENTAL SAMPLING SUPPLY

LOT#

SAMPLE ID

SAMPLED BY	DATE TIME
LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

Oakland, CA • Houston, TX • Chicago, IL • Richmond, VA
(510) 562-4988 www.essvial.com (800) 233-8425

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 227 French Landing Drive, Suite 550 ♦ Nashville, TN 37228 ♦ 615-345-1115 ♦ (fax) 615-846-5426

Send Results to:	Send Invoice to:
Name:_____	Name:_____
Company:_____	Company:_____
Address:_____	Address:_____
City:_____	City:_____
State,_____	State, Zip:_____
Phone:_____	Phone:_____
Fax:_____	Fax:_____
E-mail:_____	E-mail:_____
Project No./Name:	**Sampler's (Signature):**

Analysis Requirements:

Lab Use Only																			
Lab #	Date/Time Sampled	Sample Description	Sample Matrix	PAH (8270C SIM)	Arsenic (6010B)	Metals (6010B/7470A) (filtered)	Metals (6010B/7470A) (unfilt)	TSS (160.2)										Comments	No. of Bottles	Containers/Pres.

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #: _____

CAR #: _____

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature)	Date/Time	*Temperature*

REMARKS:

Details:

Page _____ of _____

Cooler No. ____ of _____

Date Shipped _____

Shipped By _____

Turnaround _____

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

Rev. 3/2006

Chain of Custody

Page _____ of _____

Company:
Project Contact:
Telephone:
Project Name:
Project Number:
Project Location:
Sampled By:

Regulatory Program:
UST RCRA SDWA NPDES
Solid Waste Other _____

CT LABORATORIES

1230 Lange Court, Baraboo, WI 53913
608-356-2760 Fax 608-356-2766
www.ctlaboratories.com

Turnaround Time
Normal RUSH*
Date Needed _____

*Notify Lab prior to sending in RUSH samples. Surcharges:
24 hr 200% 2-3 days 100% 4-9 days 50%, subject to change without notice.

Lab Use Only
Place Header Sticker Here:

Mail Report To:
Company:
Address:
City/State/Zip:

Invoice To:
Company:
Address:
City/State/Zip:

PO No.

Client Special Instructions:

Landfill License Number:

ANALYSES REQUESTED

Collection Date	Collection Time	Grab/ Comp	Sample ID Description	Filtered? Y/N	**Matrix:									Total # of Containers	Preservation*	Lab ID #
				Fill in Spaces with Bottles per Test												

*** Preservation Code**
A=None B=HCL
C=H2SO4 D=HNO3
E=Encore F=Methanol
G=NaOH
O=Other _____

Relinquished By:	Date/Time	Relinquished By:	Date/Time
Received by:	Date/Time	Received for Laboratory by:	Date/Time

Ice Present Yes No
Temperature _____
Cooler # _____

****Matrix**
S–Soil **A**–Air **Sl**–Sludge **M**–Misc Waste
GW–Groundwater **SW**–Surface Water
WW–Wastewater **DW**–Drinking Water

APPENDIX C

LABORATORY ACCREDITATIONS AND SELF-DECLARATION FORMS

USACE Candidate Environmental Laboratory
Self-Declaration Form

The undersigned persons understand and acknowledge that:

a. Laboratory operations, which will be utilized for testing in support of environmental analytical testing for USACE, are in full compliance with the most recent version of the DOD Quality Systems Manual (including NELAC Standard Chapter 5 and Appendix requirements). All written documentation provided to USACE, accompanying this declaration, accurately reflect policy and practices implemented by laboratory staff.

b. The Laboratory will notify USACE immediately of change in status of laboratory operations that may affect on-going compliance as declared per item a.

c. The Laboratory acknowledges that USACE may audit the laboratory, relative to policy compliance at any time deemed appropriate; and will allow a designated COR fill access to information and facilities to conduct such audit operations.

d. Signatories are authorized to sign this form on behalf of the owner and that there are no misrepresentations in the information provided in the initial laboratory assessment package.

Signature of Quality Assurance Officer:	Randy D. Ward
Date: January 1, 2008	Randy D. Ward
Signature of Laboratory Director:	D. Rick Davis
Date: January 1, 2008	D. Rick Davis

Note: Minimally, the laboratory evaluator should receive the completed declaration form with the following material (to verify compliance with the QSM):

- A copy of the laboratory's most current Quality Assurance Manual (e.g., the laboratory's ethics program policies and quality system procedures), and select QA SOPs (minimally, the laboratory's SOPs for MDL studies and LCS control chart limits).

- The determinative and preparatory method SOP for the parameters for which testing will be performed.

- Method performance demonstration for the parameters of interest – minimally, MDL studies and LCS control ranges for the preparatory-determinative method combinations and PT sample results (from a NELAP accredited PT provider) for the parameters of interest (e.g., or NELAP accreditation for these parameters, when NELAP accreditation is offered for the parameter of interest).

USACE Candidate Environmental Laboratory
Self-Declaration Form

The following self declaration form is provided to the candidate environmental laboratory by the COR, completed by the laboratory and returned to the COR. The self-declaration form should also be provided to the laboratory evaluator (if different from COR) with requested documentation that demonstrates compliance with the QSM prior to the provision of environmental and analytical support for USACE contracts. Before testing services can be performed by the laboratory, the COR will notify the candidate laboratory of the acceptability of the declaration and supporting documentation. The form is to be updated on an annual basis.

Legal name of laboratory:	**Empirical Laboratories, LLC**
Street Address:	**227 French Landing Drive Nashville, TN 37228**
Name of Owner:	**S. McLendon, R. Davis, S.C. Culbreth, H. Ashby**
Owner address (if different):	**121 Executive Circle, Suite 100 Daytona Beach, FL 32114**
Phone number:	**(615) 345-1115**
E-Mail address:	**sales@empirlabs.com**
Web site:	**www.empirlabs.com**
Laboratory director:	**D. Rick Davis**
Phone number:	**(615) 345-1115-X245**
E-Mail address:	**rdavis@empirlabs.com**
Quality Assurance Officer:	**Randy D. Ward**
Phone number:	**(615) 345-1115-X253**
E-Mail address:	**rward@empirlabs.com**

STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY
NELAP - RECOGNIZED
ENVIRONMENTAL LABORATORY ACCREDITATION

is hereby granted to

EMPIRICAL LABORATORIES, LLC
227 FRENCH LANDING DRIVE, SUITE 550
NASHVILLE, TN 37228

NELAP ACCREDITED
ACCREDITATION NUMBER #200056

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Primary Accrediting Authority: NJ Department of Environmental Protection

Ron Turpin
Manager
Environmental Laboratory Accreditation Program

Janet Cruse
Accreditation Officer
Environmental Laboratory Accreditation Program

Certificate No.: 001814
Expiration Date: 07/24/2008
Issued On: 07/24/2007

State of Illinois
Environmental Protection Agency

Certificate No.: 001814

Awards the Certificate of Approval

Empirical Laboratories, LLC
227 French Landing Drive, Suite 550
Nashville, TN 37228

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

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Hazardous and Solid Waste, Inorganic

1010

Ignitability

1311

TCLP (Organic and Inorganic)

6010B

Aluminum	Antimony	Arsenic
Barium	Beryllium	Boron
Cadmium	Calcium	Chromium
Cobalt	Copper	Iron
Lead	Magnesium	Manganese
Molybdenum	Nickel	Potassium
Selenium	Silver	Sodium
Thallium	Tin	Vanadium
Zinc		

7196A

Chromium VI

7470A

Mercury

7471A

Mercury

9010B

Cyanide

9012A

Cyanide

9020B

TOX (Total Organic Halides)

9045C

Hydrogen Ion (pH)

9056

Chloride	Fluoride	Nitrate
Nitrite	Sulfate	

9060

Total Organic Carbon (TOC)

Hazardous and Solid Waste, Organic

8015B

State of Illinois
Environmental Protection Agency

Certificate No.: 001814

Awards the Certificate of Approval

Empirical Laboratories, LLC
227 French Landing Drive, Suite 550
Nashville, TN 37228

Hazardous and Solid Waste, Organic	*8015B*	Diesel range organics (DRO)
Gasoline range organics (GRO)		
8081A		
4,4'-DDD	4,4'-DDE	4,4'-DDT
Aldrin	alpha-BHC	alpha-Chlordane
Chlordane - not otherwise specified	delta-BHC	Dieldrin
Endosulfan I	Endosulfan II	Endosulfan sulfate
Endrin	Endrin aldehyde	Endrin ketone
gamma-BHC (Lindane)	gamma-Chlordane	Heptachlor
Heptachlor epoxide	Methoxychlor	Toxaphene
8082		
PCB-1016	PCB-1221	PCB-1232
PCB-1242	PCB-1248	PCB-1254
PCB-1260		
8151A		
2,4,5-T	2,4,5-TP (Silvex)	2,4-D
Dalapon	Dicamba	Dichloroprop
Dinoseb	MCPA	MCPP
8260B		
1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene
1,2,3-Trichlorobenzene	1,2,3-Trichloropropane	1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene	1,2-Dibromo-3-chloropropane (DBCP)	1,2-Dibromoethane (EDB)
1,2-Dichlorobenzene	1,2-Dichloroethane	1,2-Dichloropropane
1,3,5-Trimethylbenzene	1,3-Dichlorobenzene	1,3-Dichloropropane
1,4-Dichlorobenzene	1,4-Dioxane	2-Butanone (Methyl ethyl ketone, MEK)
2-Chloro-1,3-butadiene (Chloroprene)	2-Chloroethyl vinyl ether	2-Hexanone
4-Methyl-2-pentanone (Methyl isobutyl ketone, I	Acetone	Acetonitrile
Acrolein (Propenal)	Acrylonitrile	Allyl chloride
Benzene	Bromochloromethane	Bromodichloromethane
Bromoform	Bromomethane	Carbon disulfide
Carbon tetrachloride	Chlorobenzene	Chlorodibromomethane (Dibromochlorometha
Chloroethane	Chloroform	Chloromethane
Chloroprene	cis-1,2-Dichloroethene	cis-1,3-Dichloropropene
Dibromomethane	Dichlorodifluoromethane	Dichloromethane (Methylene chloride)
Ethyl methacrylate	Ethylbenzene	Hexachlorobutadiene
Isopropylbenzene	Methacrylonitrile	Methyl iodide (Iodmethane)
Methyl methacrylate	Methyl-t-butyl ether	m-Xylene
Naphthalene	n-Butylbenzene	n-Propylbenzene
o-Xylene	p-Isopropyltoluene	Propionitrile (Ethyl cyanide)
p-Xylene	sec-Butylbenzene	Styrene
tert-Butylbenzene	Tetrachloroethene	Toluene
trans-1,2-Dichloroethene	trans-1,3-Dichloropropene	trans-1,4-Dichloro-2-butene
Trichloroethene	Trichlorofluoromethane	Trichlorotrifluoroethane
Vinyl acetate	Vinyl chloride	Xylenes (total)
8270C		

State of Illinois
Environmental Protection Agency

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Empirical Laboratories, LLC
227 French Landing Drive, Suite 550
Nashville, TN 37228

Hazardous and Solid Waste, Organic

8270C

1,2-Dichlorobenzene
1,3,5-Trinitrobenzene (1,3,5-TNB)
1,2,4-Trichlorobenzene
1,3-Dinitrobenzene (1,3-DNB)
1,4-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Phenylenediamine
1-Naphthylamine
1,4-Naphthoquinone
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,3,4,6-Tetrachlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene (2,6-DNT)
2,4-Dinitrotoluene (2,4-DNT)
2-Chloronaphthalene
2-Chlorophenol
2-Acetylaminofluorene
2-Methylphenol (o-Cresol)
2-Methylpyridine (2-Picoline)
2-Methylnaphthalene
2-Nitroaniline
2-Nitrophenol
2-Naphthylamine
3,3'-Dimethylbenzidine
3-Methylcholanthrene
3,3'-Dichlorobenzidine
3-Nitroaniline
4,6-Dinitro-2-methylphenol
3-Methylphenol (m-Cresol)
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol
4-Aminobiphenyl
4-Chlorophenyl phenyl ether
4-Methylphenol (p-Cresol)
4-Chloroaniline
4-Nitrophenol
4-Nitroquinoline-1-oxide
4-Nitroaniline
7,12-Dimethylbenz(a)anthracene
Acenaphthene
5-Nitro-o-toluidine
Acetophenone
alpha,alpha-Dimethylphenethylamine
Acenaphthylene
Anthracene
Aramite
Aniline
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(a)anthracene
Benzo(k)fluoranthene
Benzyl alcohol
Benzo(g,h,i)perlyene
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-chloroethoxy) methane
Butyl benzyl phthalate
Carbazole
Bis(2-ethylhexyl)phthalate
Chrysene
Diallate
Chlorobenzilate
Dibenzofuran
Diethyl phthalate
Dibenz(a,h)anthracene
Dimethyl phthalate
Dimethylaminoazobenzene
Dimethoate
Di-n-octyl phthalate
Dinoseb
Di-n-butyl phthalate
Disulfoton
Ethyl methanesulfonate
Diphenylamine
Fluoranthene
Fluorene
Famphur
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachlorobenzene
Hexachlorophene
Hexachloropropene
Hexachloroethane
Isodrin
Isophorone
Indeno(1,2,3-cd) pyrene
Kepone
Methyl methanesulfonate
Isosafrole
Methylpyrilene
Naphthalene
Methyl parathion
Nitroquinoline-1-oxide
N-Nitrosodiethylamine
Nitrobenzene
N-Nitrosodi-n-butylamine (N-Nitrosodibutylamin
N-Nitrosodi-n-propylamine
N-Nitrosodimethylamine
N-Nitrosomethylethylamine
N-Nitrosomorpholine
N-Nitrosodiphenylamine
N-Nitrosopyrrolidine
O,O,O-Triethyl phosphorothioate
N-Nitrosopiperidine
Parathion
p-Dimethylaminoazobenzene
o-Toluidine
Pentachloronitrobenzene
Pentachlorophenol
Pentachlorobenzene
Phenanthrene
Phenol
Phenacetin
Pronamide
Pyrene
Phorate
Safrole
Thionazine (Zinophos)
Pyridine

8330

1,3,5-Trinitrobenzene (1,3,5-TBN)
1,3-Dinitrobenzene (1,3-DNB)
2,4,6-Trinitrotoluene (2,4,6-TNT)
2,4-Dinitrotoluene (2,4-DNT)
2,6-Dinitrotoluene (2,6-DNT)
2-Amino-4,6-dinitrotoluene (2-Am-DNT)
4-Amino-2,6-dinitrotoluene (4-Am-DNT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
m-Nitrotoluene (3-Nitrotoluene, 3-NT)
Nitrobenzene
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocin

State of Illinois
Environmental Protection Agency

Certificate No.: 001814

Awards the Certificate of Approval

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227 French Landing Drive, Suite 550
Nashville, TN 37228

Hazardous and Solid Waste, Organic *8330* o-Nitrotoluene (2-Nitrotoluene, 2-NT)

p-Nitrotoluene (4-Nitrotoluene, 4-NT)

CENWO-HX-S (200) 22 October 2007

MEMORANDUM FOR U.S. Army Engineer District, Louisville, ATTN: CELRL-ED-E-C (Kari Meier), 600 Martin Luther King Jr. Place, Louisville, KY 40202

SUBJECT: Laboratory Assessment of CT Laboratories of Baraboo, WI for Various FUDS Projects

1. This correspondence addresses the recent laboratory assessment of CT Laboratories of Baraboo, WI by the USACE HTRW Center of Expertise (HTRW CX). Technical assistance was requested by your office in June 2007 to evaluate CT Laboratories, of Baraboo, WI for compliance with the DOD Quality Systems Manual for Environmental laboratories, Version 3, January 2006.

2. The laboratory was assessed for the parameters listed below:

METHOD	PARAMETER	MATRIX(1)
5030B/8260B	VOCs	Water(2)
5035/8260B	VOCs	Soil(2)
3510C/8270C	BNAs	Water(2)
3545/8270C	BNAs	Soil(2)
3510C/8081A	Pesticides	Water(2)
3545/8081A	Pesticides	Soil(2)
3510C/8082	PCBs	Water(2)
3545/8082	PCBs	Soil(2)
3510C//8310	PAHs	Water(2)
3545/8310	PAHs	Soil(2)
3535/8330	Explosives	Water(2)
8330(3)	Explosives	Soil(2)
3535/8332	Nitroglycerin	Water
8332(3)	Nitroglycerin	Soil
5030B/8015B	TPH-GRO(4)	Water(2)
5035/8015B	TPH-GRO(4)	Soil(2)
3510C/8015B	TPH-DRO(4)	Water(2)
3545/8015B	TPH-DRO(4)	Soil(2)
3005A/3010A/3020A/6010B/7000s	Metals(5)	Water(2)
3050B/6010B/7000s	Metals(5)	Soil(2)
9056(3)	Anions(6)	Water(2)
9056(3)	Anions(6)	Soil(2)
9010B/9012A	Cyanide	Water(2)
9013/9012A	Cyanide	Soil(2)
7196A(3)	Chromium(VI)	Water(2)

3060A/7196A	Chromium(VI)	Soil[2]

Remarks: 1) Water and soil matrices; "soil" includes sediments and other solids.

2) The laboratory has successfully analyzed a Proficiency Testing (PT) sample for this method/matrix.

3) Analytical methods include sample preparation and measurement methods.

4) The evaluation of the method was limited to compliance with the requirements in the QSM for Method 8015B, rather than state-specific QA/QC criteria.

5) Metals (TAL Metals): Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

6) Anions: Fluoride, chloride, nitrate, nitrite, sulfate, and orthophosphate.

3. Enclosed for your information and use is a copy of the Desk Audit Report, including the laboratory's responses and final evaluation status by this office. Because the US Navy recently performed an on-site audit of CT Laboratories, of Baraboo, WI, this office did not perform an on-site audit. The Navy's on-site audit report and other supporting documents are available for review upon request.

4. Based upon the successful analysis of NELAC PT samples and the evaluation of the laboratory's supporting documentation, the laboratory has been determined to be compliant with the DOD QSM, Version 3 for the parameters/matrices/methods shown in Paragraph 2. CT Laboratories of Baraboo, WI is planning to analyze nitroglycerin using Method 8330 or 8330B. This is acceptable if the laboratory submits satisfactory documents as prescribed in Section 2(f) of the enclosed report.

5. It is your responsibility to provide final correspondence to the laboratory regarding their DOD QSM Compliance, and to determine ongoing compliance on an annual basis, in accordance with your project needs for analytical capacity and associated business processes prescribed in the HQUSACE CEMP-CE policy memorandum, SUBJECT: Hazardous, Toxic and Radioactive Waste (HTRW) Chemical Data Quality Management Policy for Environmental Laboratory Testing, dated 30 September 2004. This laboratory assessment is not considered valid beyond two years from the date of this letter. You are also urged to forward a copy of this correspondence to appropriate Project Management staff for their files. A record of this assessment will be posted on our website so that other USACE Districts can be informed of the laboratory's status.

6. Any questions or comments can be directed to Dr. Chung-Rei Mao at 402-697-2570.

Encl
as

Sandra M. Zebrowski, P.E.
Acting Director, USACE Hazardous,
Toxic and Radioactive Waste
Center of Expertise

Mao/cak/2570

Dunker/CENWO-HX-S

COATS/CENWO-HX-S

ZEBROWSKI/CENWO-HX

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STATE OF ILLINOIS

ENVIRONMENTAL PROTECTION AGENCY
NELAP - RECOGNIZED
ENVIRONMENTAL LABORATORY ACCREDITATION

is hereby granted to

CT LABORATORIES

1230 LANGE CT.

BARABOO, WI 53913

NELAP ACCREDITED
ACCREDITATION NUMBER #100457

According to the Illinois Administrative Code, Title 35, Subtitle A, Chapter II, Part 186, ACCREDITATION OF LABORATORIES FOR DRINKING WATER, WASTEWATER AND HAZARDOUS WASTES ANALYSIS, the State of Illinois formally recognizes that this laboratory is technically competent to perform the environmental analyses listed on the scope of accreditation detailed below.

The laboratory agrees to perform all analyses listed on this scope of accreditation according to the Part 186 requirements and acknowledges that continued accreditation is dependent on successful ongoing compliance with the applicable requirements of Part 186. Please contact the Illinois EPA Environmental Laboratory Accreditation Program (IL ELAP) to verify the laboratory's scope of accreditation and accreditation status. Accreditation by the State of Illinois is not an endorsement or a guarantee of validity of the data generated by the laboratory.

Ron Turpin
Manager
Environmental Laboratory Accreditation Program

Scott D. Siders
Accreditation Officer
Environmental Laboratory Accreditation Program

Certificate No.:	001867
Expiration Date:	09/30/2008
Issued On:	10/04/2007

APPENDIX D

ILLINOIS REMEDIAL OBJECTIVES TABLES AND EPA PRELIMINARY REMEDIATION GOALS

Section 742.APPENDIX A General

Section 742.TABLE G Concentrations of Inorganic Chemicals in Background Soils

Chemical Name	Counties Within Metropolitan Statistical Areas (mg/kg)	Counties Outside Metropolitan Statistical Areas (mg/kg)
Aluminum	9,500	9,200
Antimony	4.0	3.3
Arsenic	13.0	11.3
Barium	110`	122
Beryllium	0.59	0.56
Cadmium	0.6	0.50
Calcium	9,300	5,525
Chromium	16.2	13.0
Cobalt	8.9	8.9
Copper	19.6	12.0
Cyanide	0.51	0.50
Iron	15,900	15,000
Lead	36.0	20.9
Magnesium	4,820	2,700
Manganese	636	630
Mercury	0.06	0.05
Nickel	18.0	13.0
Potassium	1,268	1,100
Selenium	0.48	0.37
Silver	0.55	0.50
Sodium	130	130.0
Sulfate	85.5	110
Sulfide	3.1	2.9
Thallium	0.32	0.42
Vanadium	25.2	25.0
Zinc	95.0	60.2

BOARD NOTE: Counties within Metropolitan Statistical Areas: Boone, Champaign, Clinton, Cook, DuPage, Grundy, Henry, Jersey, Kane, Kankakee, Kendall, Lake, Macon, Madison, McHenry, McLean, Menard, Monroe, Peoria, Rock Island, Sangamon, St. Clair, Tazewell, Will, Winnebago and Woodford.

(Source: Amended at 31 Ill. Reg. 4063, effective February 23, 2007)

Section 742.APPENDIX A: General

Section 742.TABLE H Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils

Chemical Name	Chicago[a] mg/kg	Metropolitan Areas[b] (mg/kg)	Non-Metropolitan Areas[c] (mg/kg)
2-Methylnaphthalene	-----	0.14	0.29
Acenaphthene	0.09	0.13	0.04
Acenaphthylene	0.03	0.07	0.04
Anthracene	0.25	0.40	0.14
Benzo(a)anthracene	1.1	1.8	0.72
Benzo(a)pyrene	1.3	2.1	0.98
Benzo(b)fluoranthene	1.5	2.1	0.70
Benzo(g,h,i)perylene	0.68	1.7	0.84
Benzo(k)fluoranthene	0.99	1.7	0.63
Chrysene	1.2	2.7	1.1
Dibenzo(a,h)anthracene	0.20	0.42	0.15
Fluoranthene	2.7	4.1	1.8
Fluorene	0.10	0.18	0.04
Indeno(1,2,3-c,d)pyrene	0.86	1.6	0.51
Naphthalene	0.04	0.20	0.17
Phenanthrene	1.3	2.5	0.99
Pyrene	1.9	3.0	1.2

[a] Chicago means within the corporate limits of the City of Chicago.

[b] Metropolitan area means a populated area, as defined in Section 742.200, (other than the City of Chicago) that is located within any county in a Metropolitan Statistical Area listed in Appendix A, Table G, footnote a.

[c] Non-Metropolitan area means a populated area, as defined in Section 742.200, that is not located within any county in a Metropolitan Statistical Area listed in Appendix A, Table G, footnote a.

Section 742.APPENDIX B Tier 1 Illustrations and Tables

Section 742.TABLE A Tier 1 Soil Remediation Objectives[a] for Residential Properties

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
83-32-9	Acenaphthene	4,700[b]	---[c]	570[b]	2,900	*
67-64-1	Acetone	70,000[b]	100,000[d]	25[b]	25	*
15972-60-8	Alachlor[o]	8[e]	---[c]	0.04	0.2	NA
116-06-3	Aldicarb[o]	78[b]	---[c]	0.013	0.07	NA
309-00-2	Aldrin	0.04[e]	3[e]	0.5[e]	2.5	0.94
120-12-7	Anthracene	23,000[b]	---[c]	12,000[b]	59,000	*
1912-24-9	Atrazine[o]	2700[b]	---[c]	0.066	0.33	NA
71-43-2	Benzene	12[e]	0.8[e]	0.03	0.17	*
56-55-3	Benzo(*a*)anthracene	0.9[e,w]	---[c]	2	8	*
205-99-2	Benzo(*b*)fluoranthene	0.9[e,w]	---[c]	5	25	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
207-08-9	Benzo(*k*)fluroanthene	9[e]	---[c]	49	250	*
50-32-8	Benzo(*a*)pyrene	0.09[e, w]	---[c]	8	82	*
111-44-4	Bis(2-chloroethyl)ether	0.6[e]	0.2[e,]	0.0004[e,]	0.0004	0.66
117-81-7	Bis(2-ethylhexyl)phthalate	46[e]	31,000[d]	3,600	31,000[d]	*
75-27-4	Bromodichloromethane (Dichlorobromomethane)	10[e]	3,000[d]	0.6	0.6	*
75-25-2	Bromoform	81[e]	53[e]	0.8	0.8	*
71-36-3	Butanol	7,800[b]	10,000[d]	17[b]	17	NA
85-68-7	Butyl benzyl phthalate	16,000[b]	930[d]	930[d]	930[d]	*
86-74-8	Carbazole	32[e]	---[c]	0.6[e]	2.8	NA
1563-66-2	Carbofuran[o]	390[b]	---[c]	0.22	1.1	NA
75-15-0	Carbon disulfide	7,800[b]	720[d, x]	32[b]	160	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
56-23-5	Carbon tetrachloride	5[e]	0.3[e]	0.07	0.33	*
57-74-9	Chlordane	1.8[e]	72[e, x]	10	48	*
106-47-8	4-Chloroaniline (*p*-Chloroaniline)	310[b]	---[c]	0.7[b]	0.7	*
108-90-7	Chlorobenzene (Monochlorobenzene)	1,600[b]	130[b, x]	1	6.5	*
124-48-1	Chlorodibromomethane (Dibromochloromethane)	1,600[b]	1,300[d]	0.4	0.4	*
67-66-3	Chloroform	100[e]	0.3[e]	0.6	2.9	*
218-01-9	Chrysene	88[e]	---[c]	160	800	*
94-75-7	2,4-D[o]	780[b]	---[c]	1.5	7.7	*
75-99-0	Dalapon[o]	2,300[b]	---[c]	0.85	8.5	*
72-54-8	DDD	3[e]	---[c]	16[e]	80	*
72-55-9	DDE	2[e]	---[c]	54[e]	270	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
50-29-3	DDT	2[e]	---[g, x]	32[e]	160	*
53-70-3	Dibenzo(*a*,*h*)anthracene	0.09[e, w]	---[c]	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	0.46[e]	11[b, x]	0.002	0.02	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.32[e]	0.06[e]	0.0004	0.004	0.005
84-74-2	Di-*n*-butyl phthalate	7,800[b]	2,300[d]	2,300[d]	2,300[d]	*
95-50-1	1,2-Dichlorobenzene (*o* – Dichlorobenzene)	7,000[b]	560[d, x]	17	43	*
106-46-7	1,4-Dichlorobenzene (*p* – Dichlorobenzene)	---[c]	11,000[b, x]	2	11	*
91-94-1	3,3'-Dichlorobenzidine	1[e]	---[c]	0.007[e,]	0.033	1.3
75-34-3	1,1-Dichloroethane	7,800[b]	1,300[b, x]	23[b]	110	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	7[e]	0.4[e]	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	3,900[b]	290[b, x]	0.06	0.3	*
156-59-2	*cis*-1,2-Dichloroethylene	780[b]	1,200[d]	0.4	1.1	*
156-60-5	*trans*-1,2-Dichloroethylene	1,600[b]	3,100[d]	0.7	3.4	*
78-87-5	1,2-Dichloropropane	9[e]	15[b, x]	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	6.4[e]	1.1[e, x]	0.004[e]	0.02	0.005
60-57-1	Dieldrin[n]	0.04[e]	1[e]	0.004[e]	0.02	0.603
84-66-2	Diethyl phthalate	63,000[b]	2,000[d]	470[b]	470	*
105-67-9	2,4-Dimethylphenol	1,600[b]	---[c]	9[b]	9	*
121-14-2	2,4-Dinitrotoluene	0.9[e]	---[c]	0.0008[e,]	0.0008	0.250

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
606-20-2	2,6-Dinitrotoluene	0.9[e]	---[c]	0.0007[e]	0.0007	0.260
117-84-0	Di-*n*-octyl phthalate	1,600[b]	10,000[d]	10,000[d]	10,000[d]	*
115-29-7	Endosulfan[o]	470[b]	---[c]	18[b]	90	*
145-73-3	Endothall[o]	1,600[b]	---[c]	0.4	0.4	NA
72-20-8	Endrin	23[b]	---[c]	1	5	*
100-41-4	Ethylbenzene	7,800[b]	400[d, x]	13	19	*
206-44-0	Fluoranthene	3,100[b]	---[c]	4,300[b]	21,000	*
86-73-7	Fluorene	3,100[b]	---[c]	560[b]	2,800	*
76-44-8	Heptachlor	0.1[e]	0.1[e]	23	110	0.871
1024-57-3	Heptachlor epoxide	0.07[e]	5[e]	0.7	3.3	1.005
118-74-1	Hexachlorobenzene	0.4[e]	1[e]	2	11	*
319-84-6	*Alpha*-HCH (*alpha*-BHC)	0.1[e]	0.8[e]	0.0005[e,]	0.003	0.0074

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
58-89-9	*Gamma*-HCH (Lindane)[n]	0.5[e]	---[c, x]	0.009	0.047	*
77-47-4	Hexachlorocyclopentadiene	550[b]	10[b, x]	400	2,200[d]	*
67-72-1	Hexachloroethane	78[b]	---[c]	0.5[b]	2.6	*
193-39-5	Indeno(1,2,3-*c*,*d*)pyrene	0.9[e,w]	---[c]	14	69	*
78-59-1	Isophorone	15,600[b]	4,600[d]	8[b]	8	*
72-43-5	Methoxychlor[o]	390[b]	---[c]	160	780	*
74-83-9	Methyl bromide (Bromomethane)	110[b]	10[b, x]	0.2[b]	1.2	*
1634-04-4	Methyl tertiary-butyl ether	780[b]	8,800[d, x]	0.32	0.32	*
75-09-2	Methylene chloride (Dichloromethane)	85[e]	13[e]	0.02[e]	0.2	*
95-48-7	2-Methylphenol (*o* – Cresol)	3,900[b]	---[c]	15[b]	15	*
91-20-3	Naphthalene	1,600 [b]	170[b, x]	12 [b]	18	*
98-95-3	Nitrobenzene	39[b]	92[b, x]	0.1[b,]	0.1	0.26

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
86-30-6	*N*-Nitrosodiphenylamine	130[e]	---[c]	1[e]	5.6	*
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.09[e,]	---[c]	0.00005[e,]	0.00005	0.0018
108-95-2	Phenol	23,000[b]	---[c]	100[b]	100	*
1918-02-1	Picloram[o]	5,500[b]	---[c]	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs)[n]	1[h]	---[c,h]	---[h]	---[h]	*
129-00-0	Pyrene	2,300[b]	---[c]	4,200[b]	21,000	*
122-34-9	Simazine[o]	390[b]	---[c]	0.04	0.37	NA
100-42-5	Styrene	16,000[b]	1,500[d, x]	4	18	*
127-18-4	Tetrachloroethylene (Perchloroethylene)	12[e]	11[e]	0.06	0.3	*
108-88-3	Toluene	16,000[b]	650[d, x]	12	29	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
8001-35-2	Toxaphene[n]	0.6[e]	89[e]	31	150	*
120-82-1	1,2,4-Trichlorobenzene	780[b]	3,200[b, x]	5	53	*
71-55-6	1,1,1-Trichloroethane	---[c]	1,200[d]	2	9.6	*
79-00-5	1,1,2-Trichloroethane	310[b]	1,800[d]	0.02	0.3	*
79-01-6	Trichloroethylene	58[e]	5[e]	0.06	0.3	*
108-05-4	Vinyl acetate	78,000[b]	1,000[b, x]	170[b]	170	*
75-01-4	Vinyl chloride	0.46[e]	0.28[e]	0.01	0.07	*
108-38-3	m-Xylene	16,000[b]	420[d, x]	210	210	*
95-47-6	o-Xylene	16,000[b]	410[d, x]	190	190	*
106-42-3	p-Xylene	16,000[b]	460[d, x]	200	200	*

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
1330-20-7	Xylenes (total)	16,000[b]	320[d, x]	150	150	*
	Ionizable Organics					
65-85-0	Benzoic Acid	310,000[b]	---[c]	400[b,i]	400[i]	*
95-57-8	2-Chlorophenol	390[b]	53,000[d]	4[b,i]	4[i]	*
120-83-2	2,4-Dichlorophenol	230[b]	---[c]	1[b,i]	1[i]	*
51-28-5	2,4-Dinitrophenol	160[b]	---[c]	0.2[b,]	0.2	3.3
88-85-7	Dinoseb[o]	78[b]	---[c]	0.34[b,i]	3.4[i]	*
87-86-5	Pentachlorophenol	3[e,j]	---[c]	0.03[i]	0.14[i]	*
93-72-1	2,4,5-TP (Silvex)	630[b]	---[c]	11[i]	55[i]	*
95-95-4	2,4,5-Trichlorophenol	7,800[b]	---[c]	270[b,i]	1,400[i]	*
88-06-2	2,4,6 Trichlorophenol	58[e]	200[e]	0.2[e, i]	0.77[i]	0.66

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
	Inorganics					
7440-36-0	Antimony	31[b]	---[c]	0.006[m]	0.024[m]	*
7440-38-2	Arsenic[l,n]	---[t]	750[e]	0.05[m]	0.2[m]	*
7440-39-3	Barium	5,500[b]	690,000[b]	2.0[m]	2.0[m]	*
7440-41-7	Beryllium	160[b]	1,300[e]	0.004[m]	0.5[m]	*
7440-42-8	Boron	16,000[b]	---[c]	2.0[m]	2.0[m]	*
7440-43-9	Cadmium[l,n]	78[b, r]	1,800[e]	0.005[m]	0.05[m]	*
7440-70-2	Calcium[n]	---[g]	---[c]	---[c]	---[c]	*
16887-00-6	Chloride	---[c]	---[c]	200[m]	200[m]	*
7440-47-3	Chromium, total	230[b]	270[e]	0.1[m]	1.0[m]	*
16065-83-1	Chromium, ion, trivalent	120,000[b]	---[c]	---[g]	---[g]	*
18540-29-9	Chromium, ion, hexavalent	230[b]	270[e]	---	---	*

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-48-4	Cobalt	4,700[b]	---[c]	1.0[m]	1.0[m]	*
7440-50-8	Copper[n]	2,900[b]	---[c]	0.65[m]	0.65[m]	*
57-12-5	Cyanide (amenable)	1,600[b]	---[c]	0.2[q,m]	0.6[q,m]	*
7782-41-4	Fluoride	4,700[b]	---[c]	4.0[m]	4.0[m]	*
15438-31-0	Iron	---[c]	---[c]	5.0[m]	5.0[m]	*
7439-92-1	Lead	400[k]	---[c]	0.0075[m]	0.1[m]	*
7439-95-4	Magnesium[n]	325,000	---[c]	---[c]	---[c]	*
7439-96-5	Manganese	1,600 [b,v]	69,000[b, x]	0.15[m]	10.0[m]	*
7439-97-6	Mercury[l,n,s]	23[b]	10[b, x]	0.002[m]	0.01[m]	*
7440-02-0	Nickel[l]	1,600[b]	13,000[e]	0.1[m]	2.0[m]	*
14797-55-8	Nitrate as N[p]	130,000[b]	---[c]	10.0[q, m]	100[q]	*
7723-14-0	Phosphorus[n]	---[g]	---[c]	---[c]	---[c]	*

		Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-09-7	Potassium[n]	---[g]	---[c]	---[c]	---[c]	*
7782-49-2	Selenium[l,n]	390[b]	---[c]	0.05[m]	0.05[m]	*
7440-22-4	Silver	390[b]	---[c]	0.05[m]	---[c]	*
7440-23-5	Sodium[n]	---[g]	---[c]	---[c]	---[c]	*
14808-79-8	Sulfate	---[c]	---[c]	400[m]	400[m]	*
7440-28-0	Thallium	6.3[b,u]	---[c]	0.002[m]	0.02[m]	*
7440-62-2	Vanadium	550[b]	---[c]	0.049[m]	0.1[m]	*
7440-66-6	Zinc[l]	23,000[b]	---[c]	5.0[m]	10[m]	*

"*" indicates that the ADL is less than or equal to the specified remediation objective.
NA means not available; no PQL or EQL available in USEPA analytical methods.

Chemical Name and Soil Remediation Objective Notations

[a] Soil remediation objectives based on human health criteria only.
[b] Calculated values correspond to a target hazard quotient of 1.
[c] No toxicity criteria available for the route of exposure.
[d] Soil saturation concentration ($C_{[sat]}$) = the concentration at which the absorptive limits of the soil particles, the solubility limits of the available soil moisture, and saturation of soil pore air have been reached. Above the soil saturation concentration, the assumptions regarding vapor transport to air and/or dissolved phase transport to groundwater (for chemicals which are liquid at ambient soil temperatures) have been violated, and alternative modeling approaches are required.
[e] Calculated values correspond to a cancer risk level of 1 in 1,000,000.
[g] Chemical-specific properties are such that this route is not of concern at any soil contaminant concentration.
[h] 40 CFR 761 contains applicability requirements and methodologies for the development of PCB remediation objectives. Requests for approval of a Tier 3 evaluation must address the applicability of 40 CFR 761.
[I] Soil remediation objective for pH of 6.8. If soil pH is other than 6.8, refer to Appendix B, Tables C and D of this Part.
[j] Ingestion soil remediation objective adjusted by a factor of 0.5 to account for dermal route.
[k] A preliminary remediation goal of 400 mg/kg has been set for lead based on *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*, OSWER Directive #9355.4-12.
[l] Potential for soil-plant-human exposure.
[m] The person conducting the remediation has the option to use: 1) TCLP or SPLP test results to compare with the remediation objectives listed in this Table; 2) where applicable, the total amount of contaminant in the soil sample results to compare with pH specific remediation objectives listed in Appendix B, Table C or D of this Part (see Section 742.510); or 3) the appropriate background value listed in Appendix A, Table G. If the person conducting the remediation wishes to calculate soil remediation objectives based on background concentrations, this should be done in accordance with Subpart D of this Part.
[n] The Agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
[o] For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.
[p] For agrichemical facilities, soil remediation objectives based on site-specific background concentrations of Nitrate as N may be more appropriate. Such determinations shall be conducted in accordance with the procedures set forth in Subparts D and I of this Part.
[q] The TCLP extraction must be done using water at a pH of 7.0.
[r] Value based on dietary Reference Dose.
[s] Value for Ingestion based on Reference Dose for Mercuric chloride (CAS No. 7487-94-7); value for Inhalation based on Reference Concentration for elemental Mercury (CAS No. 7439-97-6). Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.
[t] For the ingestion route for arsenic, see 742.Appendix A, Table G.
[u] Value based on Reference Dose for Thallium sulfate (CAS No. 7446-18-6).
[v] Value based on Reference Dose adjusted for dietary intake.
[w] For sites located in any populated area as defined in Section 742.200, Appendix A, Table H may be used.
[x] The remediation objectives for these chemicals must also include the construction worker inhalation objective in Appendix B, Table B.

(Source: Amended at 31 Ill. Reg. 4063, effective February 23, 2007)

Section 742.APPENDIX B Tier 1 Illustrations and Tables

Section 742.Table B Tier 1 Soil Remediation Objectives[a] for Industrial/Commercial Properties

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
83-32-9	Acenaphthene	120,000[b]	-----[c]	120,000[b]	-----[c]	570[b]	2,900	*
67-64-1	Acetone	----[g]	100,000[d]	----[g]	100,000[d]	25[b]	25	*
15972-60-8	Alachlor[o]	72[e]	-----[c]	1,600[e]	-----[c]	0.04	0.2	NA
116-06-3	Aldicarb[o]	2,000[b]	-----[c]	200[b]	-----[c]	0.013	0.07	NA
309-00-2	Aldrin	0.3[e]	6.6[e]	6.1[b]	9.3[e]	0.5[e]	2.5	0.94
120-12-7	Anthracene	610,000[b]	-----[c]	610,000[b]	-----[c]	12,000[b]	59,000	*
1912-24-9	Atrazine[o]	72,000[b]	-----[c]	7,100[b]	-----[c]	0.066	0.33	NA
71-43-2	Benzene	100[e]	1.6[e]	2,300[e]	2.2[e]	0.03	0.17	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
56-55-3	Benzo(*a*)anthracene	8[e]	-----[c]	170[e]	-----[c]	2	8	*
205-99-2	Benzo(*b*)fluoranthene	8[e]	-----[c]	170[e]	-----[c]	5	25	*
207-08-9	Benzo(*k*)fluroanthene	78[e]	-----[c]	1,700[e]	-----[c]	49	250	*
50-32-8	Benzo(*a*)pyrene	0.8[e,x]	-----[c]	17[e]	-----[c]	8	82	*
111-44-4	Bis(2-chloroethyl)ether	5[e]	0.47[e]	75[e]	0.66[e]	0.0004[e,]	0.0004	0.66
117-81-7	Bis(2-ethylhexyl)phthalate	410[e]	31,000[d]	4,100[b]	31,000[d]	3,600	31,000[d]	*
75-27-4	Bromodichloromethane (Dichlorobromomethane)	92[e]	3,000[d]	2,000[e]	3,000[d]	0.6	0.6	*
75-25-2	Bromoform	720[e]	100[e]	16,000[e]	140[e]	0.8	0.8	*
71-36-3	Butanol	200,000[b]	10,000[d]	200,000[b]	10,000[d]	17[b]	17	NA
85-68-7	Butyl benzyl phthalate	410,000[b]	930[d]	410,000[b]	930[d]	930[d]	930[d]	*
86-74-8	Carbazole	290[e]	-----[c]	6,200[e]	-----[c]	0.6[e]	2.8	NA

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
1563-66-2	Carbofuran[o]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.22	1.1	NA
75-15-0	Carbon disulfide	200,000[b]	720[d]	20,000[b]	9.0[b]	32[b]	160	*
56-23-5	Carbon tetrachloride	44[e]	0.64[e]	410[b]	0.90[e]	0.07	0.33	*
57-74-9	Chlordane	16[e]	140[e]	100[b]	22[b]	10	48	*
106-47-8	4 – Chloroaniline (*p*-Chloroaniline)	8,200[b]	-----[c]	820[b]	-----[c]	0.7[b]	0.7	*
108-90-7	Chlorobenzene (Monochlorobenzene)	41,000[b]	210[b]	4,100[b]	1.3[b]	1	6.5	*
124-48-1	Chlorodibromomethane (Dibromochloromethane)	41,000[b]	1,300[d]	41,000[b]	1,300[d]	0.4	0.4	*
67-66-3	Chloroform	940[e]	0.54[e]	2,000[b]	0.76[e]	0.6	2.9	*
218-01-9	Chrysene	780[e]	-----[c]	17,000[e]	-----[e]	160	800	*
94-75-7	2,4-D[o]	20,000[b]	-----[c]	2,000[b]	-----[c]	1.5	7.7	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
75-99-0	Dalapon[o]	61,000[b]	-----[c]	6,100[b]	-----[c]	0.85	8.5	*
72-54-8	DDD	24[e]	-----[c]	520[e]	-----[c]	16[e]	80	*
72-55-9	DDE	17[e]	-----[c]	370[e]	-----[c]	54[e]	270	*
50-29-3	DDT	17[e]	1,500[e]	100[b]	2,100[e]	32[e]	160	*
53-70-3	Dibenzo(*a*,*h*)anthracene	0.8[e]	-----[c]	17[e]	-----[c]	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	4[e]	17[b]	89[e]	0.11[b]	0.002	0.02	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	2.9[e]	0.12[e]	62[e]	0.16[e]	0.0004	0.004	0.005
84-74-2	Di-*n*-butyl phthalate	200,000[b]	2,300[d]	200,000[b]	2,300[d]	2,300[d]	2,300[d]	*
95-50-1	1,2-Dichlorobenzene (*o* – Dichlorobenzene)	180,000[b]	560[d]	18,000[b]	310[b]	17	43	*
106-46-7	1,4-Dichlorobenzene (*p* – Dichlorobenzene)	-----[c]	17,000[b]	-----[c]	340[b]	2	11	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
91-94-1	3,3'-Dichlorobenzidine	13[e]	-----[c]	280[e]	-----[c]	0.007[e,]	0.033	1.3
75-34-3	1,1-Dichloroethane	200,000[b]	1,700[d]	200,000[b]	130[b]	23[b]	110	*
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	63[e]	0.70[e]	1,400[e]	0.99[e]	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	100,000[b]	470[b]	10,000[b]	3.0[b]	0.06	0.3	*
156-59-2	*cis*-1,2-Dichloroethylene	20,000[b]	1,200[d]	20,000[b]	1,200[d]	0.4	1.1	*
156-60-5	*Trans*-1,2-Dichloroethylene	41,000[b]	3,100[d]	41,000[b]	3,100[d]	0.7	3.4	*
78-87-5	1,2-Dichloropropane	84[e]	23[b]	1,800[e]	0.50[b]	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	57[e]	2.1[e]	1,200[e]	0.39[b]	0.004[e]	0.02	0.005
60-57-1	Dieldrin[n]	0.4[e]	2.2[e]	7.8[e]	3.1[e]	0.004[e]	0.02	0.603
84-66-2	Diethyl phthalate	1,000,000[b]	2,000[d]	1,000,000[b]	2,000[d]	470[b]	470	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
105-67-9	2,4-Dimethylphenol	41,000[b]	-----[c]	41,000[b]	-----[c]	9[b]	9	*
121-14-2	2,4-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0008[e,]	0.0008	0.250
606-20-2	2,6-Dinitrotoluene	8.4[e]	-----[c]	180[e]	-----[c]	0.0007[e,]	0.0007	0.260
117-84-0	Di-*n*-octyl phthalate	41,000[e]	10,000[d]	4,100[b]	10,000[d]	10,000[d]	10,000[d]	*
115-29-7	Endosulfan[o]	12,000[b]	-----[c]	1,200[b]	-----[c]	18[b]	90	*
145-73-3	Endothall[o]	41,000[c]	-----[c]	4,100[b]	-----[c]	0.4	0.4	NA
72-20-8	Endrin	610[b]	-----[c]	61[b]	-----[c]	1	5	*
100-41-4	Ethylbenzene	200,000[b]	400[d]	20,000[b]	58[b]	13	19	*
206-44-0	Fluoranthene	82,000[b]	-----[c]	82,000[b]	-----[c]	4,300[b]	21,000	*
86-73-7	Fluorene	82,000[b]	-----[c]	82,000[b]	-----[c]	560[b]	2,800	*
76-44-8	Heptachlor	1[e]	11[e]	28[e]	16[e]	23	110	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
1024-57-3	Heptachlor epoxide	0.6[e]	9.2[e]	2.7[b]	13[e]	0.7	3.3	1.005
118-74-1	Hexachlorobenzene	4[e]	1.8[e]	78[e]	2.6[e]	2	11	*
319-84-6	*Alpha*-HCH (*alpha*-BHC)	0.9[e]	1.5[e]	20[e]	2.1[e]	0.0005[e,]	0.003	0.0074
58-89-9	*Gamma*-HCH (Lindane)[n]	4[e]	-----[c]	96[e]	-----[c]	0.009	0.047	*
77-47-4	Hexachlorocyclopentadiene	14,000[b]	16[b]	14,000[b]	1.1[b]	400	2,200[d]	*
67-72-1	Hexachloroethane	2,000[b]	-----[c]	2,000[b]	-----[c]	0.5[b]	2.6	*
193-39-5	Indeno(1,2,3-*c*,*d*)pyrene	8[e]	-----[c]	170[e]	-----[c]	14	69	*
78-59-1	Isophorone	410,000[b]	4,600[d]	410,000[b]	4,600[d]	8[b]	8	*
72-43-5	Methoxychlor[o]	10,000[b]	-----[c]	1,000[b]	-----[c]	160	780	*
74-83-9	Methyl bromide (Bromomethane)	2,900[b]	15[b]	1,000[b]	3.9[b]	0.2[b]	1.2	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
1634-04-4	Methyl tertiary-butyl ether	20,000[b]	8,800[d]	2,000[b]	140[b]	0.32	0.32	*
75-09-2	Methylene chloride (Dichloromethane)	760[e]	24[e]	12,000[b]	34[e]	0.02[e]	0.2	*
95-48-7	2-Methylphenol (*o* – Cresol)	100,000[b]	-----[c]	100,000[b]	-----[c]	15[b]	15	*
86-30-6	*N*-Nitrosodiphenylamine	1,200[e]	-----[c]	25,000[e]	-----[c]	1[e]	5.6	*
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.8[e]	-----[c]	18[e]	-----[c]	0.00005[e]	0.00005	0.0018
91-20-3	Naphthalene	41,000[b]	270[b]	4,100[b]	1.8[b]	12[b]	18	*
98-95-3	Nitrobenzene	1,000[b]	140[b]	1,000[b]	9.4[b]	0.1[b]	0.1	0.26
108-95-2	Phenol	610,000[b]	-----[c]	61,000[b]	-----[c]	100[b]	100	*
1918-02-1	Picloram[o]	140,000[b]	-----[c]	14,000[b]	-----[c]	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs)[n]	1[h]	-----[c,h]	1[h]	-----[c,h]	-----[h]	-----[h]	*
129-00-0	Pyrene	61,000[b]	-----[c]	61,000[b]	-----[c]	4,200[b]	21,000	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
122-34-9	Simazine[o]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.04	0.37	NA
100-42-5	Styrene	410,000[b]	1,500[d]	41,000[b]	430[b]	4	18	*
127-18-4	Tetrachloroethylene (Perchloroethylene)	110[e]	20[e]	2,400[e]	28[e]	0.06	0.3	*
108-88-3	Toluene	410,000[b]	650[d]	410,000[b]	42[b]	12	29	*
8001-35-2	Toxaphene[n]	5.2[e]	170[e]	110[e]	240[e]	31	150	*
120-82-1	1,2,4-Trichlorobenzene	20,000[b]	3,200[d]	2,000[b]	920[b]	5	53	*
71-55-6	1,1,1-Trichloroethane	-----[c]	1,200[d]	-----[c]	1,200[d]	2	9.6	*
79-00-5	1,1,2-Trichloroethane	8,200[b]	1,800[d]	8,200[b]	1,800[d]	0.02	0.3	*
79-01-6	Trichloroethylene	520[e]	8.9[e]	1,200[b]	12[e]	0.06	0.3	*
108-05-4	Vinyl acetate	1,000,000[b]	1,600[b]	200,000[b]	10[b]	170[b]	170	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
75-01-4	Vinyl chloride	7.9[e]	1.1[e]	170[e]	1.1[b]	0.01	0.07	*
108-38-3	m-Xylene	410,000[b]	420[d]	41,000[b]	6.4[b]	210	210	*
95-47-6	o-Xylene	410,000[b]	410[d]	41,000[b]	6.5[b]	190	190	*
106-42-3	p-Xylene	410,000[b]	460[d]	41,000[b]	5.9[b]	200	200	*
1330-20-7	Xylenes (total)	410,000[b]	320[d]	41,000[b]	5.6[b]	150	150	*
	Ionizable Organics							
65-85-0	Benzoic Acid	1,000,000[b]	-----[c]	820,000[b]	-----[c]	400[b,i]	400[i]	*
95-57-8	2-Chlorophenol	10,000[b]	53,000[d]	10,000[b]	53,000[d]	4[b, i]	20[i]	*
120-83-2	2,4-Dichlorophenol	6,100[b]	-----[c]	610[b]	-----[c]	1[b, i]	1[i]	*
51-28-5	2,4-Dinitrophenol	4,100[b]	-----[c]	410[b]	-----[c]	0.2[b, i]	0.2[i]	3.3
88-85-7	Dinoseb[o]	2,000[b]	-----[c]	200[b]	-----[c]	0.34[b, i]	3.4[i]	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
87-86-5	Pentachlorophenol	24[e,j]	-----[c]	520[e,j]	-----[c]	0.03 [i]	0.14[i]	*
93-72-1	2,4,5-TP (Silvex)	16,000[b]	-----[c]	1,600[b]	-----[c]	11[i]	55[i]	*
95-95-4	2,4,5-Trichlorophenol	200,000[b]	-----[c]	200,000[b]	-----[c]	270[b, i]	1,400[i]	*
88-06-2	2,4,6- Trichlorophenol	520[e]	390[e]	11,000[e]	540[e]	0.2[e, i]	0.77[i]	0.66

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
	Inorganics							
7440-36-0	Antimony	820[b]	-----[c]	82[b]	-----[c]	0.006[m]	0.024[m]	*
7440-38-2	Arsenic[l,n]	---[t]	1,200[e]	61[b]	25,000[e]	0.05[m]	0.2[m]	*
7440-39-3	Barium	140,000[b]	910,000[b]	14,000[b]	870,000[b]	2.0[m]	2.0[m]	*
7440-41-7	Beryllium	4,100[b]	2,100[e]	410[b]	44,000[e]	0.004[m]	0.5[m]	*
7440-42-8	Boron	410,000[b]	---[c]	41,000[b]	---[c]	2.0[m]	2.0[m]	*
7440-43-9	Cadmium[l,n]	2,000[b,r]	2,800[e]	200[b,r]	59,000[e]	0.005[m]	0.05[m]	*
7440-70-2	Calcium[n]	---[g]	---[c]	---[g]	---[c]	---[c]	---[c]	*
16887-00-6	Chloride	-------[c]	-----[c]	-----[c]	-----[c]	200[m]	200[m]	*
7440-47-3	Chromium, total	6,100[b]	420[e]	4,100[b]	690[b]	0.1[m]	1.0[m]	*
16065-83-1	Chromium, ion, trivalent	1,000,000[b]	-----[c]	310,000[b]	-----[c]	-----[g]	-----[g]	*
18540-29-9	Chromium, ion, hexavalent	6,100[b]	420[e]	4,100[b]	690[b]	-----	-----	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-48-4	Cobalt	120,000[b]	-----[c]	12,000[b]	-----[c]	1.0[m]	1.0[m]	*
7440-50-8	Copper[n]	82,000[b]	-----[c]	8,200[b]	-----[c]	0.65[m]	0.65[m]	*
57-12-5	Cyanide (amenable)	41,000[b]	-----[c]	4,100[b]	-----[c]	0.2[q,m]	0.6[q,m]	*
7782-41-4	Fluoride	120,000[b]	-----[c]	12,000[b]	-----[c]	4.0[m]	4.0[m]	*
15438-31-0	Iron	-----[c]	-----[c]	-----[c]	-----[c]	5.0[m]	5.0[m]	*
7439-92-1	Lead	800[y]	-----[c]	700[y]	-----[c]	0.0075[m]	0.1[m]	*
7439-95-4	Magnesium[n]	---[g]	---[c]	730,000	---[c]	---[c]	---[c]	*
7439-96-5	Manganese	41,000 [b,w]	91,000[b]	4,100 [b,w]	8,700[b]	0.15[m]	10.0[m]	*
7439-97-6	Mercury[l,n,s]	610[b]	16[b]	61[b]	0.1[b]	0.002[m]	0.01[m]	*
7440-02-0	Nickel[l]	41,000[b]	21,000[e]	4,100[b]	440,000[e]	0.1[m]	2.0[m]	*
14797-55-8	Nitrate as N[p]	1,000,000[b]	-----[c]	330,000[b]	-----[c]	10.0[q, m]	100[q]	*
7723-14-0	Phosphorus[n]	---[g]	---[c]	---[g]	---[c]	---[c]	---[c]	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-09-7	Potassium[n]	---[g]	---[c]	---[g]	---[c]	---[c]	---[c]	*
7782-49-2	Selenium[l,n]	10,000[b]	-----[c]	1,000[b]	-----[c]	0.05[m]	0.05[m]	*
7440-22-4	Silver	10,000[b]	-----[c]	1,000[b]	-----[c]	0.05[m]	-----	*
7440-23-5	Sodium[n]	---[g]	---[c]	---[g]	---[c]	---[c]	---[c]	*
14808-79-8	Sulfate	-----[c]	-----[c]	-----[c]	-----[c]	400[m]	400[m]	*
7440-28-0	Thallium	160[b,u]	-----[c]	160[b,u]	-----[c]	0.002[m]	0.02[m]	*
7440-62-2	Vanadium	14,000[b]	-----[c]	1,400[b]	-----[c]	0.049[m]	0.1[m]	*
7440-66-6	Zinc[l]	610,000[b]	-----[c]	61,000[b]	-----[c]	5.0[m]	10[m]	*

"*" indicates that the ADL is less than or equal to the specified remediation objective.

NA means Not Available; no PQL or EQL available in USEPA analytical methods.

Chemical Name and Soil Remediation Objective Notations (2nd, 5th thru 8th Columns)

[a] oil remediation objectives based on human health criteria only.
[b] Calculated values correspond to a target hazard quotient of 1.
[c] No toxicity criteria available for this route of exposure.
[d] Soil saturation concentration ($C_{[sat]}$) = the concentration at which the absorptive limits of the soil particles, the solubility limits of the available soil moisture, and saturation of soil pore air have been reached. Above the soil saturation concentration, the assumptions regarding vapor transport to air and/or dissolved phase transport to groundwater (for chemicals which are liquid at ambient soil temperatures) have been violated, and alternative modeling approaches are required.
[e] Calculated values correspond to a cancer risk level of 1 in 1,000,000.

[g] Chemical-specific properties are such that this route is not of concern at any soil contaminant concentration.
[h] 40 CFR 761 contains applicability requirements and methodologies for the development of PCB remediation objectives. Requests for approval of a Tier 3 evaluation must address the applicability of 40 CFR 761.
[i] Soil remediation objective for pH of 6.8. If soil pH is other than 6.8, refer to Appendix B, Tables C and D in this Part.
[j] Ingestion soil remediation objective adjusted by a factor of 0.5 to account for dermal route.
[l] Potential for soil-plant-human exposure.
[m] The person conducting the remediation has the option to use: (1) TCLP or SPLP test results to compare with the remediation objectives listed in this Table; (2) the total amount of contaminant in the soil sample results to compare with pH specific remediation objectives listed in Appendix B, Table C or D of this Part (see Section 742.510); or (3) the appropriate background value listed in Appendix A, Table G. If the person conducting the remediation wishes to calculate soil remediation objectives based on background concentrations, this should be done in accordance with Subpart D of this Part.
[n] The Agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
[o] For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.
[p] For agrichemical facilities, soil remediation objectives based on site-specific background concentrations of Nitrate as N may be more appropriate. Such determinations shall be conducted in accordance with the procedures set forth in Subparts D and I of this Part.
[q] The TCLP extraction must be done using water at a pH of 7.0.
[r] Value based on dietary Reference Dose.
[s] Value for Ingestion based on Reference Dose for Mercuric chloride (CAS No. 7487-94-7); value for Inhalation based on Reference Concentration for elemental Mercury (CAS No. 7439-97-6). Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.
[t] For the ingestion route for arsenic for industrial/commercial, see 742.Appendix A, Table G.
[u] Value based on Reference Dose for Thallium sulfate (CAS No. 7446-18-6).
[w] Value based on Reference Dose adjusted for dietary intake.
[x] For any populated areas as defined in Section 742.200, Appendix A, Table H may be used.
[y] Value based on maintaining fetal blood lead below 10 ug/d1, using the USEPA adults Blood Lead Model.

(Source: Amended at 31 Ill. Reg. 4063, effective February 23, 2007)

Section 742.APPENDIX B Tier 1 Illustrations and Tables

Section 742.TABLE E Tier 1 Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route

		Groundwater Remediation Objective	
CAS No.	Chemical Name Organics	Class I (mg/L)	Class II (mg/L)
83-32-9	Acenaphthene	0.42	2.1
67-64-1	Acetone	6.3	6.3
15972-60-8	Alachlor	0.002[c]	0.01[c]
116-06-3	Aldicarb	0.003[c]	0.015[c]
309-00-2	Aldrin	0.014[a]	0.07
120-12-7	Anthracene	2.1	10.5
1912-24-9	Atrazine	0.003[c]	0.015[c]
71-43-2	Benzene	0.005[c]	0.025[c]
56-55-3	Benzo(*a*)anthracene	0.00013[a]	0.00065
205-99-2	Benzo(*b*)fluoranthene	0.00018[a]	0.0009
207-08-9	Benzo(*k*)fluroanthene	0.00017[a]	0.00085
50-32-8	Benzo(*a*)pyrene	0.0002[a,c]	0.002[c]
65-85-0	Benzoic Acid	28	28
111-44-4	Bis(2-chloroethyl)ether	0.01[a]	0.01
117-81-7	Bis(2-ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	0.006[c]	0.06[c]
75-27-4	Bromodichloromethane (Dichlorobromomethane)	0.0002[a]	0.0002
75-25-2	Bromoform	0.001[a]	0.001
71-36-3	Butanol	0.7	0.7
85-68-7	Butyl benzyl phthalate	1.4	7.0
86-74-8	Carbazole	---	---
1563-66-2	Carbofuran	0.04[c]	0.2[c]
75-15-0	Carbon disulfide	0.7	3.5
56-23-5	Carbon tetrachloride	0.005[c]	0.025[c]
57-74-9	Chlordane	0.002[c]	0.01[c]

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
106-47-8	4-Chloroaniline (ρ-Chloroaniline)	0.028	0.028
108-90-7	Chlorobenzene (Monochlorobenzene)	0.1[c]	0.5[c]
124-48-1	Chlorodibromomethane (Dibromochloromethane)	0.14	0.14
67-66-3	Chloroform	0.0002[a]	0.001
95-57-8	2-Chlorophenol (pH 4.9-7.3)	0.035	0.175
	2-Chlorophenol (pH 7.4-8.0)	0.035	0.035
218-01-9	Chrysene	0.0015[a]	0.0075
94-75-7	2,4-D	0.07[c]	0.35[c]
75-99-0	Dalapon	0.2[c]	2.0[c]
72-54-8	DDD	0.014[a]	0.07
72-55-9	DDE	0.01[a]	0.05
50-29-3	DDT	0.006[a]	0.03
53-70-3	Dibenzo(*a*,*h*)anthracene	0.0003[a]	0.0015
96-12-8	1,2-Dibromo-3-chloropropane	0.0002[c]	0.002 [c]
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.00005[c]	0.0005[c]
84-74-2	Di-*n*-butyl phthalate	0.7	3.5
95-50-1	1,2-Dichlorobenzene (*o* – Dichlorobenzene)	0.6[c]	1.5[c]
106-46-7	1,4-Dichlorobenzene (*p* – Dichlorobenzene)	0.075[c]	0.375[c]
91-94-1	3,3'-Dichlorobenzidine	0.02[a]	0.1
75-34-3	1,1-Dichloroethane	0.7	3.5
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.005[c]	0.025[c]
75-35-4	1,1-Dichloroethylene[b]	0.007[c]	0.035[c]
156-59-2	*cis*-1,2-Dichloroethylene	0.07[c]	0.2[c]
156-60-5	*trans*-1,2-Dichloroethylene	0.1[c]	0.5[c]
120-83-2	2,4-Dichlorophenol	0.021	0.021
78-87-5	1,2-Dichloropropane	0.005[c]	0.025[c]
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, *cis* + *trans*)	0.001[a]	0.005

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
60-57-1	Dieldrin	0.009[a]	0.045
84-66-2	Diethyl phthalate	5.6	5.6
105-67-9	2,4-Dimethylphenol	0.14	0.14
51-28-5	2,4-Dinitrophenol	0.014	0.014
121-14-2	2,4-Dinitrotoluene	0.00002[a]	0.00002
606-20-2	2,6-Dinitrotoluene	0.00031[a]	0.00031
88-85-7	Dinoseb	0.007[c]	0.07[c]
117-84-0	Di-*n*-octyl phthalate	0.14	0.7
115-29-7	Endosulfan	0.042	0.21
145-73-3	Endothall	0.1[c]	0.1[c]
72-20-8	Endrin	0.002[c]	0.01[c]
100-41-4	Ethylbenzene	0.7[c]	1.0[c]
206-44-0	Fluoranthene	0.28	1.4
86-73-7	Fluorene	0.28	1.4
76-44-8	Heptachlor	0.0004[c]	0.002[c]
1024-57-3	Heptachlor epoxide	0.0002[c]	0.001[c]
118-74-1	Hexachlorobenzene	0.00006[a]	0.0003
319-84-6	*alpha*-HCH (*alpha*-BHC)	0.00011[a]	0.00055
58-89-9	*Gamma*-HCH (Lindane)	0.0002[c]	0.001[c]
77-47-4	Hexachlorocyclopentadiene	0.05[c]	0.5[c]
67-72-1	Hexachloroethane	0.007	0.035
193-39-5	Indeno(1,2,3-*c*,*d*)pyrene	0.00043[a]	0.00215
78-59-1	Isophorone	1.4	1.4
72-43-5	Methoxychlor	0.04[c]	0.2[c]
74-83-9	Methyl bromide (Bromomethane)	0.0098	0.049
1634-04-4	Methyl tertiary-butyl ether	0.07	0.07
75-09-2	Methylene chloride (Dichloromethane)	0.005[c]	0.05[c]
95-48-7	2-Methylphenol (*o*-Cresol)	0.35	0.35
91-20-3	Naphthalene	0.14	0.22
98-95-3	Nitrobenzene[b]	0.0035	0.0035

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
86-30-6	*N*-Nitrosodiphenylamine	0.0032 [a]	0.016
621-64-7	*N*-Nitrosodi-*n*-propylamine	0.0018 [a]	0.0018
87-86-5	Pentachlorophenol	0.001[c]	0.005[c]
108-95-2	Phenol	0.1[c]	0.1[c]
1918-02-1	Picloram	0.5[c]	5.0[c]
1336-36-3	Polychlorinated biphenyls (PCBs)	0.0005[c]	0.0025[c]
129-00-0	Pyrene	0.21	1.05
122-34-9	Simazine	0.004[c]	0.04[c]
100-42-5	Styrene	0.1[c]	0.5[c]
93-72-1	2,4,5-TP (Silvex)	0.05[c]	0.25[c]
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.005[c]	0.025[c]
108-88-3	Toluene	1.0[c]	2.5[c]
8001-35-2	Toxaphene	0.003[c]	0.015[c]
120-82-1	1,2,4-Trichlorobenzene	0.07[c]	0.7[c]
71-55-6	1,1,1-Trichloroethane[b]	0.2[c]	1.0[c]
79-00-5	1,1,2-Trichloroethane	0.005[c]	0.05[c]
79-01-6	Trichloroethylene	0.005[c]	0.025[c]
95-95-4	2,4,5-Trichlorophenol (pH 4.9-7.8)	0.7	3.5
	2,4,5-Trichlorophenol (pH 7.9-8.0)	0.7	0.7
88-06-2	2,4,6-Trichlorophenol (pH 4.9-6.8)	0.01[a]	0.05
	2,4,6-Trichlorophenol (pH 6.9-8.0)	0.01	0.01
108-05-4	Vinyl acetate	7.0	7.0
75-01-4	Vinyl chloride	0.002[c]	0.01[c]
1330-20-7	Xylenes (total)	10.0[c]	10.0[c]

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
	Inorganics		
7440-36-0	Antimony	0.006[c]	0.024[c]
7440-38-2	Arsenic	0.05[c]	0.2[c]
7440-39-3	Barium	2.0[c]	2.0[c]
7440-41-7	Beryllium	0.004[c]	0.5[c]
7440-42-8	Boron	2.0[c]	2.0[c]
7440-43-9	Cadmium	0.005[c]	0.05[c]
7440-70-2	Calcium	---[d]	---[d]
16887-00-6	Chloride	200[c]	200[c]
7440-47-3	Chromium, total	0.1[c]	1.0[c]
18540-29-9	Chromium, ion, hexavalent	---	---
7440-48-4	Cobalt	1.0[c]	1.0[c]
7440-50-8	Copper	0.65[c]	0.65[c]
57-12-5	Cyanide	0.2[c]	0.6[c]
7782-41-4	Fluoride	4.0[c]	4.0[c]
15438-31-0	Iron	5.0[c]	5.0[c]
7439-92-1	Lead	0.0075[c]	0.1[c]
7439-95-4	Magnesium	---[d]	---[d]
7439-96-5	Manganese	0.15[c]	10.0[c]
7439-97-6	Mercury	0.002[c]	0.01[c]
7440-02-0	Nickel	0.1[c]	2.0[c]
14797-55-8	Nitrate as N	10.0[c]	100[c]
7723-14-0	Phosphorus	---[d]	---[d]
7440-09-7	Potassium	---[d]	---[d]
7782-49-2	Selenium	0.05[c]	0.05[c]

		Groundwater Remediation Objective	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
7440-22-4	Silver	0.05[c]	---
7440-23-5	Sodium	---[d]	---[d]
14808-79-8	Sulfate	400[c]	400[c]
7440-28-0	Thallium	0.002[c]	0.02[c]
7440-62-2	Vanadium[b]	0.049	0.1
7440-66-6	Zinc	5.0[c]	10[c]

Chemical Name and Groundwater Remediation Objective Notations

[a] The groundwater remediation objective is equal to the ADL for carcinogens according to the procedures specified in 35 Ill. Adm. Code 620.

[b] Oral Reference Dose and/or Reference Concentration under review by USEPA. Listed values subject to change.

[c] Value listed is also the Groundwater Quality Standard for this chemical pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

[d] This chemical is included in the Total Dissolved Solids (TDS) Groundwater Quality Standard of 1,200 mg/l pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

(Source: Amended at 31 Ill. Reg. 4063, effective February 23, 2007)

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
208-96-8	Acenaphthylene	2,300[b]	-----[c]	85[b]	420	*	YES-NC
75-07-0	Acetaldehyde	-----[c]	9.6[e]	-----[c]	-----[c]	NA	YES-NC/C
34256-82-1	Acetochlor[f]	1,600[b]	1,300[d]	5.9[b]	30	*	YES-NC
107-02-8	Acrolein	39[b]	0.16[b]	0.014[b]	0.014	SS	YES-NC
79-10-7	Acrylic Acid	39,000[b]	140[b]	14[b]	14	*	YES-NC
107-13-1	Acrylonitrile	1.2[e]	0.28[e]	0.0006[e]	0.0006	SS	YES-NC/C
107-18-6	Allyl Alcohol	390[b]	35,000[d]	0.14[b]	0.14	SS	YES-NC
7429-90-5	Aluminum	78,000[b]	1,000,000[b]	3.5 mg/l (TCLP/SPLP)	5.0 mg/l (TCLP/SPLP)	*	YES-NC
62-53-3	Aniline	110[e]	81[b]	0.063[e]	0.063	SS	YES-NC/C
25057-89-0	Bentazon[f]	2,300[b]	-----[c]	2.5[b]	2.5	NA	YES-NC
100-52-7	Benzaldehyde	7,800[b]	620[d]	3.3[b]	3.3	NA	YES-NC
92-87-5	Benzidine	0.003[e]	0.009[e]	2.2E-06[e]	2.2E-06	NA	YES-C
191-24-2	Benzo(g,h,i)perylene	2,300[b]	-----[c]	27,000[b]	130,000	SS	YES-NC
100-51-6	Benzyl Alcohol	39,000[b]	6,100[d]	15[b]	15	SS	YES-NC
141-66-2	Bidrin[f]	7.8[b]	110,000[d]	0.0028[b]	0.0028	NA	YES-NC
92-52-4	1,1-Biphenyl	3,900[b]	-----[c]	150[b]	740	NA	YES-NC
39638-32-9	Bis(2-chloroisopropyl)ether	3,100[b]	1,300[d]	2.4[b]	2.4	SS	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
108-86-1	Bromobenzene	1,600[b]	100[b]	2.2[b]	11	SS	YES-NC
1689-84-5	Bromoxynil[f]	1,600[b]	-----[c]	see Table C	see Table D	NA	
106-99-0	1,3-Butadiene	-----[c]	0.05[e]	-----[c]	-----[c]	NA	YES-NC/C
2008-41-5	Butylate[f]	3,900[b]	3,200[d]	170[b]	850	NA	YES-NC
105-60-2	Caprolactam	39,000[b]	-----[c]	14[b]	14	NA	YES-NC
133-06-2	Captan[f]	10,000[b]	-----[c]	11[b]	11	NA	
63-25-2	Carbaryl[f]	7,800[b]	-----[c]	8.7[b]	8.7	NA	YES-NC
5234-68-4	Carboxin	7,800[b]	-----[c]	6.3[b]	6.3	NA	
133-90-4	Chloramben[f]	1,200[b]	-----[c]	0.47[b]	0.47	NA	YES-NC
470-90-6	Chlorfenvinphos	55[b]	4,200[d]	1.1	5.6	*	YES-NC
109-69-3	1-Chlorobutane	3,100[b]	1,200[d]	3.1[b]	16	SS	YES-NC
91-58-7	beta-Chloronaphthalene	6,300[b]	-----[c]	49[b]	240	SS	YES-NC
95-49-8	o-Chlorotoluene	1,600[b]	1,400[d]	4[b]	20	SS	
2921-88-2	Chlorpyrifos[f]	230[b]	-----[c]	88[b]	440	SS	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
5598-13-0	Chlorpyrifos Methyl[f]	780[b]	-----[c]	49[b]	240	NA	YES-NC
98-82-8	Cumene (isopropylbenzene)	7,800[b]	500[b]	91[b]	460	SS	YES-NC
21725-46-2	Cyanazine[f]	160[b]	-----[c]	0.14[b]	0.14	NA	YES-NC
110-82-7	Cyclohexane	-----[c]	280[d]	-----[c]	-----[c]	NA	YES-NC
108-94-1	Cyclohexanone	390,000[b]	660[d]	150[b]	150	NA	
333-41-5	Diazinon[f]	55[b]	-----[c]	1.1[b]	5.6	SS	YES-NC
132-64-9	Dibenzofuran	160[b]	-----[c]	6.1[b]	30	*	YES-NC
1918-00-9	Dicamba[f]	2,300[b]	-----[c]	0.86[b]	0.86	NA	YES-NC
75-71-8	Dichlorodifluoromethane	16,000[b]	190[b]	43[b]	220	SS	YES-NC
142-28-9	1,3-Dichloropropane	1,600[b]	1,000[d]	0.83[b]	0.83	SS	YES-NC
62-73-7	Dichlorvos	2.2[e]	3.6[b]	0.0015[e]	0.0015	0.4	YES-NC/C
77-73-6	Dicyclopentadiene	630[b]	18[b]	1.3[b]	6.6	NA	YES-NC
111-90-0	Diethylene Glycol Monoethyl Ether	4,700[b]	560[b]	1.7[b]	1.7	NA	YES-NC
99-65-0	1,3-Dinitrobenzene	7.8[b]	-----[c]	0.0037[b]	0.0037	*	YES-NC
534-52-1	4,6-Dinitro-o-cresol	7.8[b]	-----[c]	see Table C	see Table D	SS	
123-91-1	1,4-Dioxane	58[e]	8.1[e]	0.031[e]	0.031	SS	YES-NC/C
122-39-4	Diphenylamine	2,000[b]	-----[c]	20[b]	100	NA	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
298-04-4	Disulfoton[f]	3.1[b]	760[d]	0.090[b]	0.45	NA	YES-NC
759-94-4	EPTC[f]	2,000[b]	960[d]	3.6[b]	18	NA	YES-NC
563-12-2	Ethion[f]	39[b]	340[d]	13[b]	67	NA	YES-NC
111-15-9	2-Ethoxyethyl acetate	23,000[b]	30,000[d]	8.7[b]	8.7	NA	YES-NC
141-78-6	Ethyl Acetate	70,000[b]	10,000[d]	26[b]	26	SS	
140-88-5	Ethyl Acrylate	13[e]	2,700[d]	0.0081[e]	0.0081	NA	YES-C
107-21-1	Ethylene Glycol	160,000[b]	100,000[d]	56[b]	56	NA	YES-NC
111-76-2	Ethylene Glycol Monobutyl Ether	39,000[b]	130,000[d]	15[b]	15	NA	YES-NC
60-29-7	Ethyl Ether	16,000[b]	8,800[d]	6.1[b]	6.1	SS	
944-22-9	Fonofos[f]	160[b]	700[d]	4.2[b]	21	NA	YES-NC
50-00-0	Formaldehyde	16,000[b]	16[e]	5.7[b]	5.7	NA	YES-NC/C
98-01-1	Furfural	230[b]	2,600[b]	0.086[b]	0.086	NA	YES-NC
1071-83-6	Glyphosate[f]	7,800[b]	-----[c]	See Table C	See Table D	NA	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
110-54-3	n-Hexane	-----[c]	290[d]	-----[c]	-----[c]	NA	YES-NC
2691-41-0	HMX	3,900[b]	-----[c]	5.7[b]	5.7	*	YES-NC
302-01-2	Hydrazine	0.21[e]	0.033[e]	0.0001[e]	0.0001	NA	YES-NC/C
81335-37-7	Imazaquin[f]	20,000[b]	-----[c]	See Table C	See Table D	NA	YES-NC
7553-56-2	Iodine	780[b]	-----[c]	0.35 mg/l (TCLP/SPLP)	NA	NA	YES-NC
7439-89-6	Iron	55,000[b]	-----[c]	5.0 mg/l (TCLP/SPLP)	5.0 mg/l (TCLP/SPLP)	*	YES-NC
78-83-1	Isobutanol	23,000[b]	11,000[d]	8.8[b]	8.8	*	YES-NC
121-75-5	Malathion[f]	1,600[b]	190[d]	1.7[b]	1.7	SS	YES-NC
94-74-6	MCPA[f]	39[b]	-----[c]	See Table C	See Table D	0.043	YES-NC
93-65-2	MCPP[f]	78[b]	-----[c]	See Table C	See Table D	0.066	YES-NC
67-56-1	Methanol	39,000[b]	100,000[d]	14[b]	14	*	YES-NC
79-20-9	Methyl Acetate	78,000[b]	27,000[d]	29[b]	29	NA	YES-NC
96-33-3	Methyl Acrylate	2,300[b]	6,500[d]	0.89[b]	0.89	SS	
108-87-2	Methylcyclohexane	-----[c]	120[d]	-----[c]	-----[c]	NA	YES-NC
101-14-4	Methylene bis(2-chloroaniline), 4,4'	6.4[e]	-----[c]	0.26[e]	1.3	NA	YES-NC/C
74-95-3	Methylene Bromide	780[b]	2,700[d]	0.34[b]	0.34	SS	YES-NC
101-77-9	4,4'-Methylenedianiline	0.4[e]	1.5[e]	0.0003[e]	0.0003	NA	YES-NC/C

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
78-93-3	Methyl Ethyl Ketone	47,000[b]	25,000[d]	17[b]	17	NA	YES-NC
108-10-1	Methyl Isobutyl Ketone	-----[c]	3,100[d]	-----[c]	-----[c]	NA	YES-NC
90-12-0	1-Methylnaphthalene	5,500[b]	980[d]	130[b]	630	NA	YES-NC
91-57-6	2-Methylnaphthalene	310[b]	-----[c]	7.2[b]	36	SS	YES-NC
108-39-4	3-Methylphenol	3,900[b]	8,100[d]	2.0[b]	2.0	NA	YES-NC
106-44-5	4-Methylphenol (p-cresol)	390[b]	-----[c]	0.20[b]	0.20	SS	YES-NC
51218-45-2	Metolachlor[f]	12,000[b]	3,900[d]	55[b]	270	NA	YES-NC
21087-64-9	Metribuzin[f]	2,000[b]	-----[c]	1.0[b]	1.0	NA	YES-NC
7786-34-7	Mevinphos	2.0[b]	65,000[d]	0.0007[b]	0.0007	SS	YES-NC
88-74-4	2-Nitroaniline	230[b]	35[b]	0.14[b]	0.14	SS	YES-NC
99-09-2	3-Nitroaniline	23[b]	250[b]	0.010[b]	0.010	SS	YES-NC
100-01-6	4-Nitroaniline	230[b]	1,000[b]	0.10[b]	0.10	SS	YES-NC
55-63-0	Nitroglycerin	7.8[b]	460[d]	0.0044[b]	0.0044	NA	YES-NC
100-02-7	4-Nitrophenol	630[b]	-----[c]	See Table C	See Table D	SS	YES-NC
62-75-9	N-Nitrosodimethylamine	0.013[e]	0.012[e]	6.7E-06[e]	6.7E-06	NA	YES-NC/C
88-72-2	2-Nitrotoluene	2.8[e]	380[d]	0.0027[e]	0.0027	0.012	YES-C
99-08-1	3-Nitrotoluene	1,600[b]	310[d]	0.065[b]	0.065	0.25	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
99-99-0	4-Nitrotoluene	780[b]	-----[c]	0.88[b]	0.88	0.25	YES-NC
1910-42-5	Paraquat[f] (dichloride)	350[b]	-----[c]	0.13[b]	0.13	NA	YES-NC
56-38-2	ethyl Parathion[f]	470[b]	230[d]	40[b]	200	SS	YES-NC
298-00-0	methyl Parathion[f]	20[b]	-----[c]	See Table C	See Table D	0.06	YES-NC
40487-42-1	Pendimethalin[f]	3,100[b]	-----[c]	1,400[b]	7,000	NA	YES-NC
82-68-8	Pentachloronitrobenzene	230[b]	-----[c]	31[b]	150	NA	YES-NC
85-01-8	Phenanthrene	2,300[b]	-----[c]	200[b]	1,000	*	YES-NC
298-02-2	Phorate[f]	16[b]	560[d]	0.11[b]	0.55	*	YES-NC
1610-18-0	Prometon[f]	1,200[b]	-----[c]	See Table C	See Table D	NA	
57-55-6	Propylene Glycol	39,000[b]	470[b]	14[b]	14	NA	YES-NC
107-98-2	Propylene Glycol Monomethyl Ether	55,000[b]	100,000[d]	20[b]	20	NA	YES-NC
110-86-1	Pyridine	78[b]	200,000[d]	See Table C	See Table D	NA	YES-NC
121-82-4	RDX	230[b]	-----[c]	0.36[b]	0.36	1.0	YES-NC
7440-24-6	Strontium	47,000[b]	-----[c]	4.2 mg/l (TCLP/SPLP)	-----[c]	*	YES-NC
34014-18-1	Tebuthiuron[f]	5,500[b]	-----[c]	3.1[b]	3.1	NA	
13071-79-9	Terbufos[f]	2[b]	130[d]	0.03[b]	0.15	NA	YES-NC
630-20-6	1,1,1,2-Tetrachloroethane	2,300[b]	2,100[d]	3.4[b]	17	*	YES-NC
79-34-5	1,1,2,2-Tetrachloroethane	4,700[b]	2,000[d]	3.3[b]	3.3	*	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

		Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values			
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)	Mixtures
961-11-5	Tetrachlorovinphos	2,300[b]	-----[c]	26[b]	130	NA	YES-NC
137-26-8	Thiram[f]	390[b]	-----[c]	0.21[b]	0.21	NA	YES-NC
7440-31-5	Tin	47,000[b]	-----[c]	4.2 mg/l (TCLP/SPLP)	-----[c]	NA	YES-NC
75-69-4	Trichlorofluoromethane	23,000[b]	850[b]	34[b]	170	*	YES-NC
93-76-5	2,4,5-Trichlorophenoxyacetic acid	780[b]	-----[c]	5.2[b]	26	NA	YES-NC
96-18-4	1,2,3-Trichloropropane	0.092[e]	730[d]	0.0001[e]	0.0001	SS	YES-NC/C
1582-09-8	Trifluralin[f]	590[b]	-----[c]	420[b]	2,100	NA	YES-NC
95-63-6	1,2,4-Trimethylbenzene	3,900[b]	73[b]	18[b]	90	SS	YES-NC
108-67-8	1,3,5-Trimethylbenzene	3,900[b]	45[b]	10[b]	51	SS	YES-NC
99-35-4	1,3,5-Trinitrobenzene	2,300[b]	-----[c]	3.9[b]	3.9	*	YES-NC
479-45-8	2,4,6-Trinitrophenylmethylnitramine	310[b]	-----[c]	0.62[b]	0.62	0.65	YES-NC
118-96-7	2,4,6-Trinitrotoluene	39[b]	-----[c]	0.077[b]	0.077	NA	YES-NC

TABLE A: Soil Remediation Objectives[a] for Residential Properties
Non-TACO Chemicals

Prepared by the Illinois EPA Toxicity Assessment Unit
May 1, 2007

Footnotes:

NA=not available; no SW-846 methods were available upon which acceptable detection limits could be established for water or soil.

*** "*" indicates that the ADL is less than or equal to the specified remediation objective.***

SS= Site-specific based upon wet weight of soil.

NC=chemical listed in target organ category for noncarcinogens.

***C=chemical listed in target organ category for carcinogens*.**

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[a] Soil remediation objectives based on human health criteria only. Please consult the IEPA Toxicity Assessment Unit if there are concerns for ecological receptors.

[b] Calculated values correspond to a target hazard quotient of 1.

[c] No toxicity criteria available for the route of exposure.

[d] Soil saturation concentration.

[e] Calculated values correspond to a cancer risk level of 1 in 1,000,000.

[f] For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Please consult the IEPA=s Toxicity Assessment Unit.

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Acephate	30560-19-1	8.7E-03	I			4.0E-03	I					1	0.1		5.6E+01	ca**	2.0E+02	ca*					7.7E+00	ca*		1.9E-03	
Acetaldehyde	75-07-0			2.2E-06	I			9.0E-03	I	V		1		1.1E+05	1.1E+01	ca**	5.3E+01	ca**	1.1E+00	ca**	5.6E+00	ca**	2.2E+00	ca**		4.5E-04	
Acetochlor	34256-82-1					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		4.0E-01	
Acetone	67-64-1					9.0E-01	I	3.1E+01	A	V		1		1.1E+05	6.1E+04	nc	6.1E+05	sat	3.2E+04	nc	1.4E+05	max	2.2E+04	nc		4.4E+00	
Acetone Cyanohydrin	75-86-5					3.0E-03	P	6.0E-02	P	V		1		1.1E+05	2.0E+02	nc	2.1E+03	nc	6.3E+01	nc	2.6E+02	nc	5.8E+01	nc		1.2E-02	
Acetonitrile	75-05-8							6.0E-02	I	V		1		1.3E+05	8.7E+02	nc	3.7E+03	nc	6.3E+01	nc	2.6E+02	nc	1.3E+02	nc		2.6E-02	
Acetophenone	98-86-2					1.0E-01	I			V		1		2.3E+03	7.8E+03	sat	1.0E+05	sat					3.7E+03	nc		1.1E+00	
Acrolein	107-02-8					5.0E-04	I	2.0E-05	I	V		1		2.5E+04	1.6E-01	nc	6.8E-01	nc	2.1E-02	nc	8.8E-02	nc	4.2E-02	nc		8.6E-06	
Acrylamide	79-06-1	4.5E+00	I	1.3E-03	I	2.0E-04	I					1	0.1		1.1E-01	ca	3.8E-01	ca	1.9E-03	ca**	9.4E-03	ca**	1.5E-02	ca		3.3E-06	
Acrylic Acid	79-10-7					5.0E-01	I	1.0E-03	I			1	0.1		3.0E+04	nc	2.9E+05	max	1.0E+00	nc	4.4E+00	nc	1.8E+04	nc		3.7E+00	
Acrylonitrile	107-13-1	5.4E-01	I	6.8E-05	I	1.0E-03	H	2.0E-03	I	V		1		1.1E+04	2.4E-01	ca*	1.2E+00	ca*	3.6E-02	ca*	1.8E-01	ca*	4.5E-02	ca*		9.9E-06	
Adiponitrile	111-69-3							6.0E-03	P			1	0.1		8.5E+06	max	3.6E+07	max	6.3E+00	nc	2.6E+01	nc					
Alachlor	15972-60-8	5.6E-02	C			1.0E-02	I					1	0.1		8.7E+00	ca*	3.1E+01	ca					1.2E+00	ca	2.0E+00	6.8E-04	1.1E-03
ALAR	1596-84-5					1.5E-01	I					1	0.1		9.2E+03	nc	9.2E+04	nc					5.5E+03	nc		1.2E+00	
Aldicarb	116-06-3					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		9.7E-03	
Aldicarb Sulfone	1646-88-4					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		8.0E-03	
Aldrin	309-00-2	1.7E+01	I	4.9E-03	I	3.0E-05	I					1	0.1		2.9E-02	ca*	1.0E-01	ca	5.0E-04	ca**	2.5E-03	ca**	4.0E-03	ca		8.4E-04	
Ally	74223-64-6					2.5E-01	I					1	0.1		1.5E+04	nc	1.5E+05	max					9.1E+03	nc		3.1E+00	
Allyl Alcohol	107-18-6					5.0E-03	I	3.0E-04	P			1	0.1		3.1E+02	nc	3.1E+03	nc	3.1E-01	nc	1.3E+00	nc	1.8E+02	nc		3.7E-02	
Allyl Chloride	107-05-1							1.0E-03	I	V		1		1.5E+03	1.8E+00	nc	7.7E+00	nc	1.0E+00	nc	4.4E+00	nc	2.1E+00	nc		6.8E-04	
Aluminum	7429-90-5					1.0E+00	P	5.0E-03	P			1			7.7E+04	nc	9.9E+05	max	5.2E+00	nc	2.2E+01	nc	3.7E+04	nc			
Aluminum Phosphide	20859-73-8					4.0E-04	I					1			3.1E+01	nc	4.1E+02	nc					1.5E+01	nc			
Amdro	67485-29-4					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		1.4E+04	
Ametryn	834-12-8					9.0E-03	I					1	0.1		5.5E+02	nc	5.5E+03	nc					3.3E+02	nc		3.6E-01	
Aminophenol, m-	591-27-5					8.0E-02	P					1	0.1		4.9E+03	nc	4.9E+04	nc					2.9E+03	nc		1.0E+00	
Aminophenol, p-	123-30-8					2.0E-02	P					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		2.5E-01	
Aminopyridine, 4-	504-24-5					2.0E-05	H					1	0.1		1.2E+00	nc	1.2E+01	nc					7.3E-01	nc		2.1E-04	
Amitraz	33089-61-1					2.5E-03	I					1	0.1		1.5E+02	nc	1.5E+03	nc					9.1E+01	nc		1.2E+02	
Ammonia	7664-41-7						H	1.0E-01	I			1			1.4E+08	max	6.0E+08	max	1.0E+02	nc	4.4E+02	nc					
Ammonium Perchlorate	7790-98-9					7.0E-04	I					1			5.5E+01	nc	7.2E+02	nc					2.6E+01	nc			
Ammonium Sulfamate	7773-06-0					2.0E-01	I					1			1.6E+04	nc	2.0E+05	max					7.3E+03	nc			
Aniline	62-53-3	5.7E-03	I			7.0E-03	P	1.0E-03	I			1	0.1		8.5E+01	ca**	3.0E+02	ca*	1.0E+00	nc	4.4E+00	nc	1.2E+01	ca*		3.4E-03	
Antimony (metallic)	7440-36-0					4.0E-04	I					0.15			3.1E+01	nc	4.1E+02	nc					1.5E+01	nc	6.0E+00		
Antimony Pentoxide	1314-60-9					5.0E-04	H					0.15			3.9E+01	nc	5.1E+02	nc					1.8E+01	nc			
Antimony Potassium Tartrate	304-61-0					9.0E-04	H					0.15			7.0E+01	nc	9.2E+02	nc					3.3E+01	nc			
Antimony Tetroxide	1332-81-6					4.0E-04	H					0.15			3.1E+01	nc	4.1E+02	nc					1.5E+01	nc			
Antimony Trioxide	1309-64-4					4.0E-04	H	2.0E-04	I			0.15			3.1E+01	nc	4.1E+02	nc	2.1E-01	nc	8.8E-01	nc	1.5E+01	nc			
Apollo	74115-24-5					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		6.1E+02	
Aramite	140-57-8	2.5E-02	I	7.1E-06	I	5.0E-02	H					1	0.1		1.9E+01	ca	6.9E+01	ca	3.4E-01	ca**	1.7E+00	ca**	2.7E+00	ca		1.1E-01	
Arsenic, Inorganic	7440-38-2	1.5E+00	I	4.3E-03	I	3.0E-04	I	3.0E-05	C			1	0.03		3.9E-01	ca*	1.6E+00	ca	5.7E-04	ca*	2.9E-03	ca*	4.5E-02	ca	1.0E+01		
Arsine	7784-42-1							5.0E-05	I			1			7.1E+04	nc	3.0E+05	max	5.2E-02	nc	2.2E-01	nc					
Assure	76578-14-8					9.0E-03	I					1	0.1		5.5E+02	nc	5.5E+03	nc					3.3E+02	nc		3.6E+00	
Asulam	3337-71-1					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		5.2E-01	
Atrazine	1912-24-9	2.3E-01	C			3.5E-02	I					1	0.1		2.1E+00	ca	7.5E+00	ca					2.9E-01	ca	3.0E+00	1.9E-04	2.0E-03
Avermectin B1	65195-55-3					4.0E-04	I					1	0.1		2.4E+01	nc	2.5E+02	nc					1.5E+01	nc		4.1E-02	
Azobenzene	103-33-3	1.1E-01	I	3.1E-05	I					V		1			4.9E+00	ca**	2.2E+01	ca**	7.8E-02	ca**	4.0E-01	ca**	1.2E-01	ca**		5.1E-04	
Barium	7440-39-3					2.0E-01	I	5.0E-04	H			0.07			1.5E+04	nc	1.9E+05	max	5.2E-01	nc	2.2E+00	nc	7.3E+03	nc	2.0E+03		
Baygon	114-26-1					4.0E-03	I					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		4.2E-02	
Bayleton	43121-43-3					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		1.2E+01	
Baythroid	68359-37-5					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		3.3E+02	
Benefin	1861-40-1					3.0E-01	I					1	0.1		1.8E+04	nc	1.8E+05	max					1.1E+04	nc		2.1E+02	
Benomyl	17804-35-2					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		2.3E+00	
Bentazon	25057-89-0					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		3.0E-01	
Benzaldehyde	100-52-7					1.0E-01	I			V		1		1.9E+03	7.8E+03	sat	1.0E+05	sat					3.7E+03	nc		9.7E-01	
Benzene	71-43-2	5.5E-02	I	7.8E-06	I	4.0E-03	I	3.0E-02	I	V		1		2.0E+03	1.1E+00	ca*	5.6E+00	ca*	3.1E-01	ca	1.6E+00	ca*	4.1E-01	ca	5.0E+00	2.3E-04	2.8E-03
Benzenethiol	108-98-5					1.0E-05	H			V		1		1.4E+03	7.8E-01	nc	1.0E+01	nc					3.7E-01	nc		2.7E-04	
Benzidine	92-87-5	2.3E+02	I	6.7E-02	I	3.0E-03	I				M	1	0.1		5.0E-04	ca	7.5E-03	ca	1.4E-05	ca**	1.8E-04	ca**	9.4E-05	ca		5.3E-07	
Benzoic Acid	65-85-0					4.0E+00	I					1	0.1		2.4E+05	max	2.5E+06	max					1.5E+05	max		3.3E+01	
Benzotrichloride	98-07-7	1.3E+01	I							V		1		1.6E+02	4.9E-02	ca**	2.2E-01	ca**					5.2E-03	ca**		1.3E-05	
Benzyl Alcohol	100-51-6					5.0E-01	P					1	0.1		3.1E+04	nc	3.1E+05	max					1.8E+04	nc		4.2E+00	
Benzyl Chloride	100-44-7	1.7E-01	I							V		1		6.4E+01	3.8E+00	ca**	1.7E+01	ca**					4.0E-01	ca**		4.9E-04	
Beryllium and compounds	7440-41-7			2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			1.6E+02	nc	2.0E+03	nc	1.0E-03	ca*	5.1E-03	ca*	7.3E+01	nc	4.0E+00		
Bidrin	141-66-2					1.0E-04	I					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		3.4E-03	
Bifenox	42576-02-3					9.0E-03	P					1	0.1		5.5E+02	nc	5.5E+03	nc					3.3E+02	nc		2.6E+00	
Biphenthrin	82657-04-3					1.5E-02	I					1	0.1		9.2E+02	nc	9.2E+03	nc					5.5E+02	nc		3.5E+03	
Biphenyl, 1,1'-	92-52-4					5.0E-02	I			V		1		2.6E+02	3.9E+03	sat	5.1E+04	sat					1.8E+03	nc		2.3E+01	
Bis(2-chloroethoxy)methane	111-91-1					3.0E-03	P					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		2.3E-02	
Bis(2-chloroethyl)ether	111-44-4	1.1E+00	I	3.3E-04	I					V		1		3.3E+03	1.9E-01	ca**	9.0E-01	ca**	7.4E-03	ca**	3.7E-02	ca**	1.2E-02	ca**		2.7E-06	
Bis(2-chloro-1-methylethyl) ether	108-60-1	7.0E-02	H	1.0E-05	H	4.0E-02	I			V		1		5.7E+02	3.5E+00	ca	1.7E+01	ca	2.4E-01	ca**	1.2E+00	ca**	3.2E-01	ca		9.0E-05	
Bis(2-ethylhexyl)phthalate	117-81-7	1.4E-02	I			2.0E-02	I					1	0.1		3.5E+01	ca*	1.2E+02	ca*					4.8E+00	ca	6.0E+00	1.6E+00	2.0E+00
Bis(chloromethyl)ether	542-88-1	2.2E+02	I	6.2E-02	I					V		1		2.8E+03	2.7E-04	ca**	1.3E-03	ca**	3.9E-05	ca**	2.0E-04	ca**	6.2E-05	ca**		1.3E-08	
Bisphenol A	80-05-7					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		2.7E+02	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels											Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Boron And Borates Only	7440-42-8					2.0E-01	I	2.0E-02	H			1			1.6E+04	nc	2.0E+05	max	2.1E+01	nc	8.8E+01	nc	7.3E+03	nc			
Boron Trifluoride	7/2/7637							7.0E-04	H			1			9.9E+05	max	4.2E+06	max	7.3E-01	nc	3.1E+00	nc					
Bromate	15541-45-4	7.0E-01	I			4.0E-03	I					1			9.1E-01	ca	4.1E+00	ca					9.6E-02	ca	1.0E+01		
Bromodichloromethane	75-27-4	6.2E-02	I			2.0E-02	I			V		1		9.9E+02	1.0E+01	ca	4.6E+01	ca					1.1E+00	ca		3.0E-04	
Bromoform	75-25-2	7.9E-03	I	1.1E-06	I	2.0E-02	I					1	0.1		6.1E+01	ca*	2.2E+02	ca*	2.2E+00	ca**	1.1E+01	ca**	8.5E+00	ca*		2.3E-03	
Bromomethane	74-83-9					1.4E-03	I	5.0E-03	I	V		1		3.6E+03	7.9E+00	nc	3.5E+01	nc	5.2E+00	nc	2.2E+01	nc	8.7E+00	nc		2.2E-03	
Bromophos	2104-96-3					5.0E-03	H					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		7.7E-01	
Bromoxynil	1689-84-5					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		7.8E-01	
Bromoxynil Octanoate	1689-99-2					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		7.2E+00	
Butadiene, 1,3-	106-99-0			3.0E-05	I			2.0E-03	I	V		1		6.9E+02	7.7E-02	ca*	3.9E-01	ca*	8.1E-02	ca*	4.1E-01	ca*	1.6E-01	ca*		9.0E-05	
Butanol, N-	71-36-3					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		7.5E-01	
Butyl Benzyl Phthlate	85-68-7					2.0E-01	I					1	0.1		1.2E+04	nc	1.2E+05	max					7.3E+03	nc		1.4E+02	
Butylate	2008-41-5					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		2.6E+00	
Butylphthalyl Butylglycolate	85-70-1					1.0E+00	I					1	0.1		6.1E+04	nc	6.2E+05	max					3.7E+04	nc		1.1E+03	
Cacodylic Acid	75-60-5					2.0E-02	A					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc			
Cadmium (Diet)	7440-43-9			1.8E-03	I	1.0E-03	I					0.025	0.001		7.0E+01	nc	8.1E+02	nc									
Cadmium (Water)	7440-43-9			1.8E-03	I	5.0E-04	I					0.05	0.001						1.4E-03	ca**	6.8E-03	ca**	1.8E+01	nc	5.0E+00		
Caprolactam	105-60-2					5.0E-01	I					1	0.1		3.1E+04	nc	3.1E+05	max					1.8E+04	nc		5.7E+00	
Captafol	6/1/2425	1.5E-01	C	4.3E-05	C	2.0E-03	I					1	0.1		3.2E+00	ca*	1.1E+01	ca	5.7E-02	ca**	2.9E-01	ca**	4.5E-01	ca		2.5E-03	
Captan	133-06-2	2.3E-03	C	6.6E-07	C	1.3E-01	I					1	0.1		2.1E+02	ca*	7.5E+02	ca	3.7E+00	ca**	1.9E+01	ca**	2.9E+01	ca		5.6E-02	
Carbaryl	63-25-2					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		2.5E+00	
Carbazole	86-74-8	2.0E-02	H									1	0.1		2.4E+01	ca**	8.6E+01	ca**					3.4E+00	ca**		7.7E-02	
Carbofuran	1563-66-2					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc	4.0E+01	6.2E-02	1.4E-02
Carbon Disulfide	75-15-0					1.0E-01	I	7.0E-01	I	V		1		2.6E+02	6.7E+02	sat	3.0E+03	sat	7.3E+02	nc	3.1E+03	nc	1.0E+03	nc		2.7E-01	
Carbon Tetrachloride	56-23-5	1.3E-01	I	1.5E-05	I	7.0E-04	I	1.9E-01	A	V		1		4.8E+02	2.5E-01	ca	1.3E+00	ca	1.6E-01	ca	8.2E-01	ca	2.0E-01	ca	5.0E+00	7.9E-05	2.0E-03
Carbosulfan	55285-14-8					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.1E+01	
Carboxin	5234-68-4					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		1.3E+00	
Chloral Hydrate	302-17-0					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		7.4E-01	
Chloramben	133-90-4					1.5E-02	I					1	0.1		9.2E+02	nc	9.2E+03	nc					5.5E+02	nc		1.2E-01	
Chloranil	118-75-2	4.0E-01	H									1	0.1		1.2E+00	ca**	4.3E+00	ca**					1.7E-01	ca**		3.7E-05	
Chlordane	57-74-9	3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I			1	0.04		1.6E+00	ca*	6.5E+00	ca*	2.4E-02	ca*	1.2E-01	ca*	1.9E-01	ca*	2.0E+00	3.3E-02	3.5E-01
Chlordecone (Kepone)	143-50-0	1.6E+01	C	4.6E-03	C							1	0.1		3.0E-02	ca**	1.1E-01	ca**	5.3E-04	ca**	2.7E-03	ca**	4.2E-03	ca**		1.5E-04	
Chlorimuron, Ethyl-	90982-32-4					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		2.6E-01	
Chlorine	7782-50-5					1.0E-01	I	1.5E-04	A			1			7.5E+03	nc	9.1E+04	nc	1.5E-01	nc	6.4E-01	nc	3.7E+03	nc		1.8E+00	
Chlorine Dioxide	10049-04-4					3.0E-02	I	2.0E-04	I			1			2.3E+03	nc	3.0E+04	nc	2.1E-01	nc	8.8E-01	nc	1.1E+03	nc			
Chlorite (Sodium Salt)	7758-19-2					3.0E-02	I					1			2.3E+03	nc	3.1E+04	nc					1.1E+03	nc			
Chloro-1,1-difluoroethane, 1-	75-68-3							5.0E+01	I	V		1		1.2E+03	5.9E+04	sat	2.5E+05	sat	5.2E+04	nc	2.2E+05	max	1.0E+05	max		5.3E+01	
Chloro-1,3-butadiene, 2-	126-99-8					2.0E-02	H	7.0E-03	H	V		1		8.2E+02	8.6E+00	nc	3.6E+01	nc	7.3E+00	nc	3.1E+01	nc	1.4E+01	nc		7.7E-03	
Chloro-2-methylaniline HCl, 4-	3165-93-3	4.6E-01	H									1	0.1		1.1E+00	ca**	3.7E+00	ca**					1.5E-01	ca**		6.4E-05	
Chloro-2-methylaniline, 4-	95-69-2	2.7E-01	C	7.7E-05	C							1	0.1		1.8E+00	ca**	6.4E+00	ca**	3.2E-02	ca**	1.6E-01	ca**	2.5E-01	ca**		1.1E-04	
Chloroacetic Acid	79-11-8					2.0E-03	H					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		1.5E-02	
Chloroacetophenone, 2-	532-27-4							3.0E-05	I			1	0.1		4.3E+04	nc	1.8E+05	max	3.1E-02	nc	1.3E-01	nc					
Chloroaniline, p-	106-47-8					4.0E-03	I					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		5.0E-02	
Chlorobenzene	108-90-7					2.0E-02	I	5.0E-02	P	V		1		8.6E+02	3.1E+02	nc	1.5E+03	sat	5.2E+01	nc	2.2E+02	nc	9.1E+01	nc	1.0E+02	6.8E-02	7.5E-02
Chlorobenzilate	510-15-6	1.1E-01	C	3.1E-11	C	2.0E-02	I					1	0.1		4.4E+00	ca	1.6E+01	ca	7.8E+04	ca**	4.0E+05	max	6.1E-01	ca		1.7E-03	
Chlorobenzoic Acid, p-	74-11-3					2.0E-01	H					1	0.1		1.2E+04	nc	1.2E+05	max					7.3E+03	nc		1.8E+00	
Chlorobenzotrifluoride, 4-	98-56-6					3.0E-03	P	3.0E-01	P	V		1		5.5E+02	2.1E+02	nc	2.4E+03	sat	3.1E+02	nc	1.3E+03	nc	9.3E+01	nc		3.9E-01	
Chlorobutane, 1-	109-69-3					4.0E-02	P			V		1		7.9E+02	3.1E+03	sat	4.1E+04	sat					1.5E+03	nc		6.2E-01	
Chlorodifluoromethane	75-45-6							5.0E+01	I	V		1		1.7E+03	5.3E+04	sat	2.2E+05	sat	5.2E+04	nc	2.2E+05	max	1.0E+05	max		4.4E+01	
Chloroform	67-66-3	3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		1		2.7E+03	3.0E-01	ca	1.5E+00	ca	1.1E-01	ca	5.3E-01	ca	1.9E-01	ca		5.5E-05	
Chloromethane	74-87-3	1.3E-02	H	1.8E-06	H			9.0E-02	I	V		1		1.4E+03	1.7E+00	ca*	8.4E+00	ca*	1.4E+00	ca*	6.8E+00	ca*	1.8E+00	ca		4.6E-04	
Chloronaphthalene, Beta-	91-58-7					8.0E-02	I			V		1		2.1E+02	6.3E+03	sat	8.2E+04	sat					2.9E+03	nc		1.8E+01	
Chlorophenol, 2-	95-57-8					5.0E-03	I			V		1		7.9E+04	3.9E+02	nc	5.1E+03	nc					1.8E+02	nc		2.0E-01	
Chloropropane, 2-	75-29-6							1.0E-01	H	V		1		1.4E+03	1.5E+02	nc	6.2E+02	nc	1.0E+02	nc	4.4E+02	nc	2.1E+02	nc		7.0E-02	
Chlorothalonil	1897-45-6	3.1E-03	C	8.9E-07	C	1.5E-02	I					1	0.1		1.6E+02	ca**	5.6E+02	ca*	2.7E+00	ca**	1.4E+01	ca**	2.2E+01	ca*		1.1E-01	
Chlorotoluene, o-	95-49-8					2.0E-02	I			V		1		1.0E+03	1.6E+03	sat	2.0E+04	sat					7.3E+02	nc		8.0E-01	
Chlorotoluene, p-	106-43-4					7.0E-02	P			V		1		2.9E+02	5.5E+03	sat	7.2E+04	sat					2.6E+03	nc		2.8E+00	
Chlorpropham	101-21-3					2.0E-01	I					1	0.1		1.2E+04	nc	1.2E+05	max					7.3E+03	nc		4.5E+00	
Chlorpyrifos	2921-88-2					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		1.5E+00	
Chlorpyrifos Methyl	5598-13-0					1.0E-02	H					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.5E+00	
Chlorsulfuron	64902-72-3					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		1.2E+00	
Chlorthiophos	60238-56-4					8.0E-04	H					1	0.1		4.9E+01	nc	4.9E+02	nc					2.9E+01	nc		7.8E-01	
Chromium (III) (Insoluble Salts)	16065-83-1					1.5E+00	I					0.013			1.2E+05	max	1.5E+06	max					5.5E+04	nc			
Chromium VI (chromic acid mists)	18540-29-9			1.2E-02	I	3.0E-03	I	8.0E-06	I			1							2.0E-04	ca*	1.0E-03	ca*	1.1E+02	nc			
Chromium VI (particulates)	18540-29-9			1.2E-02	I	3.0E-03	I	1.0E-04	I			0.025			2.3E+02	nc	1.4E+03	ca**	2.0E-04	ca	1.0E-03	ca					
Coke Oven Emissions	8007-45-2			6.2E-04	I						M	1	0.1						1.5E-03	ca**	2.0E-02	ca**					
Copper	7440-50-8					4.0E-02	H					1			3.1E+03	nc	4.1E+04	nc					1.5E+03	nc	1.3E+03		
Cresol, m-	108-39-4					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		1.9E+00	
Cresol, o-	95-48-7					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		2.0E+00	
Cresol, p-	106-44-5					5.0E-03	H					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		1.9E-01	
Crotonaldehyde, trans-	123-73-9	1.9E+00	H							V		1		2.4E+04	3.4E-01	ca**	1.5E+00	ca**					3.5E-02	ca**		7.4E-06	
Cumene	98-82-8					1.0E-01	I	4.0E-01	I	V		1		3.1E+02	2.2E+03	sat	1.1E+04	sat	4.2E+02	nc	1.8E+03	nc	6.8E+02	nc		1.3E+00	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Cyanazine	21725-46-2	8.4E-01	H			2.0E-03	H					1	0.1		5.8E-01	ca	2.1E+00	ca					8.0E-02	ca		3.6E-05	
Cyanides																											
Calcium Cyanide	592-01-8					4.0E-02	I					1			3.1E+03	nc	4.1E+04	nc					1.5E+03	nc			
Copper Cyanide	544-92-3					5.0E-03	I					1			3.9E+02	nc	5.1E+03	nc					1.8E+02	nc			
Cyanide (CN-)	57-12-5					2.0E-02	I					1			1.6E+03	nc	2.0E+04	nc					7.3E+02	nc	2.0E+02		
Cyanogen	460-19-5					4.0E-02	I			V		1			3.1E+03	nc	4.1E+04	nc					1.5E+03	nc			
Cyanogen Bromide	506-68-3					9.0E-02	I			V		1			7.0E+03	nc	9.2E+04	nc					3.3E+03	nc			
Cyanogen Chloride	506-77-4					5.0E-02	I			V		1			3.9E+03	nc	5.1E+04	nc					1.8E+03	nc			
Hydrogen Cyanide	74-90-8					2.0E-02	I	3.0E-03	I	V		1			1.6E+03	nc	2.0E+04	nc	3.1E+00	nc	1.3E+01	nc	6.2E+00	nc			
Potassium Cyanide	151-50-8					5.0E-02	I					1			3.9E+03	nc	5.1E+04	nc					1.8E+03	nc			
Potassium Silver Cyanide	506-61-6					2.0E-01	I					0.04			1.6E+04	nc	2.0E+05	max					7.3E+03	nc			
Silver Cyanide	506-64-9					1.0E-01	I					0.04			7.8E+03	nc	1.0E+05	max					3.7E+03	nc			
Sodium Cyanide	143-33-9					4.0E-02	I					1			3.1E+03	nc	4.1E+04	nc					1.5E+03	nc			
Thiocyanate	463-56-9					2.0E-04	P			V		1		5.6E+03	1.6E+01	nc	2.0E+02	nc					7.3E+00	nc		1.5E-03	
Zinc Cyanide	557-21-1					5.0E-02	I					1			3.9E+03	nc	5.1E+04	nc					1.8E+03	nc			
Cyclohexane	110-82-7							6.0E+00	I	V		1		1.2E+02	7.2E+03	sat	3.0E+04	sat	6.3E+03	nc	2.6E+04	nc	1.3E+04	nc		1.3E+01	
Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	2.3E-02	H									1	0.1		2.1E+01	ca**	7.5E+01	ca**					2.9E+00	ca**		2.0E-02	
Cyclohexanone	108-94-1					5.0E+00	I					1	0.1		3.1E+05	max	3.1E+06	max					1.8E+05	max		4.2E+01	
Cyclohexylamine	108-91-8					2.0E-01	I					1	0.1		1.2E+04	nc	1.2E+05	max					7.3E+03	nc		2.0E+00	
Cyhalothrin/karate	68085-85-8					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		1.7E+02	
Cypermethrin	52315-07-8					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		7.9E+01	
Cyromazine	66215-27-8					7.5E-03	I					1	0.1		4.6E+02	nc	4.6E+03	nc					2.7E+02	nc		6.6E-02	
Dacthal	1861-32-1					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		2.8E-01	
Dalapon	75-99-0					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc	2.0E+02	2.2E-01	4.1E-02
DDD	72-54-8	2.4E-01	I									1	0.1		2.0E+00	ca**	7.2E+00	ca**					2.8E-01	ca**		8.6E-02	
DDE, p,p'-	72-55-9	3.4E-01	I									1	0.1		1.4E+00	ca**	5.1E+00	ca**					2.0E-01	ca**		6.0E-02	
DDT	50-29-3	3.4E-01	I	9.7E-05	I	5.0E-04	I					1	0.03		1.7E+00	ca*	7.0E+00	ca*	2.5E-02	ca**	1.3E-01	ca**	2.0E-01	ca*		8.7E-02	
Decabromodiphenyl Ether	1163-19-5					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		3.0E+02	
Demeton	8065-48-3					4.0E-05	I					1	0.1		2.4E+00	nc	2.5E+01	nc					1.5E+00	nc			
Di(2-ethylhexyl)adipate	103-23-1	1.2E-03	I			6.0E-01	I					1	0.1		4.0E+02	ca*	1.4E+03	ca					5.6E+01	ca	4.0E+02	5.5E+00	3.9E+01
Diallate	2303-16-4	6.1E-02	H									1	0.1		8.0E+00	ca**	2.8E+01	ca**					1.1E+00	ca**		2.5E-03	
Diazinon	333-41-5					9.0E-04	H					1	0.1		5.5E+01	nc	5.5E+02	nc					3.3E+01	nc		9.4E-02	
Dibromo-3-chloropropane, 1,2-	96-12-8	8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1		1.1E+03	5.6E-03	ca	7.3E-02	ca	1.6E-04	ca	2.0E-03	ca	3.2E-04	ca	2.0E-01	1.5E-07	9.2E-05
Dibromobenzene, 1,4-	106-37-6					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		3.9E-01	
Dibromochloromethane	124-48-1	8.4E-02	I			2.0E-02	I			V		1	0.1	8.5E+02	5.8E+00	ca	2.1E+01	ca					8.0E-01	ca		2.2E-04	
Dibromoethane, 1,2-	106-93-4	2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V		1		1.4E+03	3.4E-02	ca	1.7E-01	ca	4.1E-03	ca	2.0E-02	ca	6.5E-03	ca	5.0E-02	1.9E-06	1.5E-05
Dibromomethane (Methylene Bromide)	74-95-3					1.0E-02	H			V		1		3.0E+03	7.8E+02	nc	1.0E+04	sat					3.7E+02	nc		9.1E-02	
Dibutyl Phthalate	84-74-2					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		1.1E+01	
Dibutyltin Compounds	NA					3.0E-04	P					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc			
Dicamba	1918-00-9					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		2.8E-01	
Dichloro-2-butene, 1,4-	764-41-0			2.6E-03	H					V		1		6.1E+02	3.2E-03	ca**	1.6E-02	ca**	9.4E-04	ca**	4.7E-03	ca**	1.9E-03	ca**		9.9E-07	
Dichloroacetic Acid	79-43-6	5.0E-02	I			4.0E-03	I					1	0.1		9.7E+00	ca*	3.4E+01	ca*					1.3E+00	ca		2.7E-04	
Dichlorobenzene, 1,2-	95-50-1					9.0E-02	I	2.0E-01	H	V		1		2.2E+02	2.0E+03	sat	1.0E+04	sat	2.1E+02	nc	8.8E+02	nc	3.7E+02	nc	6.0E+02	4.0E-01	6.6E-01
Dichlorobenzene, 1,4-	106-46-7	5.4E-03	C	1.1E-05	C			8.0E-01	I	V		1			2.6E+00	ca	1.3E+01	ca	2.2E-01	ca	1.1E+00	ca	4.3E-01	ca	7.5E+01	4.6E-04	8.1E-02
Dichlorobenzidine, 3,3'-	91-94-1	4.5E-01	I									1	0.1		1.1E+00	ca**	3.8E+00	ca**					1.5E-01	ca**		2.3E-03	
Dichlorodifluoromethane	75-71-8					2.0E-01	I	2.0E-01	H	V		1		8.5E+02	1.9E+02	nc	7.8E+02	nc	2.1E+02	nc	8.8E+02	nc	3.9E+02	nc		6.1E-01	
Dichloroethane, 1,1-	75-34-3	5.7E-03	C	1.6E-06	C	2.0E-01	P	5.0E-01	H	V		1		1.8E+03	3.4E+00	ca	1.7E+01	ca	1.5E+00	ca	7.7E+00	ca	2.4E+00	ca		7.0E-04	
Dichloroethane, 1,2-	107-06-2	9.1E-02	I	2.6E-05	I			2.4E+00	A	V		1		1.9E+03	4.5E-01	ca	2.2E+00	ca	9.4E-02	ca	4.7E-01	ca	1.5E-01	ca	5.0E+00	4.4E-05	1.5E-03
Dichloroethylene, 1,1-	75-35-4					5.0E-02	I	2.0E-01	I	V		1		1.2E+03	2.5E+02	nc	1.1E+03	nc	2.1E+02	nc	8.8E+02	nc	3.4E+02	nc	7.0E+00	1.2E-01	2.6E-03
Dichloroethylene, 1,2- (Mixed Isomers)	540-59-0					9.0E-03	H			V		1		1.4E+03	7.0E+02	nc	9.2E+03	sat					3.3E+02	nc		9.9E-02	
Dichloroethylene, 1,2-cis-	156-59-2					1.0E-02	P			V		1		1.4E+03	7.8E+02	nc	1.0E+04	sat					3.7E+02	nc	7.0E+01	1.1E-01	2.1E-02
Dichloroethylene, 1,2-trans-	156-60-5					2.0E-02	I	6.0E-02	P	V		1		1.5E+03	1.1E+02	nc	5.0E+02	nc	6.3E+01	nc	2.6E+02	nc	1.1E+02	nc	1.0E+02	3.4E-02	3.2E-02
Dichlorophenol, 2,4-	120-83-2					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		1.8E-01	
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7					1.0E-02	I					1	0.05		6.9E+02	nc	7.7E+03	nc					3.7E+02	nc	7.0E+01	9.4E-02	1.8E-02
Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6					8.0E-03	I					1	0.1		4.9E+02	nc	4.9E+03	nc					2.9E+02	nc		1.2E-01	
Dichloropropane, 1,2-	78-87-5	3.6E-02	C	1.0E-05	C			4.0E-03	I	V		1		1.5E+03	9.3E-01	ca*	4.7E+00	ca*	2.4E-01	ca*	1.2E+00	ca*	3.9E-01	ca*	5.0E+00	1.3E-04	1.7E-03
Dichloropropane, 1,3-	142-28-9					2.0E-02	P			V		1		1.6E+03	1.6E+03	nc	2.0E+04	sat					7.3E+02	nc		2.7E-01	
Dichloropropanol, 2,3-	616-23-9					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		2.3E-02	
Dichloropropene, 1,3-	542-75-6	1.0E-01	I	4.0E-06	I	3.0E-02	I	2.0E-02	I	V		1		1.7E+03	1.7E+00	ca*	8.4E+00	ca*	6.1E-01	ca*	3.1E+00	ca*	4.3E-01	ca*		1.6E-04	
Dichlorvos	62-73-7	2.9E-01	I			5.0E-04	I	5.0E-04	I			1	0.1		1.7E+00	ca*	5.9E+00	ca*	5.2E-01	nc	2.2E+00	nc	2.3E-01	ca*		6.5E-05	
Dicyclopentadiene	77-73-6					8.0E-03	P	7.0E-03	P	V		1		5.9E+02	2.9E+01	nc	1.3E+02	nc	7.3E+00	nc	3.1E+01	nc	1.4E+01	nc		5.6E-02	
Dieldrin	60-57-1	1.6E+01	I	4.6E-03	I	5.0E-05	I					1	0.1		3.0E-02	ca	1.1E-01	ca	5.3E-04	ca**	2.7E-03	ca**	4.2E-03	ca		9.0E-05	
Diesel Engine Exhaust	NA							5.0E-03	I			1	0.1						5.2E+00	nc	2.2E+01	nc					
Diethyl Phthalate	84-66-2					8.0E-01	I					1	0.1		4.9E+04	nc	4.9E+05	max					2.9E+04	nc		1.3E+01	
Diethylformamide	617-84-5					1.0E-03	P					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		8.0E-03	
Diethylstilbestrol	56-53-1	3.5E+02	C	1.0E-01	C							1	0.1		1.4E-03	ca**	4.9E-03	ca**	2.4E-05	ca**	1.2E-04	ca**	1.9E-04	ca**		2.2E-04	
Difenzoquat	43222-48-6					8.0E-02	I					1	0.1		4.9E+03	nc	4.9E+04	nc					2.9E+03	nc			
Diflubenzuron	35367-38-5					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		1.7E+00	
Difluoroethane, 1,1-	75-37-6							4.0E+01	I	V		1		1.5E+03	5.3E+04	sat	2.2E+05	sat	4.2E+04	nc	1.8E+05	max	8.3E+04	nc		2.9E+01	
Diisopropyl Methylphosphonate	1445-75-6					8.0E-02	I			V		1		4.3E+02	6.3E+03	sat	8.2E+04	sat					2.9E+03	nc		7.7E-01	
Dimethipin	55290-64-7					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		1.9E-01	
Dimethoate	60-51-5					2.0E-04	I					1	0.1		1.2E+01	nc	1.2E+02	nc					7.3E+00	nc		1.8E-03	

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Dimethoxybenzidine, 3,3'-	119-90-4	1.4E-02	H									1	0.1		3.5E+01	ca**	1.2E+02	ca**					4.8E+00	ca**		1.5E-02	
Dimethyl methylphosphonate	756-79-6	1.7E-03	P			6.0E-02	P					1	0.1		2.9E+02	ca*	1.0E+03	ca*					4.0E+01	ca*		8.2E-03	
Dimethylaniline HCl, 2,4-	21436-96-4	5.8E-01	H									1	0.1		8.4E-01	ca**	3.0E+00	ca**					1.2E-01	ca**		5.1E-05	
Dimethylaniline, 2,4-	95-68-1	7.5E-01	H									1	0.1		6.5E-01	ca**	2.3E+00	ca**					9.0E-02	ca**		3.9E-05	
Dimethylaniline, N,N-	121-69-7					2.0E-03	I			V		1		8.2E+02	1.6E+02	nc	2.0E+03	sat					7.3E+01	nc		2.6E-02	
Dimethylformamide	68-12-2					1.0E-01	P	3.0E-02	I			1	0.1		6.1E+03	nc	6.2E+04	nc	3.1E+01	nc	1.3E+02	nc	3.7E+03	nc		7.5E-01	
Dimethylphenol, 2,4-	105-67-9					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		1.2E+00	
Dimethylphenol, 2,6-	576-26-1					6.0E-04	I					1	0.1		3.7E+01	nc	3.7E+02	nc					2.2E+01	nc		3.6E-02	
Dimethylphenol, 3,4-	95-65-8					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		6.0E-02	
Dimethylterephthalate	120-61-6					1.0E-01	I			V		1		6.1E+00	7.8E+03	sat	1.0E+05	sat					3.7E+03	nc		1.0E+00	
Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		2.1E+00	
Dinitrobenzene, 1,2-	528-29-0					1.0E-04	P					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		2.4E-03	
Dinitrobenzene, 1,3-	99-65-0					1.0E-04	I					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		2.3E-03	
Dinitrobenzene, 1,4-	100-25-4					1.0E-04	P					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		2.3E-03	
Dinitrophenol, 2,4-	51-28-5					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		6.8E-02	
Dinitrotoluene Mixture, 2,4/2,6-	25321-14-6	6.8E-01	I			2.0E-03	H					1	0.1		7.1E-01	ca	2.5E+00	ca					9.9E-02	ca		9.3E-05	
Dinitrotoluene, 2,4-	121-14-2					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		6.8E-02	
Dinitrotoluene, 2,6-	606-20-2					1.0E-03	P					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		3.4E-02	
Dinitrotoluene, 2-Amino-4,6-	35572-78-2					2.0E-03	S					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		2.9E-02	
Dinitrotoluene, 4-Amino-2,6-	19406-51-0					2.0E-03	S					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		2.9E-02	
Dinoseb	88-85-7					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc	7.0E+00	2.7E-01	5.1E-02
Dioxane, 1,4-	123-91-1	1.1E-02	I					3.6E+00	A			1	0.1		4.4E+01	ca	1.6E+02	ca	3.8E+03	nc	1.6E+04	nc	6.1E+00	ca**		1.2E-03	
Dioxins																											
Hexachlorodibenzo-p-dioxin	34465-46-8	1.5E+04	W	3.3E+00	W							1	0.03		3.9E-05	ca**	1.6E-04	ca**	7.4E-07	ca**	3.7E-06	ca**	4.5E-06	ca**		3.7E-06	
Hexachlorodibenzo-p-dioxin, Mixture	NA	6.2E+03	I	1.3E+00	I							1	0.03		9.4E-05	ca**	3.9E-04	ca**	1.9E-06	ca**	9.4E-06	ca**	1.1E-05	ca**			
HpCDD, 2,3,7,8-	37871-00-4	1.5E+03	W	3.3E-01	W							1	0.03		3.9E-04	ca**	1.6E-03	ca**	7.4E-06	ca**	3.7E-05	ca**	4.5E-05	ca**		6.3E-05	
OCDD	3268-87-9	4.5E+01	W	9.9E-03	W							1	0.03		1.3E-02	ca**	5.3E-02	ca**	2.5E-04	ca**	1.2E-03	ca**	1.5E-03	ca**		3.5E-03	
PeCDD, 2,3,7,8-	36088-22-9	1.5E+05	W	3.3E+01	W							1	0.03		3.9E-06	ca**	1.6E-05	ca**	7.4E-08	ca**	3.7E-07	ca**	4.5E-07	ca**		2.3E-07	
TCDD, 2,3,7,8-	1746-01-6	1.3E+05	C	3.8E+01	C	1.0E-09	A					1	0.03		4.5E-06	ca*	1.8E-05	ca*	6.4E-08	ca**	3.2E-07	ca**	5.2E-07	ca*	3.0E-05	1.5E-07	8.8E-06
Diphenamid	957-51-7					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		3.4E+01	
Diphenylamine	122-39-4					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		3.6E+00	
Diphenylhydrazine, 1,2-	122-66-7	8.0E-01	I	2.2E-04	I							1	0.1		6.1E-01	ca**	2.2E+00	ca**	1.1E-02	ca**	5.6E-02	ca**	8.4E-02	ca**		6.0E-04	
Diquat	85-00-7					2.2E-03	I					1	0.1		1.3E+02	nc	1.4E+03	nc					8.0E+01	nc	2.0E+01	3.3E-01	8.1E-02
Direct Black 38	1937-37-7	7.4E+00	C	2.1E-03	C							1	0.1		6.6E-02	ca**	2.3E-01	ca**	1.2E-03	ca**	5.8E-03	ca**	9.1E-03	ca**		1.4E+00	
Direct Blue 6	2602-46-2	7.4E+00	C	2.1E-03	C							1	0.1		6.6E-02	ca**	2.3E-01	ca**	1.2E-03	ca**	5.8E-03	ca**	9.1E-03	ca**		4.0E+00	
Direct Brown 95	16071-86-6	6.7E+00	C	1.9E-03	C							1	0.1		7.2E-02	ca**	2.6E-01	ca**	1.3E-03	ca**	6.5E-03	ca**	1.0E-02	ca**			
Disulfoton	298-04-4					4.0E-05	I					1	0.1		2.4E+00	nc	2.5E+01	nc					1.5E+00	nc		2.7E-03	
Dithiane, 1,4-	505-29-3					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.9E-01	
Diuron	330-54-1					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		3.4E-02	
Dodine	197143					4.0E-03	I					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		4.5E+00	
Endosulfan	115-29-7					6.0E-03	I					1	0.1		3.7E+02	nc	3.7E+03	nc					2.2E+02	nc		9.7E+00	
Endothall	145-73-3					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc	1.0E+02	1.6E-01	2.2E-02
Endrin	72-20-8					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc	2.0E+00	2.3E-01	4.3E-02
Epichlorohydrin	106-89-8	9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V		1		8.4E+03	1.8E+01	nc	7.7E+01	nc	1.0E+00	nc	4.4E+00	nc	2.1E+00	nc		4.3E-04	
Epoxybutane, 1,2-	106-88-7							2.0E-02	I	V		1		1.2E+04	1.5E+02	nc	6.4E+02	nc	2.1E+01	nc	8.8E+01	nc	4.2E+01	nc		8.7E-03	
EPTC	759-94-4					2.5E-02	I			V		1		6.2E+02	2.0E+03	sat	2.6E+04	sat					9.1E+02	nc		6.5E-01	
Ethephon	16672-87-0					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		3.8E-02	
Ethion	563-12-2					5.0E-04	I					1	0.1		3.1E+01	nc	3.1E+02	nc					1.8E+01	nc		4.8E-01	
Ethoxyethanol Acetate, 2-	111-15-9					3.0E-01	H					1	0.1		1.8E+04	nc	1.8E+05	max					1.1E+04	nc		2.2E+00	
Ethoxyethanol, 2-	110-80-5					4.0E-01	H	2.0E-01	I			1	0.1		2.4E+04	nc	2.5E+05	max	2.1E+02	nc	8.8E+02	nc	1.5E+04	nc		2.9E+00	
Ethyl Acetate	141-78-6					9.0E-01	I			V		1		1.1E+04	7.0E+04	sat	9.2E+05	sat					3.3E+04	nc		7.0E+00	
Ethyl Acrylate	140-88-5	4.8E-02	H							V		1		2.6E+03	1.3E+01	ca**	6.0E+01	ca**					1.4E+00	ca**		3.2E-04	
Ethyl Chloride	75-00-3							1.0E+01	I	V		1		2.2E+03	1.5E+04	sat	6.2E+04	sat	1.0E+04	nc	4.4E+04	nc	2.1E+04	nc		6.0E+00	
Ethyl Ether	60-29-7					2.0E-01	I			V		1		8.2E+03	1.6E+04	sat	2.0E+05	sat					7.3E+03	nc		1.6E+00	
Ethyl Methacrylate	97-63-2					9.0E-02	H			V		1		1.2E+03	7.0E+03	sat	9.2E+04	sat					3.3E+03	nc		7.9E-01	
Ethyl-p-nitrophenyl Phosphonate	2104-64-5					1.0E-05	I					1	0.1		6.1E-01	nc	6.2E+00	nc					3.7E-01	nc		8.7E-03	
Ethylbenzene	100-41-4	1.1E-02	C	2.5E-06	C	1.0E-01	I	1.0E+00	I	V		1		5.5E+02	5.7E+00	ca	2.9E+01	ca	9.7E-01	ca	4.9E+00	ca	1.5E+00	ca	7.0E+02	1.9E-03	8.9E-01
Ethylene Cyanohydrin	109-78-4					3.0E-02	P					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		2.2E-01	
Ethylene Diamine	107-15-3					9.0E-02	P					1	0.1		5.5E+03	nc	5.5E+04	nc					3.3E+03	nc		8.2E-01	
Ethylene Glycol	107-21-1					2.0E+00	I	4.0E-01	C			1	0.1		1.2E+05	max	1.2E+06	max	4.2E+02	nc	1.8E+03	nc	7.3E+04	nc		1.5E+01	
Ethylene Glycol Monobutyl Ether	111-76-2					5.0E-01	I	1.3E+01	I			1	0.1		3.1E+04	nc	3.1E+05	max	1.4E+04	nc	5.7E+04	nc	1.8E+04	nc		3.7E+00	
Ethylene Oxide	75-21-8	3.1E-01	C	8.8E-11	C					V		1		1.1E+05	2.1E+00	ca**	9.2E+00	ca**	2.8E+04	ca**	1.4E+05	max	2.2E-01	ca**		4.4E-05	
Ethylene Thiourea	96-45-7	4.5E-02	C	1.3E-05	C	8.0E-05	I					1	0.1		4.9E+00	nc	3.8E+01	ca**	1.9E-01	ca**	9.4E-01	ca**	1.5E+00	ca**		3.2E-04	
Ethylphthalyl Ethyl Glycolate	84-72-0					3.0E+00	I					1	0.1		1.8E+05	max	1.8E+06	max					1.1E+05	max		3.0E+02	
Express	101200-48-0					8.0E-03	I					1	0.1		4.9E+02	nc	4.9E+03	nc					2.9E+02	nc		1.1E-01	
Fenamiphos	22224-92-6					2.5E-04	I					1	0.1		1.5E+01	nc	1.5E+02	nc					9.1E+00	nc		5.9E-03	
Fenpropathrin	39515-41-8					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		5.4E+01	
Fluometuron	2164-17-2					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		4.4E-01	
Fluorine (Soluble Fluoride)	7782-41-4					6.0E-02	I					1			4.7E+03	nc	6.1E+04	nc					2.2E+03	nc	4.0E+03		
Fluridone	59756-60-4					8.0E-02	I					1	0.1		4.9E+03	nc	4.9E+04	nc					2.9E+03	nc		6.5E+02	
Flurprimidol	56425-91-3					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		1.4E+00	
Flutolanil	66332-96-5					6.0E-02	I					1	0.1		3.7E+03	nc	3.7E+04	nc					2.2E+03	nc		2.4E+01	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Fluvalinate	69409-94-5					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		5.3E+02	
Folpet	133-07-3	3.5E-03	I			1.0E-01	I					1	0.1		1.4E+02	ca*	4.9E+02	ca					1.9E+01	ca		9.4E-03	
Fomesafen	72178-02-0	1.9E-01	I									1	0.1		2.6E+00	ca**	9.1E+00	ca**					3.5E-01	ca**		7.9E-03	
Fonofos	944-22-9					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		1.4E-01	
Formaldehyde	50-00-0			1.3E-05	I	2.0E-01	I	9.8E-03	A			1	0.1		1.2E+04	nc	1.2E+05	max	1.9E-01	ca*	9.4E-01	ca*	7.3E+03	nc		1.5E+00	
Formic Acid	64-18-6					2.0E+00	H					1	0.1		1.2E+05	max	1.2E+06	max					7.3E+04	nc		1.5E+01	
Fosetyl-AL	39148-24-8					3.0E+00	I					1	0.1		1.8E+05	max	1.8E+06	max					1.1E+05	max			
Furans																											
Furan	110-00-9					1.0E-03	I			V		1		6.8E+03	7.8E+01	nc	1.0E+03	nc					3.7E+01	nc		1.5E-02	
HpCDF, 2,3,7,8-	38998-75-3	1.5E+03	W	3.3E-01	W							1	0.1		3.2E-04	ca**	1.1E-03	ca**	7.4E-06	ca**	3.7E-05	ca**	4.5E-05	ca**		3.5E-05	
HxCDF, 2,3,7,8-	55684-94-1	1.5E+04	W	3.3E+00	W							1	0.1		3.2E-05	ca**	1.1E-04	ca**	7.4E-07	ca**	3.7E-06	ca**	4.5E-06	ca**		2.1E-06	
OCDF	39001-02-0	4.5E+01	W	9.9E-03	W							1	0.1		1.1E-02	ca**	3.8E-02	ca**	2.5E-04	ca**	1.2E-03	ca**	1.5E-03	ca**		2.0E-03	
PeCDF, 1,2,3,7,8-	57117-41-6	4.5E+03	W	9.9E-01	W							1	0.1		1.1E-04	ca**	3.8E-04	ca**	2.5E-06	ca**	1.2E-05	ca**	1.5E-05	ca**		4.1E-06	
PeCDF, 2,3,4,7,8-	57117-31-4	4.5E+04	W	9.9E+00	W							1	0.1		1.1E-05	ca**	3.8E-05	ca**	2.5E-07	ca**	1.2E-06	ca**	1.5E-06	ca**		4.1E-07	
TCDF, 2,3,7,8-	51207-31-9	1.5E+04	W	3.3E+00	W							1	0.1		3.2E-05	ca**	1.1E-04	ca**	7.4E-07	ca**	3.7E-06	ca**	4.5E-06	ca**		7.3E-07	
Furazolidone	67-45-8	3.8E+00	H									1	0.1		1.3E-01	ca**	4.5E-01	ca**					1.8E-02	ca**		3.3E-05	
Furfural	98-01-1					3.0E-03	I	5.0E-02	H			1	0.1		1.8E+02	nc	1.8E+03	nc	5.2E+01	nc	2.2E+02	nc	1.1E+02	nc		2.6E-02	
Furium	531-82-8	1.5E+00	C	4.3E-04	C							1	0.1		3.2E-01	ca**	1.1E+00	ca**	5.7E-03	ca**	2.9E-02	ca**	4.5E-02	ca**		5.3E-05	
Furmecyclox	60568-05-0	3.0E-02	I									1	0.1		1.6E+01	ca**	5.7E+01	ca**					2.2E+00	ca**		7.4E-03	
Glufosinate, Ammonium	77182-82-2					4.0E-04	I					1	0.1		2.4E+01	nc	2.5E+02	nc					1.5E+01	nc		4.7E-03	
Glycidyl	765-34-4					4.0E-04	I	1.0E-03	H			1	0.1		2.4E+01	nc	2.5E+02	nc	1.0E+00	nc	4.4E+00	nc	1.5E+01	nc		2.9E-03	
Glyphosate	1071-83-6					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc	7.0E+02	8.7E-01	1.7E-01
Goal	42874-03-3					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		1.0E+01	
Haloxyfop, Methyl	69806-40-2					5.0E-05	I					1	0.1		3.1E+00	nc	3.1E+01	nc					1.8E+00	nc		6.5E-02	
Harmony	79277-27-3					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		1.3E-01	
Heptachlor	76-44-8	4.5E+00	I	1.3E-03	I	5.0E-04	I					1	0.1		1.1E-01	ca	3.8E-01	ca	1.9E-03	ca**	9.4E-03	ca**	1.5E-02	ca	4.0E-01	1.6E-03	4.2E-02
Heptachlor Epoxide	1024-57-3	9.1E+00	I	2.6E-03	I	1.3E-05	I					1	0.1		5.3E-02	ca*	1.9E-01	ca*	9.4E-04	ca**	4.7E-03	ca**	7.4E-03	ca*	2.0E-01	7.9E-05	2.1E-03
Hexabromobenzene	87-82-1					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		5.1E-01	
Hexachlorobenzene	118-74-1	1.6E+00	I	4.6E-04	I	8.0E-04	I					1	0.1		3.0E-01	ca	1.1E+00	ca	5.3E-03	ca**	2.7E-02	ca**	4.2E-02	ca	1.0E+00	2.9E-04	7.0E-03
Hexachlorobutadiene	87-68-3	7.8E-02	I	2.2E-05	I	1.0E-03	P					1	0.1		6.2E+00	ca**	2.2E+01	ca*	1.1E-01	ca**	5.6E-01	ca**	8.6E-01	ca*		1.9E-03	
Hexachlorocyclohexane, Alpha-	319-84-6	6.3E+00	I	1.8E-03	I							1	0.1		7.7E-02	ca**	2.7E-01	ca**	1.4E-03	ca**	6.8E-03	ca**	1.1E-02	ca**		7.4E-05	
Hexachlorocyclohexane, Beta-	319-85-7	1.8E+00	I	5.3E-04	I							1	0.1		2.7E-01	ca**	9.6E-01	ca**	4.6E-03	ca**	2.3E-02	ca**	3.7E-02	ca**		2.6E-04	
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	1.1E+00	C	3.1E-04	C	3.0E-04	I					1	0.04		5.2E-01	ca*	2.1E+00	ca	7.8E-03	ca**	4.0E-02	ca**	6.1E-02	ca	2.0E-01	4.3E-04	1.4E-03
Hexachlorocyclohexane, Technical	608-73-1	1.8E+00	I	5.1E-04	I							1	0.1		2.7E-01	ca**	9.6E-01	ca**	4.8E-03	ca**	2.4E-02	ca**	3.7E-02	ca**		2.6E-04	
Hexachlorocyclopentadiene	77-47-4					6.0E-03	I	2.0E-04	I			1	0.1		3.7E+02	nc	3.7E+03	nc	2.1E-01	nc	8.8E-01	nc	2.2E+02	nc	5.0E+01	8.0E-01	1.8E-01
Hexachloroethane	67-72-1	1.4E-02	I	4.0E-06	I	1.0E-03	I					1	0.1		3.5E+01	ca**	1.2E+02	ca**	6.1E-01	ca**	3.1E+00	ca**	4.8E+00	ca**		3.2E-03	
Hexachlorophene	70-30-4					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		1.4E+01	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1.1E-01	I			3.0E-03	I					1	0.1		4.4E+00	ca*	1.6E+01	ca					6.1E-01	ca		3.6E-04	
Hexamethylene Diisocyanate, 1,6-	822-06-0							1.0E-05	I	V		1		4.1E+03	3.7E+00	nc	1.6E+01	nc	1.0E-02	nc	4.4E-02	nc	2.1E-02	nc		2.5E-04	
Hexane, N-	110-54-3					6.0E-02	H	7.0E-01	I	V		1		1.4E+02	5.7E+02	sat	2.6E+03	sat	7.3E+02	nc	3.1E+03	nc	8.8E+02	nc		6.2E+00	
Hexanedioic Acid	124-04-9					2.0E+00	P					1	0.1		1.2E+05	max	1.2E+06	max					7.3E+04	nc		1.8E+01	
Hexazinone	51235-04-2					3.3E-02	I					1	0.1		2.0E+03	nc	2.0E+04	nc					1.2E+03	nc		1.7E+00	
Hydrazine	302-01-2	3.0E+00	I	4.9E-03	I			2.0E-04	C			1			2.1E-01	ca	9.5E-01	ca	5.0E-04	ca	2.5E-03	ca	2.2E-02	ca**			
Hydrazine Sulfate	10034-93-2	3.0E+00	I	4.9E-03	I							1			2.1E-01	ca**	9.5E-01	ca**	5.0E-04	ca**	2.5E-03	ca**	2.2E-02	ca**			
Hydrogen Chloride	7647-01-0							2.0E-02	I			1			2.8E+07	max	1.2E+08	max	2.1E+01	nc	8.8E+01	nc					
Hydrogen Sulfide	2148878					3.0E-03	I	2.0E-03	I			1			2.3E+02	nc	3.1E+03	nc	2.1E+00	nc	8.8E+00	nc	1.1E+02	nc			
Imazalil	35554-44-0					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		1.9E+00	
Imazaquin	81335-37-7					2.5E-01	I					1	0.1		1.5E+04	nc	1.5E+05	max					9.1E+03	nc		9.2E+01	
Iprodione	36734-19-7					4.0E-02	I					1	0.1		2.4E+03	nc	2.5E+04	nc					1.5E+03	nc		7.0E-01	
Iron	7439-89-6					7.0E-01	P					1			5.5E+04	nc	7.2E+05	max					2.6E+04	nc			
Isobutyl Alcohol	78-83-1					3.0E-01	I			V		1		9.6E+03	2.3E+04	sat	3.1E+05	sat					1.1E+04	nc		2.2E+00	
Isophorone	78-59-1	9.5E-04	I			2.0E-01	I	2.0E+00	C			1	0.1		5.1E+02	ca*	1.8E+03	ca*	2.1E+03	nc	8.8E+03	nc	7.1E+01	ca		2.2E-02	
Isopropalin	33820-53-0					1.5E-02	I					1	0.1		9.2E+02	nc	9.2E+03	nc					5.5E+02	nc		7.4E+00	
Isopropyl Methyl Phosphonic Acid	1832-54-8					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		7.7E-01	
Isoxaben	82558-50-7					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		1.1E+01	
Kerb	23950-58-5					7.5E-02	I					1	0.1		4.6E+03	nc	4.6E+04	nc					2.7E+03	nc		9.2E+00	
Lactofen	77501-63-4					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		3.7E+00	
Lead Compounds																											
Lead and Compounds	7439-92-1											1			4.0E+02	++									1.5E+01		
Tetraethyl Lead	78-00-2					1.0E-07	I					1	0.1		6.1E-03	nc	6.2E-02	nc					3.7E-03	nc		1.4E-05	
Linuron	330-55-2					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		6.6E-02	
Lithium Perchlorate	2151713					7.0E-04	I					1			5.5E+01	nc	7.2E+02	nc					2.6E+01	nc			
Londax	83055-99-6					2.0E-01	I					1	0.1		1.2E+04	nc	1.2E+05	max					7.3E+03	nc		1.9E+00	
Malathion	121-75-5					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		1.9E-01	
Maleic Anhydride	108-31-6					1.0E-01	I	7.0E-04	C			1	0.1		6.1E+03	nc	6.1E+04	nc	7.3E-01	nc	3.1E+00	nc	3.7E+03	nc		7.4E-01	
Maleic Hydrazide	123-33-1					5.0E-01	I					1	0.1		3.1E+04	nc	3.1E+05	max					1.8E+04	nc		4.0E+00	
Malononitrile	109-77-3					1.0E-04	P					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		8.4E-04	
Mancozeb	2234562					3.0E-02	H					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		2.4E-01	
Maneb	12427-38-2					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		4.0E-02	
Manganese (Diet)	7439-96-5					1.4E-01	I	5.0E-05	I			1															
Manganese (Water)	7439-96-5					2.4E-02	I	5.0E-05	I			0.04			1.8E+03	nc	2.3E+04	nc	5.2E-02	nc	2.2E-01	nc	8.8E+02	nc			
MCPA	94-74-6					5.0E-04	I					1	0.1		3.1E+01	nc	3.1E+02	nc					1.8E+01	nc		4.7E-03	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
MCPB	94-81-5					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.5E-01	
MCPP	93-65-2					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		1.1E-02	
Mephosfolan	950-10-7					9.0E-05	H					1	0.1		5.5E+00	nc	5.5E+01	nc					3.3E+00	nc		3.9E-03	
Mepiquat Chloride	24307-26-4					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		6.0E-01	
Mercury Compounds																											
Mercuric Chloride	7487-94-7					3.0E-04	I					0.07			2.3E+01	nc	3.1E+02	nc					1.1E+01	nc			
Mercuric Sulfide	1344-48-5					3.0E-04	S					1			2.3E+01	nc	3.1E+02	nc					1.1E+01	nc			
Mercury (elemental)	7439-97-6							3.0E-04	I	V		1		3.1E+00	6.7E+00	sat	2.8E+01	sat	3.1E-01	nc	1.3E+00	nc	6.3E-01	nc	2.0E+00	3.3E-02	1.0E-01
Mercury, Inorganic Salts	NA					3.0E-04	I					0.07			2.3E+01	nc	3.1E+02	nc					1.1E+01	nc			
Methyl Mercury	22967-92-6					1.0E-04	I					1			7.8E+00	nc	1.0E+02	nc					3.7E+00	nc			
Phenylmercuric Acetate	62-38-4					8.0E-05	I					1	0.1		4.9E+00	nc	4.9E+01	nc					2.9E+00	nc		1.6E-03	
Merphos	150-50-5					3.0E-05	I					1	0.1		1.8E+00	nc	1.8E+01	nc					1.1E+00	nc		1.4E-01	
Merphos Oxide	78-48-8					3.0E-05	I					1	0.1		1.8E+00	nc	1.8E+01	nc					1.1E+00	nc		4.4E-03	
Metalaxyl	57837-19-1					6.0E-02	I					1	0.1		3.7E+03	nc	3.7E+04	nc					2.2E+03	nc		5.4E-01	
Methacrylonitrile	126-98-7					1.0E-04	I	7.0E-04	H	V		1		4.5E+03	3.2E+00	nc	1.8E+01	nc	7.3E-01	nc	3.1E+00	nc	1.0E+00	nc		2.4E-04	
Methamidophos	10265-92-6					5.0E-05	I					1	0.1		3.1E+00	nc	3.1E+01	nc					1.8E+00	nc		3.8E-04	
Methanol	67-56-1					5.0E-01	I	4.0E+00	C			1	0.1		3.1E+04	nc	3.1E+05	max	4.2E+03	nc	1.8E+04	nc	1.8E+04	nc		3.7E+00	
Methidathion	950-37-8					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		8.0E-03	
Methomyl	16752-77-5					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		2.0E-01	
Methoxy-5-nitroaniline, 2-	99-59-2	4.9E-02	C	1.4E-05	C							1	0.1		9.9E+00	ca**	3.5E+01	ca**	1.7E-01	ca**	8.8E-01	ca**	1.4E+00	ca**		3.8E-04	
Methoxychlor	72-43-5					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc	4.0E+01	1.6E+01	3.4E+00
Methoxyethanol Acetate, 2-	110-49-6					2.0E-03	H					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		1.5E-02	
Methoxyethanol, 2-	109-86-4							2.0E-02	I			1	0.1		2.8E+07	max	1.2E+08	max	2.1E+01	nc	8.8E+01	nc					
Methyl Acetate	79-20-9					1.0E+00	H			V		1		2.9E+04	7.8E+04	sat	1.0E+06	sat					3.7E+04	nc		7.6E+00	
Methyl Acrylate	96-33-3					3.0E-02	H			V		1		6.9E+03	2.3E+03	nc	3.1E+04	sat					1.1E+03	nc		2.3E-01	
Methyl Ethyl Ketone (2-Butanone)	78-93-3					6.0E-01	I	5.0E+00	I	V		1		2.8E+04	2.8E+04	sat	1.9E+05	sat	5.2E+03	nc	2.2E+04	nc	7.1E+03	nc		1.5E+00	
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1					8.0E-02	H	3.0E+00	I	V		1		3.2E+03	5.3E+03	sat	5.2E+04	sat	3.1E+03	nc	1.3E+04	nc	2.0E+03	nc		4.4E-01	
Methyl Methacrylate	80-62-6					1.4E+00	I	7.0E-01	I	V		1		2.5E+03	4.7E+03	sat	2.0E+04	sat	7.3E+02	nc	3.1E+03	nc	1.4E+03	nc		3.1E-01	
Methyl Parathion	298-00-0					2.5E-04	I					1	0.1		1.5E+01	nc	1.5E+02	nc					9.1E+00	nc		1.1E-02	
Methyl Styrene (Mixed Isomers)	25013-15-4					6.0E-03	H	4.0E-02	H	V		1		4.5E+02	1.9E+02	nc	1.1E+03	sat	4.2E+01	nc	1.8E+02	nc	6.0E+01	nc		1.1E-01	
Methyl tert-Butyl Ether (MTBE)	1634-04-4	1.8E-03	C	2.6E-07	C			3.0E+00	I	V		1		6.9E+03	3.9E+01	ca	1.9E+02	ca	9.4E+00	ca	4.7E+01	ca	1.2E+01	ca		2.7E-03	
Methyl-5-Nitroaniline, 2-	99-55-8	3.3E-02	H									1	0.1		1.5E+01	ca**	5.2E+01	ca**					2.0E+00	ca**		7.6E-04	
Methylaniline Hydrochloride, 2-	636-21-5	1.3E-01	C	3.7E-05	C							1	0.1		3.7E+00	ca**	1.3E+01	ca**	6.6E-02	ca**	3.3E-01	ca**	5.2E-01	ca**		1.8E-04	
Methylarsonic acid	124-58-3					1.0E-02	A			A		1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc			
Methylcyclohexane	108-87-2							3.0E+00	H	V		1		7.1E+01	3.4E+03	sat	1.4E+04	sat	3.1E+03	nc	1.3E+04	nc	6.3E+03	nc		1.4E+01	
Methylene Chloride	75-09-2	7.5E-03	I	4.7E-07	I	6.0E-02	I	1.1E+00	A	V		1		3.5E+03	1.1E+01	ca	5.4E+01	ca	5.2E+00	ca	2.6E+01	ca	4.8E+00	ca	5.0E+00	1.2E-03	1.3E-03
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.0E-01	P	4.3E-10	C	2.0E-03	P				M	1	0.1		1.2E+00	ca	1.7E+01	ca*	2.2E+03	ca**	2.9E+04	ca**	2.2E-01	ca		5.9E-03	
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	4.6E-02	I									1	0.1		1.1E+01	ca**	3.7E+01	ca**					1.5E+00	ca**		4.3E-02	
Methylenebisbenzenamine, 4,4'-	101-77-9	1.6E+00	C	4.6E-04	C							1	0.1		3.0E-01	ca**	1.1E+00	ca**	5.3E-03	ca**	2.7E-02	ca**	4.2E-02	ca**		4.2E-04	
Methylenediphenyl Diisocyanate	101-68-8							6.0E-04	I			1	0.1		8.5E+05	max	3.6E+06	max	6.3E-01	nc	2.6E+00	nc					
Methylstyrene, Alpha-	98-83-9					7.0E-02	H			V		1		4.5E+02	5.5E+03	sat	7.2E+04	sat					2.6E+03	nc		4.7E+00	
Metolachlor	51218-45-2					1.5E-01	I					1	0.1		9.2E+03	nc	9.2E+04	nc					5.5E+03	nc		4.3E+00	
Metribuzin	21087-64-9					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		2.4E+00	
Mirex	2385-85-5	1.8E+01	C	5.1E-03	C	2.0E-04	I					1	0.1		2.7E-02	ca	9.6E-02	ca	4.8E-04	ca**	2.4E-03	ca**	3.7E-03	ca		3.5E-03	
Molinate	2212-67-1					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		5.6E-02	
Molybdenum	7439-98-7					5.0E-03	I					1			3.9E+02	nc	5.1E+03	nc					1.8E+02	nc			
Monochloramine	10599-90-3					1.0E-01	I					1			7.8E+03	nc	1.0E+05	max					3.7E+03	nc			
Monochlorobutanes	25154-42-1					4.0E-01	H					1	0.1		2.4E+04	nc	2.5E+05	max					1.5E+04	nc			
Monomethylaniline	100-61-8		P			2.0E-03	P					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		2.4E-02	
N,N'-Diphenyl-1,4-benzenediamine	74-31-7					3.0E-04	P					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		2.8E+00	
Naled	300-76-5					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		2.9E-02	
Napropamide	15299-99-7					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		8.5E+01	
Nickel Refinery Dust	NA			2.4E-04	I							0.04			1.4E+04	ca**	6.9E+04	ca**	1.0E-02	ca**	5.1E-02	ca**					
Nickel Soluble Salts	7440-02-0					2.0E-02	I					0.04			1.6E+03	nc	2.0E+04	nc					7.3E+02	nc			
Nickel Subsulfide	12035-72-2			4.8E-04	I							0.04			6.9E+03	ca**	3.5E+04	ca**	5.1E-03	ca**	2.6E-02	ca**					
Nitrate	14797-55-8					1.6E+00	I					1			1.3E+05	max	1.6E+06	max					5.8E+04	nc	1.0E+04		
Nitrite	14797-65-0					1.0E-01	I					1			7.8E+03	nc	1.0E+05	max					3.7E+03	nc	1.0E+03		
Nitrobenzene	98-95-3					5.0E-04	I	2.0E-03	H	V		1		2.6E+03	3.1E+01	nc	2.8E+02	nc	2.1E+00	nc	8.8E+00	nc	3.4E+00	nc		2.0E-03	
Nitrofurantoin	67-20-9					7.0E-02	H					1	0.1		4.3E+03	nc	4.3E+04	nc					2.6E+03	nc		1.9E+00	
Nitrofurazone	59-87-0	1.3E+00	C	3.7E-04	C							1	0.1		3.7E-01	ca**	1.3E+00	ca**	6.6E-03	ca**	3.3E-02	ca**	5.2E-02	ca**		4.9E-05	
Nitroglycerin	55-63-0	1.7E-02	P			1.0E-04	P					1	0.1		6.1E+00	nc	6.2E+01	nc					3.7E+00	nc		1.7E-03	
Nitroguanidine	556-88-7					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		9.2E-01	
Nitromethane	75-52-5			9.0E-06	P			2.0E-02	P	V		1		1.7E+04	4.7E+00	ca*	2.4E+01	ca*	2.7E-01	ca*	1.4E+00	ca*	5.4E-01	ca*		1.2E-04	
Nitropropane, 2-	79-46-9			2.7E-03	H			2.0E-02	I	V		1		4.3E+03	1.2E-02	ca	6.0E-02	ca	9.0E-04	ca	4.5E-03	ca	1.8E-03	ca		4.5E-07	
Nitroso-di-N-butylamine, N-	924-16-3	5.4E+00	I	1.6E-03	I					V		1		1.3E+04	9.3E-02	ca**	4.3E-01	ca**	1.5E-03	ca**	7.7E-03	ca**	2.4E-03	ca**		8.6E-06	
Nitroso-di-N-propylamine, N-	621-64-7	7.0E+00	I									1	0.1		6.9E-02	ca**	2.5E-01	ca**					9.6E-03	ca**		1.1E-05	
Nitroso-N-ethylurea, N-	759-73-9	2.7E+01	C	7.7E-03	C						M	1	0.1		4.3E-03	ca**	6.4E-02	ca**	1.2E-04	ca**	1.6E-03	ca**	8.0E-04	ca**		2.2E-07	
Nitrosodiethanolamine, N-	1116-54-7	2.8E+00	I									1	0.1		1.7E-01	ca**	6.2E-01	ca**					2.4E-02	ca**		4.9E-06	
Nitrosodiethylamine, N-	55-18-5	1.5E+02	I	4.3E-02	I						M	1	0.1		7.7E-04	ca**	1.1E-02	ca**	2.2E-05	ca**	2.9E-04	ca**	1.4E-04	ca**		7.0E-08	
Nitrosodimethylamine, N-	62-75-9	5.1E+01	I	1.4E-02	I	8.0E-06	P				M	1	0.1		2.3E-03	ca	3.4E-02	ca	6.9E-05	ca**	8.8E-04	ca**	4.2E-04	ca		1.2E-07	
Nitrosodiphenylamine, N-	86-30-6	4.9E-03	I									1	0.1		9.9E+01	ca**	3.5E+02	ca**					1.4E+01	ca**		1.7E-01	
Nitrosomethylethylamine, N-	10595-95-6	2.2E+01	I									1	0.1		2.2E-02	ca**	7.8E-02	ca**					3.1E-03	ca**		1.1E-06	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V= volatile; ca = cancer; ca* = where: nc SL < 100X ca SL; ca** = where nc SL < 10X ca SL; nc = noncancer; max=Concentration may exceed ceiling limit (See User's Guide); sat=Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Nitrosopyrrolidine, N-	930-55-2	2.1E+00	I	6.1E-04	I							1	0.1		2.3E-01	ca**	8.2E-01	ca**	4.0E-03	ca**	2.0E-02	ca**	3.2E-02	ca**		1.7E-05	
Nitrotoluene, o-	88-72-2					1.0E-02	H			V		1		1.3E+03	7.8E+02	nc	1.0E+04	sat					3.7E+02	nc		3.0E-01	
Nitrotoluene, p-	99-99-0	1.6E-02	P			4.0E-03	P					1	0.1		3.0E+01	ca**	1.1E+02	ca*					4.2E+00	ca*		3.4E-03	
Norflurazon	27314-13-2					4.0E-02	I					1	0.1		2.4E+03	nc	2.5E+04	nc					1.5E+03	nc		1.7E+01	
Nustar	85509-19-9					7.0E-04	I					1	0.1		4.3E+01	nc	4.3E+02	nc					2.6E+01	nc		9.0E+01	
Octabromodiphenyl Ether	32536-52-0					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		3.1E+01	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		7.1E+00	
Octamethylpyrophosphoramide	152-16-9					2.0E-03	H					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		1.3E-01	
Oryzalin	19044-88-3					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		4.8E+00	
Oxadiazon	19666-30-9					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		1.3E+00	
Oxamyl	23135-22-0					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc	2.0E+02	2.0E-01	4.4E-02
Paclobutrazol	76738-62-0					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		1.2E+01	
Polynuclear Aromatic Hydrocarbons (PAHs)																											
Acenaphthene	83-32-9					6.0E-02	I			V		1	0.13		3.4E+03	nc	3.3E+04	nc					2.2E+03	nc		2.7E+01	
Anthracene	120-12-7					3.0E-01	I			V		1	0.13		1.7E+04	nc	1.7E+05	max					1.1E+04	nc		4.5E+02	
Benz[a]anthracene	56-55-3	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	ca**	2.1E+00	ca**	8.7E-03	ca**	1.1E-01	ca**	2.9E-02	ca**		1.4E-02	
Benzo[a]pyrene	50-32-8	7.3E+00	I	1.1E-03	C						M	1	0.13		1.5E-02	ca**	2.1E-01	ca**	8.7E-04	ca**	1.1E-02	ca**	2.9E-03	ca**	2.0E-01	4.6E-03	3.1E-01
Benzo[b]fluoranthene	205-99-2	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	ca**	2.1E+00	ca**	8.7E-03	ca**	1.1E-01	ca**	2.9E-02	ca**		4.7E-02	
Benzo[k]fluoranthene	207-08-9	7.3E-02	*	1.1E-04	C						M	1	0.13		1.5E+00	ca**	2.1E+01	ca**	8.7E-03	ca**	1.1E-01	ca**	2.9E-01	ca**		4.6E-01	
Chrysene	218-01-9	7.3E-03	*	1.1E-05	C						M	1	0.13		1.5E+01	ca**	2.1E+02	ca**	8.7E-02	ca**	1.1E+00	ca**	2.9E+00	ca**		1.4E+00	
Dibenz[a,h]anthracene	53-70-3	7.3E+00	*	1.2E-03	C						M	1	0.13		1.5E-02	ca**	2.1E-01	ca**	8.0E-04	ca**	1.0E-02	ca**	2.9E-03	ca**		1.5E-02	
Fluoranthene	206-44-0					4.0E-02	I					1	0.13		2.3E+03	nc	2.2E+04	nc					1.5E+03	nc		2.1E+02	
Fluorene	86-73-7					4.0E-02	I			V		1	0.13		2.3E+03	nc	2.2E+04	nc					1.5E+03	nc		3.3E+01	
Indeno[1,2,3-cd]pyrene	193-39-5	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	ca**	2.1E+00	ca**	8.7E-03	ca**	1.1E-01	ca**	2.9E-02	ca**		1.6E-01	
Methylnaphthalene, 1-	90-12-0	2.9E-02	P			7.0E-03	P			V		1		4.6E+02	2.2E+01	ca*	9.9E+01	ca*					2.3E+00	ca		1.5E-02	
Methylnaphthalene, 2-	91-57-6					4.0E-03	I			V		1		4.4E+02	3.1E+02	nc	4.1E+03	sat					1.5E+02	nc		9.0E-01	
Naphthalene	91-20-3					2.0E-02	I	3.0E-03	I	V		1	0.13		1.5E+02	nc	6.7E+02	nc	3.1E+00	nc	1.3E+01	nc	6.2E+00	nc		2.4E-02	
Pyrene	129-00-0					3.0E-02	I			V		1	0.13		1.7E+03	nc	1.7E+04	nc					1.1E+03	nc		1.5E+02	
Paraquat Dichloride	1910-42-5					4.5E-03	I					1	0.1		2.7E+02	nc	2.8E+03	nc					1.6E+02	nc		4.9E-01	
Parathion	56-38-2					6.0E-03	H					1	0.1		3.7E+02	nc	3.7E+03	nc					2.2E+02	nc		8.2E-01	
Polychlorinated Biphenyls (PCBs)																											
Aroclor 1016	12674-11-2	7.0E-02	I	2.0E-05	I	7.0E-05	I					1	0.14		3.9E+00	nc	2.1E+01	ca**	1.2E-01	ca**	6.1E-01	ca**	9.6E-01	ca**		5.2E-02	
Aroclor 1221	11104-28-2	2.0E+00	I	5.7E-04	I					V		1	0.14	3.0E+02	1.7E-01	ca**	6.2E-01	ca**	4.3E-03	ca**	2.1E-02	ca**	6.8E-03	ca**		1.4E-04	
Aroclor 1232	11141-16-5	2.0E+00	I	5.7E-04	I					V		1	0.14	3.0E+02	1.7E-01	ca**	6.2E-01	ca**	4.3E-03	ca**	2.1E-02	ca**	6.8E-03	ca**		1.4E-04	
Aroclor 1242	53469-21-9	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	ca**	7.4E-01	ca**	4.3E-03	ca**	2.1E-02	ca**	3.4E-02	ca**		3.0E-03	
Aroclor 1248	12672-29-6	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	ca**	7.4E-01	ca**	4.3E-03	ca**	2.1E-02	ca**	3.4E-02	ca**		3.0E-03	
Aroclor 1254	11097-69-1	2.0E+00	I	5.7E-04	I	2.0E-05	I					1	0.14		2.2E-01	ca**	7.4E-01	ca*	4.3E-03	ca**	2.1E-02	ca**	3.4E-02	ca*		5.1E-03	
Aroclor 1260	11096-82-5	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	ca**	7.4E-01	ca**	4.3E-03	ca**	2.1E-02	ca**	3.4E-02	ca**		1.4E-02	
Heptachlorobiphenyl, 2,2',3,3',4,4',5- (PCB 170)	35065-30-6	1.5E+01	W	3.3E-03	W							1	0.14		3.0E-02	ca**	9.9E-02	ca**	7.4E-04	ca**	3.7E-03	ca**	4.5E-03	ca**		1.9E-03	
Heptachlorobiphenyl, 2,2',3,4,4',5,5'- (PCB 180)	35065-29-3	1.5E+00	W	3.3E-04	W							1	0.14		3.0E-01	ca**	9.9E-01	ca**	7.4E-03	ca**	3.7E-02	ca**	4.5E-02	ca**		1.9E-02	
Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		6.2E-03	
Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		3.7E-03	
Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		3.7E-03	
Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		3.7E-03	
Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	4.5E+03	W	9.9E-01	W							1	0.14		9.8E-05	ca**	3.3E-04	ca**	2.5E-06	ca**	1.2E-05	ca**	1.5E-05	ca**		3.7E-06	
Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		2.3E-03	
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		2.2E-03	
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		2.3E-03	
Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	4.5E+00	W	9.9E-04	W							1	0.14		9.8E-02	ca**	3.3E-01	ca**	2.5E-03	ca**	1.2E-02	ca**	1.5E-02	ca**		2.3E-03	
Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	1.5E+04	W	3.3E+00	W							1	0.14		3.0E-05	ca**	9.9E-05	ca**	7.4E-07	ca**	3.7E-06	ca**	4.5E-06	ca**		6.7E-07	
Polychlorinated Biphenyls (high risk)	1336-36-3	2.0E+00	I	5.7E-04	C							1	0.1		2.4E-01	ca**	8.6E-01	ca**	4.3E-03	ca**	2.2E-02	ca**					
Polychlorinated Biphenyls (low risk)	1336-36-3	4.0E-01	I	1.0E-04	I							1	0.1						2.4E-02	ca**	1.2E-01	ca**	1.7E-01	ca**	5.0E-01	1.5E-02	4.5E-02
Polychlorinated Biphenyls (lowest risk)	1336-36-3	7.0E-02	I									1	0.1														
Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	1.5E+01	W	3.3E-03	W							1	0.14		3.0E-02	ca**	9.9E-02	ca**	7.4E-04	ca**	3.7E-03	ca**	4.5E-03	ca**		4.0E-04	
Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	4.5E+01	W	9.9E-03	W							1	0.14		9.8E-03	ca**	3.3E-02	ca**	2.5E-04	ca**	1.2E-03	ca**	1.5E-03	ca**		1.3E-04	
Pebulate	1114-71-2					5.0E-02	H					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		2.1E+00	
Pendimethalin	40487-42-1					4.0E-02	I					1	0.1		2.4E+03	nc	2.5E+04	nc					1.5E+03	nc		7.9E+00	
Pentabromodiphenyl Ether	32534-81-9					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		4.5E+00	
Pentachlorobenzene	608-93-5					8.0E-04	I					1	0.1		4.9E+01	nc	4.9E+02	nc					2.9E+01	nc		1.2E-01	
Pentachloronitrobenzene	82-68-8	2.6E-01	H			3.0E-03	I					1	0.1		1.9E+00	ca*	6.6E+00	ca					2.6E-01	ca		1.3E-03	
Pentachlorophenol	87-86-5	1.2E-01	I			3.0E-02	I					1	0.25		3.0E+00	ca	9.0E+00	ca					5.6E-01	ca	1.0E+00	3.9E-03	7.0E-03
Perchlorate and Perchlorate Salts	14797-73-0					7.0E-04	I					1			5.5E+01	nc	7.2E+02	nc					2.6E+01	nc			
Permethrin	52645-53-1					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		6.5E+02	
Phenmedipham	13684-63-4					2.5E-01	I					1	0.1		1.5E+04	nc	1.5E+05	max					9.1E+03	nc		6.8E+00	
Phenol	108-95-2					3.0E-01	I	2.0E-01	C			1	0.1		1.8E+04	nc	1.8E+05	max	2.1E+02	nc	8.8E+02	nc	1.1E+04	nc		8.1E+00	
Phenylenediamine, m-	108-45-2					6.0E-03	I					1	0.1		3.7E+02	nc	3.7E+03	nc					2.2E+02	nc		7.6E-02	
Phenylenediamine, o-	95-54-5	4.7E-02	H									1	0.1		1.0E+01	ca**	3.7E+01	ca**					1.4E+00	ca**		5.0E-04	
Phenylenediamine, p-	106-50-3					1.9E-01	H					1	0.1		1.2E+04	nc	1.2E+05	max					6.9E+03	nc		2.4E+00	
Phenylphenol, 2-	90-43-7	1.9E-03	H									1	0.1		2.5E+02	ca**	8.9E+02	ca**					3.5E+01	ca**		7.2E-01	
Phorate	298-02-2					2.0E-04	H					1	0.1		1.2E+01	nc	1.2E+02	nc					7.3E+00	nc		7.9E-03	
Phosgene	75-44-5							3.0E-04	I	V		1		8.7E+04	4.0E-01	nc	1.7E+00	nc	3.1E-01	nc	1.3E+00	nc					
Phosmet	732-11-6					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		2.1E-01	

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels											Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Phosphine	7803-51-2					3.0E-04	I	3.0E-04	I			1			2.3E+01	nc	3.1E+02	nc	3.1E-01	nc	1.3E+00	nc	1.1E+01	nc			
Phosphoric Acid	7664-38-2							1.0E-02	I			1			1.4E+07	max	6.0E+07	max	1.0E+01	nc	4.4E+01	nc					
Phosphorus, White	7723-14-0					2.0E-05	I					1			1.6E+00	nc	2.0E+01	nc					7.3E-01	nc			
Phthalic Acid, P-	100-21-0					1.0E+00	H					1	0.1		6.1E+04	nc	6.2E+05	max					3.7E+04	nc		1.3E+01	
Phthalic Anhydride	85-44-9					2.0E+00	I	2.0E-02	C			1	0.1		1.2E+05	max	1.2E+06	max	2.1E+01	nc	8.8E+01	nc	7.3E+04	nc		1.6E+01	
Picloram	6607					7.0E-02	I					1	0.1		4.3E+03	nc	4.3E+04	nc					2.6E+03	nc	5.0E+02	6.0E-01	1.2E-01
Pirimiphos, Methyl	29232-93-7					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.7E-01	
Polybrominated Biphenyls	59536-65-1	3.0E+01	C	8.6E-03	C	7.0E-06	H					1	0.1		1.6E-02	ca*	5.7E-02	ca*	2.8E-04	ca**	1.4E-03	ca**	2.2E-03	ca			
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9							6.0E-04	I			1	0.1		8.5E+05	max	3.6E+06	max	6.3E-01	nc	2.6E+00	nc					
Potassium Perchlorate	7778-74-7					7.0E-04	I					1			5.5E+01	nc	7.2E+02	nc					2.6E+01	nc			
Prochloraz	67747-09-5	1.5E-01	I			9.0E-03	I					1	0.1		3.2E+00	ca	1.1E+01	ca					4.5E-01	ca		2.5E-03	
Profluralin	26399-36-0					6.0E-03	H					1	0.1		3.7E+02	nc	3.7E+03	nc					2.2E+02	nc		8.0E+00	
Prometon	1610-18-0					1.5E-02	I					1	0.1		9.2E+02	nc	9.2E+03	nc					5.5E+02	nc		2.8E-01	
Prometryn	7287-19-6					4.0E-03	I					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		2.3E-01	
Propachlor	1918-16-7					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		3.7E-01	
Propanil	709-98-8					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		1.1E-01	
Propargite	2312-35-8					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		2.0E+02	
Propargyl Alcohol	107-19-7					2.0E-03	I					1	0.1		1.2E+02	nc	1.2E+03	nc					7.3E+01	nc		1.5E-02	
Propazine	139-40-2					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		6.7E-01	
Propham	122-42-9					2.0E-02	I					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		3.3E-01	
Propiconazole	60207-90-1					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		5.4E+00	
Propylene Glycol	57-55-6					2.0E+01	P					1	0.1		1.2E+06	max	1.2E+07	max					7.3E+05	max		1.5E+02	
Propylene Glycol Dinitrate	6423-43-4						A	2.7E-04	A	V		1		1.4E+03	6.0E+01	nc	2.5E+02	nc	2.8E-01	nc	1.2E+00	nc	5.7E-01	nc		1.9E-04	
Propylene Glycol Monoethyl Ether	1569-02-4					7.0E-01	H					1	0.1		4.3E+04	nc	4.3E+05	max					2.6E+04	nc		5.2E+00	
Propylene Glycol Monomethyl Ether	107-98-2					7.0E-01	H	2.0E+00	I			1	0.1		4.3E+04	nc	4.3E+05	max	2.1E+03	nc	8.8E+03	nc	2.6E+04	nc		5.2E+00	
Propylene Oxide	75-56-9	2.4E-01	I	3.7E-06	I			3.0E-02	I	V		1		6.8E+04	1.9E+00	ca	8.7E+00	ca	6.6E-01	ca*	3.3E+00	ca*	2.3E-01	ca		4.7E-05	
Pursuit	81335-77-5					2.5E-01	I					1	0.1		1.5E+04	nc	1.5E+05	max					9.1E+03	nc		2.7E+01	
Pydrin	51630-58-1					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		8.1E+02	
Pyridine	110-86-1					1.0E-03	I			V		1		3.0E+05	7.8E+01	nc	1.0E+03	nc					3.7E+01	nc		9.7E-03	
Quinalphos	13593-03-8					5.0E-04	I					1	0.1		3.1E+01	nc	3.1E+02	nc					1.8E+01	nc		7.1E-02	
Quinoline	91-22-5	3.0E+00	I									1	0.1		1.6E-01	ca**	5.7E-01	ca**					2.2E-02	ca**		8.7E-05	
Refractory Ceramic Fibers	NA							3.0E-02	A			1			4.3E+07	max	1.8E+08	max	3.1E+01	nc	1.3E+02	nc					
Resmethrin	10453-86-8					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		9.3E+02	
Ronnel	299-84-3					5.0E-02	H					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		7.7E+00	
Rotenone	83-79-4					4.0E-03	I					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		1.0E+02	
Savey	78587-05-0					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		7.6E+00	
Selenious Acid	7783-00-8					5.0E-03	I					1			3.9E+02	nc	5.1E+03	nc					1.8E+02	nc			
Selenium	7782-49-2					5.0E-03	I					1			3.9E+02	nc	5.1E+03	nc					1.8E+02	nc	5.0E+01		
Selenourea	630-10-4					5.0E-03	H					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc			
Sethoxydim	74051-80-2					9.0E-02	I					1	0.1		5.5E+03	nc	5.5E+04	nc					3.3E+03	nc		1.9E+01	
Silver	7440-22-4					5.0E-03	I					0.04			3.9E+02	nc	5.1E+03	nc					1.8E+02	nc			
Simazine	122-34-9	1.2E-01	H			5.0E-03	I					1	0.1		4.0E+00	ca*	1.4E+01	ca					5.6E-01	ca	4.0E+00	2.8E-04	2.0E-03
Sodium Acifluorfen	62476-59-9					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		3.1E+00	
Sodium Azide	26628-22-8					4.0E-03	I					1			3.1E+02	nc	4.1E+03	nc					1.5E+02	nc			
Sodium Diethyldithiocarbamate	148-18-5	2.7E-01	H			3.0E-02	I					1	0.1		1.8E+00	ca	6.4E+00	ca					2.5E-01	ca			
Sodium Fluoroacetate	62-74-8					2.0E-05	I					1	0.1		1.2E+00	nc	1.2E+01	nc					7.3E-01	nc		1.5E-04	
Sodium Metavanadate	13718-26-8					1.0E-03	H					1			7.8E+01	nc	1.0E+03	nc					3.7E+01	nc			
Sodium Perchlorate	7601-89-0					7.0E-04	I					1			5.5E+01	nc	7.2E+02	nc					2.6E+01	nc			
Stirofos (Tetrachlorovinphos)	961-11-5	2.4E-02	H			3.0E-02	I					1	0.1		2.0E+01	ca*	7.2E+01	ca					2.8E+00	ca		2.2E-03	
Strontium, Stable	7440-24-6					6.0E-01	I					1			4.7E+04	nc	6.1E+05	max					2.2E+04	nc			
Strychnine	57-24-9					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		1.4E-01	
Styrene	100-42-5					2.0E-01	I	1.0E+00	I	V		1		1.0E+03	6.5E+03	sat	3.8E+04	sat	1.0E+03	nc	4.4E+03	nc	1.6E+03	nc	1.0E+02	2.0E+00	1.2E-01
Systhane	88671-89-0					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		2.1E+02	
TCMTB	21564-17-0					3.0E-02	H					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		8.3E+00	
Tebuthiuron	34014-18-1					7.0E-02	I					1	0.1		4.3E+03	nc	4.3E+04	nc					2.6E+03	nc		6.3E-01	
Temephos	3383-96-8					2.0E-02	H					1	0.1		1.2E+03	nc	1.2E+04	nc					7.3E+02	nc		2.3E+03	
Terbacil	5902-51-2					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		1.7E-01	
Terbufos	13071-79-9					2.5E-05	H					1	0.1		1.5E+00	nc	1.5E+01	nc					9.1E-01	nc		2.0E-03	
Terbutryn	886-50-0					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		5.4E-02	
Tetrachlorobenzene, 1,2,4,5-	95-94-3					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		2.8E-02	
Tetrachloroethane, 1,1,1,2-	630-20-6	2.6E-02	I	7.4E-06	I	3.0E-02	I			V		1		7.5E+02	2.0E+00	ca	9.8E+00	ca	3.3E-01	ca**	1.7E+00	ca**	5.2E-01	ca		2.1E-04	
Tetrachloroethane, 1,1,2,2-	79-34-5	2.0E-01	I	5.8E-05	I					V		1		2.1E+03	5.9E-01	ca**	2.9E+00	ca**	4.2E-02	ca**	2.1E-01	ca**	6.7E-02	ca**		2.8E-05	
Tetrachloroethylene	127-18-4	5.4E-01	C	5.9E-06	C	1.0E-02	I	2.7E-01	A	V		1		1.8E+02	5.7E-01	ca	2.7E+00	ca	4.1E-01	ca	2.1E+00	ca	1.1E-01	ca	5.0E+00	5.2E-05	2.4E-03
Tetrachlorophenol, 2,3,4,6-	58-90-2					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		4.6E+00	
Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	2.0E+01	H									1	0.1		2.4E-02	ca**	8.6E-02	ca**					3.4E-03	ca**		1.4E-05	
Tetraethyl Dithiopyrophosphate	3689-24-5					5.0E-04	I					1	0.1		3.1E+01	nc	3.1E+02	nc					1.8E+01	nc		1.4E-01	
Tetrafluoroethane, 1,1,1,2-	811-97-2							8.0E+01	I	V		1		8.2E+02	1.1E+05	sat	4.7E+05	sat	8.3E+04	nc	3.5E+05	max	1.7E+05	max		9.6E+01	
Tetryl (Trinitrophenylmethylnitramine)	479-45-8					4.0E-03	P					1	0.1		2.4E+02	nc	2.5E+03	nc					1.5E+02	nc		6.5E-01	
Thallium (I) Nitrate	10102-45-1					9.0E-05	I					1			7.0E+00	nc	9.2E+01	nc					3.3E+00	nc			
Thallium (Soluble Salts)	7440-28-0					6.5E-05	S					1			5.1E+00	nc	6.6E+01	nc					2.4E+00	nc	2.0E+00		
Thallium Acetate	563-68-8					9.0E-05	I					1			7.0E+00	nc	9.2E+01	nc					3.3E+00	nc			
Thallium Carbonate	6533-73-9					8.0E-05	I					1			6.3E+00	nc	8.2E+01	nc					2.9E+00	nc			

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater Soil Screening Levels	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	muta-gen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Thallium Chloride	7791-12-0					8.0E-05	I					1			6.3E+00	nc	8.2E+01	nc					2.9E+00	nc			
Thallium Sulfate	7446-18-6					8.0E-05	I					1			6.3E+00	nc	8.2E+01	nc					2.9E+00	nc			
Thiobencarb	28249-77-6					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		2.0E+00	
Thiofanox	39196-18-4					3.0E-04	H					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		4.3E-03	
Thiophanate, Methyl	23564-05-8					8.0E-02	I					1	0.1		4.9E+03	nc	4.9E+04	nc					2.9E+03	nc		6.7E-01	
Thiram	137-26-8					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		4.0E-02	
Tin	7440-31-5					6.0E-01	H					1			4.7E+04	nc	6.1E+05	max					2.2E+04	nc			
Toluene	108-88-3					8.0E-02	I	5.0E+00	I	V		1		9.3E+02	5.0E+03	sat	4.6E+04	sat	5.2E+03	nc	2.2E+04	nc	2.3E+03	nc	1.0E+03	1.7E+00	7.6E-01
Toluene diisocyanate mixture (TDI)	26471-62-5							7.0E-05	I	V		1		2.1E+03	5.4E+01	nc	2.3E+02	nc	7.3E-02	nc	3.1E-01	nc	1.5E-01	nc		2.7E-03	
Toluene-2,4-diamine	95-80-7	3.8E+00	C	1.1E-03	C							1	0.1		1.3E-01	ca**	4.5E-01	ca**	2.2E-03	ca**	1.1E-02	ca**	1.8E-02	ca**		7.8E-06	
Toluene-2,5-diamine	95-70-5					6.0E-01	H					1	0.1		3.7E+04	nc	3.7E+05	max					2.2E+04	nc		9.6E+00	
Toluene-2,6-diamine	823-40-5					3.0E-02	P					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		4.9E-01	
Toluidine, o- (Methylaniline, 2-)	95-53-4	1.8E-01	C	5.1E-05	C							1	0.1		2.7E+00	ca**	9.6E+00	ca**	4.8E-02	ca**	2.4E-01	ca**	3.7E-01	ca**		1.3E-04	
Toluidine, p-	106-49-0	1.9E-01	H									1	0.1		2.6E+00	ca**	9.1E+00	ca**					3.5E-01	ca**		1.2E-04	
Toxaphene	8001-35-2	1.1E+00	I	3.2E-04	I							1	0.1		4.4E-01	ca**	1.6E+00	ca**	7.6E-03	ca**	3.8E-02	ca**	6.1E-02	ca**	3.0E+00	1.2E-02	6.0E-01
Tralomethrin	66841-25-6					7.5E-03	I					1	0.1		4.6E+02	nc	4.6E+03	nc					2.7E+02	nc		1.4E+02	
Triallate	2303-17-5					1.3E-02	I					1	0.1		7.9E+02	nc	8.0E+03	nc					4.7E+02	nc		1.7E+00	
Triasulfuron	82097-50-5					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		3.3E-01	
Tribromobenzene, 1,2,4-	615-54-3					5.0E-03	I					1	0.1		3.1E+02	nc	3.1E+03	nc					1.8E+02	nc		3.0E-01	
Tributyltin Compounds	NA					3.0E-04	P					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc			
Tributyltin Oxide	56-35-9					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		8.2E+02	
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1					3.0E+01	I	3.0E+01	H	V		1		9.4E+02	4.3E+04	sat	1.8E+05	sat	3.1E+04	nc	1.3E+05	max	5.9E+04	nc		1.5E+02	
Trichloroaniline HCl, 2,4,6-	33663-50-2	2.9E-02	H									1	0.1		1.7E+01	ca**	5.9E+01	ca**					2.3E+00	ca**		2.2E-03	
Trichloroaniline, 2,4,6-	634-93-5	3.4E-02	H									1	0.1		1.4E+01	ca**	5.1E+01	ca**					2.0E+00	ca**		1.2E-03	
Trichlorobenzene, 1,2,4-	120-82-1	3.6E-03	C			1.0E-02	I			V		1		2.2E+02	1.8E+02	ca**	7.9E+02	sat					1.9E+01	ca*	7.0E+01	3.1E-02	1.1E-01
Trichloroethane, 1,1,1-	71-55-6					2.0E+00	I	5.0E+00	I	V		1		6.8E+02	9.0E+03	sat	3.9E+04	sat	5.2E+03	nc	2.2E+04	nc	9.1E+03	nc	2.0E+02	3.3E+00	7.2E-02
Trichloroethane, 1,1,2-	79-00-5	5.7E-02	I	1.6E-05	I	4.0E-03	I			V		1		5.6E+02	1.1E+00	ca	5.5E+00	ca	1.5E-01	ca**	7.7E-01	ca**	2.4E-01	ca	5.0E+00	8.2E-05	1.7E-03
Trichloroethylene	79-01-6	1.3E-02	C	2.0E-06	C			6.0E-01	C	V		1		7.5E+02	2.8E+00	ca	1.4E+01	ca	1.2E+00	ca	6.1E+00	ca	1.7E+00	ca	5.0E+00	6.1E-04	1.9E-03
Trichlorofluoromethane	75-69-4					3.0E-01	I	7.0E-01	H	V		1		1.3E+03	8.0E+02	nc	3.4E+03	sat	7.3E+02	nc	3.1E+03	nc	1.3E+03	nc		8.4E-01	
Trichlorophenol, 2,4,5-	95-95-4					1.0E-01	I					1	0.1		6.1E+03	nc	6.2E+04	nc					3.7E+03	nc		9.4E+00	
Trichlorophenol, 2,4,6-	88-06-2	1.1E-02	I	3.1E-06	I	1.0E-03	P					1	0.1		4.4E+01	ca**	1.6E+02	ca**	7.8E-01	ca**	4.0E+00	ca**	6.1E+00	ca**		1.6E-02	
Trichlorophenoxy) Propionic Acid, 2(2,4,5-	93-72-1					8.0E-03	I					1	0.1		4.9E+02	nc	4.9E+03	nc					2.9E+02	nc	5.0E+01	1.1E-01	1.8E-02
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5					1.0E-02	I					1	0.1		6.1E+02	nc	6.2E+03	nc					3.7E+02	nc		1.1E-01	
Trichloropropane, 1,1,2-	598-77-6					5.0E-03	I			V		1		1.4E+03	3.9E+02	nc	5.1E+03	sat					1.8E+02	nc		7.6E-02	
Trichloropropane, 1,2,3-	96-18-4	7.0E+00	H			6.0E-03	I			V		1		1.6E+03	9.1E-02	ca	4.1E-01	ca					9.6E-03	ca		4.4E-06	
Tridiphane	58138-08-2					3.0E-03	I					1	0.1		1.8E+02	nc	1.8E+03	nc					1.1E+02	nc		4.1E-01	
Triethylamine	121-44-8							7.0E-03	I	V		1		5.5E+04	1.7E+02	nc	7.1E+02	nc	7.3E+00	nc	3.1E+01	nc	1.5E+01	nc		6.1E-03	
Trifluralin	1582-09-8	7.7E-03	I			7.5E-03	I					1	0.1		6.3E+01	ca**	2.2E+02	ca*					8.7E+00	ca*		1.7E-01	
Trimethyl Phosphate	512-56-1	3.7E-02	H									1	0.1		1.3E+01	ca**	4.7E+01	ca**					1.8E+00	ca**		3.9E-04	
Trimethylbenzene, 1,2,4-	95-63-6							7.0E-03	P	V		1		2.5E+02	6.7E+01	nc	2.8E+02	sat	7.3E+00	nc	3.1E+01	nc	1.5E+01	nc		2.4E-02	
Trinitrobenzene, 1,3,5-	99-35-4					3.0E-02	I					1	0.1		1.8E+03	nc	1.8E+04	nc					1.1E+03	nc		2.6E+00	
Trinitrotoluene, 2,4,6-	118-96-7	3.0E-02	I			5.0E-04	I					1	0.1		1.6E+01	ca**	5.7E+01	ca**					2.2E+00	ca**		8.7E-03	
Tri-n-butyltin	688-73-3					3.0E-04	A					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		2.8E-01	
Uranium (Soluble Salts)	NA					3.0E-03	I					1			2.3E+02	nc	3.1E+03	nc					1.1E+02	nc			
Vanadium Pentoxide	1314-62-1					9.0E-03	I					0.026			7.0E+02	nc	9.2E+03	nc					3.3E+02	nc			
Vanadium Sulfate	36907-42-3					2.0E-02	H					0.026			1.6E+03	nc	2.0E+04	nc					7.3E+02	nc			
Vanadium and Compounds	NA					5.0E-03	S					1			3.9E+02	nc	5.2E+03	nc					1.8E+02	nc			
Vanadium, Metallic	7440-62-2					7.0E-03	H					0.026			5.5E+02	nc	7.2E+03	nc					2.6E+02	nc			
Vanadyl Sulfate	27774-13-6					2.0E-02	H					1			1.6E+03	nc	2.0E+04	nc					7.3E+02	nc			
Vernolate	1929-77-7					1.0E-03	I					1	0.1		6.1E+01	nc	6.2E+02	nc					3.7E+01	nc		4.2E-02	
Vinclozolin	50471-44-8					2.5E-02	I					1	0.1		1.5E+03	nc	1.5E+04	nc					9.1E+02	nc		7.1E-01	
Vinyl Acetate	108-05-4					1.0E+00	H	2.0E-01	I	V		1		2.8E+03	9.9E+02	nc	4.2E+03	sat	2.1E+02	nc	8.8E+02	nc	4.1E+02	nc		8.8E-02	
Vinyl Bromide	593-60-2							3.0E-03	I	V		1		1.7E+03	4.7E+00	nc	2.0E+01	nc	3.1E+00	nc	1.3E+01	nc	6.3E+00	nc		1.8E-03	
Vinyl Chloride	75-01-4	7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1		4.0E+03	6.0E-02	ca	1.7E+00	ca	1.6E-01	ca	2.8E+00	ca	1.6E-02	ca	2.0E+00	5.6E-06	7.0E-04
Warfarin	81-81-2					3.0E-04	I					1	0.1		1.8E+01	nc	1.8E+02	nc					1.1E+01	nc		8.2E-03	
Xylene, Mixture	1330-20-7					2.0E-01	I	1.0E-01	I	V		1		3.0E+02	6.0E+02	sat	2.6E+03	sat	1.0E+02	nc	4.4E+02	nc	2.0E+02	nc	1.0E+04	2.3E-01	1.1E+01
Xylene, P-	106-42-3							7.0E-01	C	V		1		4.5E+02	4.7E+03	sat	2.0E+04	sat	7.3E+02	nc	3.1E+03	nc	1.5E+03	nc		1.6E+00	
Xylene, m-	108-38-3					2.0E+00	H	7.0E-01	C	V		1		4.4E+02	4.5E+03	sat	1.9E+04	sat	7.3E+02	nc	3.1E+03	nc	1.4E+03	nc		1.6E+00	
Xylene, o-	95-47-6					2.0E+00	H	7.0E-01	C	V		1		3.0E+02	5.3E+03	sat	2.3E+04	sat	7.3E+02	nc	3.1E+03	nc	1.4E+03	nc		1.6E+00	
Zinc (Metallic)	7440-66-6					3.0E-01	I					1			2.3E+04	nc	3.1E+05	max					1.1E+04	nc			
Zinc Phosphide	1314-84-7					3.0E-04	I					1			2.3E+01	nc	3.1E+02	nc					1.1E+01	nc			
Zineb	12122-67-7					5.0E-02	I					1	0.1		3.1E+03	nc	3.1E+04	nc					1.8E+03	nc		4.0E-01	

CHEMICAL NAME	CAS No.	CLASS 1 GW	CLASS 2 GW	MIXTURES	NOTE
ACENAPHTHYLENE	208-96-8	0.21	1.05	X	
ACETALDEHYDE	75-07-0	not available	not available		
ACETOCHLOR	34256-82-1	0.14	0.7	X	
ACROLEIN	107-02-8	0.0035	0.0035		
ACRYLIC ACID	79-10-7	3.5	3.5	X	
ACRYLONITRILE	107-13-1	0.001	0.001	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
ALLYL ALCOHOL	107-18-6	0.035	0.035	X	
ALUMINUM	7429-90-5	3.5	5	X	
ANILINE	62-53-3	0.023	0.023	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
BENTAZON	25057-89-0	0.21	0.21	X	
BENZALDEHYDE	100-52-7	0.7	0.7	X	
BENZIDINE	92-87-5	0.00000037	0.00000037	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
BENZO(g,h,i,)PERYLENE	191-24-2	0.21	1.05	X	
BENZYL ALCOHOL	100-51-6	3.5	3.5		
BIDRIN	141-66-2	0.0007	0.0007	X	
BIPHENYL, 1,1-	92-52-4	0.35	1.75	X	
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	0.28	0.28	X	
BROMOBENZENE	108-86-1	0.14	0.7	X	
BROMOXYNIL	1689-84-5	0.14	0.14		
BUTADIENE,1,3-	106-99-0	not available	not available		
BUTYLATE	2008-41-5	0.35	1.75	X	
CAPROLACTAM	105-60-2	3.5	3.5	X	
CAPTAN	133-06-2	0.91	0.91		
CARBARYL	63-25-2	0.7	0.7	X	
CARBOXIN	5234-68-4	0.7	0.7		
CHLORAMBEN	133-90-4	0.105	0.105	X	
CHLORFENVINPHOS	470-90-6	0.0049	0.0245	X	
CHLOROBUTANE, 1-	109-69-3	0.28	1.4		
CHLOROETHANE	75-00-3	not available	not available		
CHLOROMETHANE	74-87-3	not available	not available		
CHLORONAPHTHALENE, 2-	91-58-7	0.56	2.8	X	
CHLOROTOLUENE, o-	95-49-8	0.14	0.7		
CHLORPYRIFOS	2921-88-2	0.021	0.105	X	
CHLORPYRIFOS METHYL	5598-13-0	0.07	0.35	X	
CUMENE	98-82-8	0.7	3.5	X	
CYANAZINE	21725-46-2	0.014	0.014	X	
CYCLOHEXANE	110-82-7	not available	not available		
CYCLOHEXANONE	108-94-1	35	35		
CYHALOTHRIN (LAMBDA)	91465-08-6	0.007	0.035	X	
DIAZINON	333-41-5	0.0063	0.0315	X	
DIBENZOFURAN	132-64-9	not available	not available		
DICAMBA	1918-00-9	0.21	0.21	X	
DICHLORODIFLUOROMETHANE	75-71-8	1.4	7		
DICHLOROPROPANE, 1,3-	142-28-9	0.14	0.14	X	
DICHLORVOS	62-73-7	0.008	0.008	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
DICYCLOPENTADIENE	77-73-6	0.056	0.28	X	
DIETHYLENE GLYCOL MONOETHYL ETHER	111-90-0	0.42	0.42	X	
DIISOPROPYL ETHER	108-20-3	not available	not available		
DINITROBENZENE,1,3-	99-65-0	0.0007	0.0007	X	
DINITRO-o-CRESOL, 4,6-	534-52-1	0.0007	0.0007	X	
DIOXANE, 1,4-	123-91-1	0.0077	0.0077	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)

CHEMICAL NAME	CAS No.	CLASS 1 GW	CLASS 2 GW	MIXTURES	NOTE
DIPHENYLAMINE	122-39-4	0.175	0.875	X	
DISULFOTON	298-04-4	0.00028	0.0014	X	
EPTC	759-94-4	0.175	0.875	X	
ETHION	563-12-2	0.0035	0.0175	X	
ETHOXYETHYL ACETATE	111-15-9	2.1	2.1	X	
ETHYL ACETATE	141-78-6	6.3	6.3		
ETHYL ACRYLATE	140-88-5	0.00177	0.00177		
ETHYLENE GLYCOL	107-21-1	14	14	X	
ETHYLENE GLYCOL MONBUTYL ETHER	111-76-2	3.5	3.5	X	
ETHYLENE THIOUREA	96-45-7	0.00077	0.00077	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
ETHYL ETHER	60-29-7	1.4	1.4		
FONOFOS	944-22-9	0.014	0.07	X	
FORMALDEHYDE	50-00-0	1.4	1.4	X	
FURFURAL	98-01-1	0.021	0.021	X	
GLYPHOSATE (pH 4.5-7.24)	1071-83-6	0.7	3.5	X	
GLYPHOSATE (pH 7.25-9.0)	1071-83-6	0.7	0.7	X	
HEXACHLOROBUTADIENE	87-68-3	0.007	0.035	X	
HEXANE	110-54-3	not available	not available		
HMX	2691-41-0	1.4	1.4	X	
HYDRAZINE	302-01-2	0.000028	0.000028	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
IMAZAQUIN	81335-37-7	1.75	1.75	X	
IODINE	7553-56-2	0.35	not available	X	
IRON	7439-89-6	5	5		
ISOBUTANOL	78-83-1	2.1	2.1	X	
MALATHION	121-75-5	0.14	0.14	X	
MCPA	94-74-6	0.0035	0.0035	X	
MCPP	93-65-2	0.007	0.007	X	
METHANOL	67-56-1	3.5	3.5	X	
METHYL ACETATE	79-20-9	7	7	X	
METHYL ACRYLATE	96-33-3	0.21	0.21		
METHYLCYCLOHEXANE	108-87-2	not available	not available		
METHYLENEBIS(2-CHLOROANILINE), 4,4'	101-14-4	0.00085	0.0043	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
METHYLENE BROMIDE	74-95-3	0.07	0.07	X	
METHYLENEDIANILINE, 4,4'	101-77-9	0.000053	0.000053	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
METHYLETHYLKETONE	78-93-3	4.2	4.2	X	
METHYLISOBUTYLKETONE	108-10-1	not available	not available		
METHYLNAPHTHALENE, 1-	90-12-0	0.49	2.45	X	
METHYLNAPHTHALENE, 2-	91-57-6	0.028	0.14	X	
METHYLPHENOL, 3-	108-39-4	0.35	0.35	X	
METHYLPHENOL, 4-	106-44-5	0.035	0.035	X	
METOLACHLOR	51218-45-2	1.05	5.25	X	
METRIBUZIN	21087-64-9	0.175	0.175	X	
NITROANILINE, 2-	88-74-4	0.021	0.021	X	
NITROANILINE, 3-	99-09-2	0.0021	0.0021	X	
NITROANILINE, 4-	100-01-6	0.021	0.021	X	
NITROGLYCERINE	55-63-0	0.0008	0.0008	X	
NITROSODIMETHYLAMINE, N-	62-75-9	0.0006	0.0006	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
NITROTOLUENE, 2-	88-72-2	0.00037	0.00037	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
NITROTOLUENE, 3-	99-08-1	0.0079	0.0079	X	
NITROTOLUENE, 4-	99-99-0	0.0085	0.0085	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
PARAQUAT DICHLORIDE	1910-42-5	0.0315	0.0315	X	

CHEMICAL NAME	CAS No.	CLASS 1 GW	CLASS 2 GW	MIXTURES	NOTE
PARATHION-ETHYL	56-38-2	0.168	0.84	X	
PARATHION-METHYL (pH 4.5-7.24)	298-00-0	0.0018	0.0088	X	
PARATHION-METHYL (pH 7.25-9.0)	298-00-0	0.0018	0.0018	X	
PENDIMETHALIN	40487-42-1	0.28	1.4	X	
PENTACHLORONITROBENZENE	82-68-8	0.021	0.105	X	
PHENANTHRENE	85-01-8	0.21	1.05	X	
PHORATE	298-02-2	0.0014	0.007	X	
PROMETON (g)	1610-18-0	0.105	0.105		
PROPYLENE GLYCOL	57-55-6	140	140	X	
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	4.9	4.9	X	
PYRIDINE	110-86-1	0.007	0.007	X	
RDX	121-82-4	0.084	0.084	X	
STRONTIUM	7440-24-6	4.2	not available	X	
TEBUTHIURON	34014-18-1	0.49	0.49		
TERBUFOS	13071-79-9	0.00018	0.0009	X	
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	0.21	1.05	X	
TETRACHLOROETHANE, 1,1,2,2-	79-34-5	0.42	0.42	X	
TETRACHLOROVINPHOS	961-11-5	0.21	1.05	X	
THIRAM	137-26-8	0.035	0.035	X	
TIN	7440-31-5	4.2	not available	X	
TRICHLOROFLUOROMETHANE	75-69-4	2.1	10.5		
TRICHLOROPHENOXYACETIC ACID, 2,4,5-	93-76-5	0.28	1.4	X	
TRICHLOROPROPANE, 1,2,3-	96-18-4	0.001	0.001	X	Mixtures for carcinogens must be evaluated in accordance with 35 IAC 742 Section 742.805(d)
TRICHLORO-1,2,2-TRIFLUOROETHANE, 1,1,2-	76-13-1	210	1050		
TRIFLURALIN	1582-09-8	0.052	0.26	X	
TRIMETHYLBENZENE, 1,2,4-	95-63-6	not available	not available		
TRIMETHYLBENZENE, 1,3,5-	108-67-8	0.35	1.75	X	
TRINITROBENZENE, 1,3,5-	99-35-4	0.84	0.84	X	
TRINITROPHENYLMETHYLNITRAMINE, 2,4,6- (TETRYL)	479-45-8	0.11	0.11	X	
TRINITROTOLUENE 2,4,6-	118-96-7	0.014	0.014	X	

NOTE: ALL CONCENTRATIONS IN MG/L

REVISION DATE: 8/05/08

CHEMICAL NAME	CAS No.	RESIDENTIAL INGESTION	RESIDENTIAL INHALATION	I/C INGESTION	I/C INHALATION	CONST. WORKER INGESTION	CONST. WORKER INHALATION	MIGRATION TO CLASS 1 GW	MIGRATION TO CLASS 2 GW	MIXTURES
ACENAPHTHYLENE	208-96-8	2300(a)	(c)	61000(a)	(c)	61000(a)	(c)	85(a)	420	X
ACETALDEHYDE	75-07-0	(c)	9.6(b)	(c)	18(b)	(c)	8.4(a)	(c)	(c)	X
ACETOCHLOR (g)	34256-82-1	1600(a)	1300(d)	41000(a)	1300(d)	4100(a)	1300(d)	5.9(a)	30	X
ACROLEIN	107-02-8	39(a)	0.16(a)	1000(a)	0.26(a)	1600(a)	0.017(a)	0.014(a)	0.014	X
ACRYLIC ACID	79-10-7	39000(a)	140(a)	1000000(a)	220(a)	100000(a)	4.2(a)	14(a)	14	X
ACRYLONITRILE	107-13-1	1.2(b)	0.28(b)	11(b)	0.54(b)	230(b)	0.17(a)	0.0006(b)	0.0006	X
ALLYL ALCOHOL	107-18-6	390(a)	35000(d)	10000(a)	35000(d)	10000(a)	1800(e)	0.14(a)	0.14	X
ALUMINUM	7429-90-5	78000(a)	1000000(a)	1000000(a)	1000000(a)	410000(a)	870000(a)	3.5 mg/l (TCLP or SPLP)	5.0 mg/l (TCLP or SPLP)	X
ANILINE	62-53-3	110(b)	81(a)	1000(b)	130(a)	1400(a)	8.4(a)	0.063(b)	0.063	X
BENTAZON (g)	25057-89-0	2300(a)	(c)	61000(a)	(c)	6100(a)	(c)	2.5(a)	2.5	X
BENZALDEHYDE	100-52-7	7800(a)	620(d)	200000(a)	620(d)	200000(a)	620(d)	3.3(a)	3.3	X
BENZIDINE	92-87-5	0.003(b)	0.009(b)	0.02(b)	0.02(b)	0.54(b)	0.02(b)	0.0000022(b)	0.0000022	X
BENZO(g,h,i,)PERYLENE	191-24-2	2300(a)	(c)	61000(a)	(c)	61000(a)	(c)	27000(a)	130000	X
BENZYL ALCOHOL	100-51-6	39000(a)	6100(d)	1000000(a)	6100(d)	200000(a)	6100(d)	15(a)	15	
BIDRIN (g)	141-66-2	7.8(a)	110000(d)	200(a)	83000(e)	200(a)	540(e)	0.0028(a)	0.0028	X
BIPHENYL, 1,1-	92-52-4	3900(a)	(c)	100000(a)	(c)	10000(a)	(c)	150(a)	740	X
BIS(2-CHLOROISOPROPYL)ETHER	108-60-1	3100(a)	1300(d)	82000(a)	1300(d)	8200(a)	1300(d)	2.4(a)	2.4	X
BROMOBENZENE	108-86-1	1600(a)	100(a)	41000(a)	160(a)	41000(a)	11(a)	2.2(a)	11	X
BROMOXYNIL (g)	1689-84-5	1600(a)	(c)	41000(a)	(c)	4100(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	
BUTADIENE,1,3-	106-99-0	(c)	0.05(b)	(c)	0.09(b)	(c)	0.01(a)	(c)	(c)	X
BUTYLATE (g)	2008-41-5	3900(a)	3200(d)	100000(a)	3200(d)	10000(a)	3200(d)	170(a)	850	X
CAPROLACTAM	105-60-2	39000(a)	(c)	1000000(a)	(c)	100000(a)	(c)	14(a)	14	X
CAPTAN (g)	133-06-2	10000(a)	(c)	270000(a)	(c)	27000(a)	(c)	11(a)	11	
CARBARYL (g)	63-25-2	7800(a)	(c)	200000(a)	(c)	20000(a)	(c)	8.7(a)	8.7	X
CARBOXIN (g)	5234-68-4	7800(a)	(c)	200000(a)	(c)	20000(a)	(c)	6.3(a)	6.3	
CHLORAMBEN (g)	133-90-4	1200(a)	(c)	31000(a)	(c)	3100(a)	(c)	0.47(a)	0.47	X
CHLORFENVINPHOS	470-90-6	55(a)	4200(d)	1400(a)	4200(d)	410(a)	4200(d)	1.1(a)	5.6	X
CHLOROBUTANE, 1-	109-69-3	3100(a)	1200(d)	82000(a)	1200(d)	14000(a)	1200(d)	3.1(a)	16	
CHLOROETHANE	75-00-3	(c)	1500(d)	(c)	1500(d)	(c)	95(a)	(c)	(c)	X
CHLOROMETHANE	74-87-3	(c)	110(a)	(c)	170(a)	(c)	1.1(a)	(c)	(c)	X
CHLORONAPHTHALENE, 2-	91-58-7	6300(a)	(c)	160000(a)	(c)	160000(a)	(c)	49(a)	240	X
CHLOROTOLUENE, o-	95-49-8	1600(a)	1400(d)	41000(a)	1400(d)	41000(a)	1400(d)	4(a)	20	
CHLORPYRIFOS (g)	2921-88-2	230(a)	(c)	6100(a)	(c)	610(a)	(c)	88(a)	440	X
CHLORPYRIFOS METHYL (g)	5598-13-0	780(a)	(c)	20000(a)	(c)	2000(a)	(c)	49(a)	240	X
CUMENE	98-82-8	7800(a)	500(a)	200000(a)	790(a)	82000(a)	51(a)	91(a)	460	X
CYANAZINE (g)	21725-46-2	160(a)	(c)	4100(a)	(c)	410(a)	(c)	0.14(a)	0.14	X
CYCLOHEXANE	110-82-7	(c)	280(d)	(c)	280(d)	(c)	110(a)	(c)	(c)	X
CYCLOHEXANONE	108-94-1	390000(a)	660(d)	1000000(a)	660(d)	1000000(a)	660(d)	150(a)	150	
CYHALOTHRIN (LAMBDA) (g)	91465-08-6	78(a)	(c)	2000(a)	(c)	2000(a)	(c)	2100(a)	11000	X
DIAZINON (g)	333-41-5	55(a)	(c)	1400(a)	(c)	180(a)	400(a)	1.1(a)	5.6	X
DIBENZOFURAN	132-64-9	(c)	(c)	(c)	(c)	820(a)	(c)	(c)	(c)	X
DICAMBA (g)	1918-00-9	2300(a)	(c)	61000(a)	(c)	6100(a)	(c)	0.86(a)	0.86	X
DICHLORODIFLUOROMETHANE	75-71-8	16000(a)	190(a)	410000(a)	310(a)	180000(a)	20(a)	43(a)	220	X
DICHLOROPROPANE, 1,3-	142-28-9	1600(a)	1000(d)	41000(a)	1000(d)	41000(a)	1000(d)	0.83(a)	0.83	X
DICHLORVOS	62-73-7	2.2(b)	3.1(a)	20(b)	5(a)	430(b)	0.032(a)	0.0014(b)	0.0014	X
DICYCLOPENTADIENE	77-73-6	630(a)	18(a)	16000(a)	28(a)	16000(a)	0.52(a)	1.3(a)	6.6	X
DIETHYLENE GLYCOL MONOETHYL ETHER	111-90-0	4700(a)	560(a)	120000(a)	890(a)	120000(a)	58(a)	1.7(a)	1.7	X
DIISOPROPYL ETHER	108-20-3	(c)	470(d)	(c)	470(d)	(c)	120(a)	(c)	(c)	
DINITROBENZENE,1,3-	99-65-0	7.8(a)	(c)	200(a)	(c)	200(a)	(c)	0.0037(a)	0.0037	X
DINITRO-o-CRESOL, 4,6-	534-52-1	7.8(a)	(c)	200(a)	(c)	820(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
DIOXANE, 1,4-	123-91-1	58(b)	8.1(b)	520(b)	15(b)	11000(b)	22(b)	0.031(b)	0.031	X
DIPHENYLAMINE	122-39-4	2000(a)	(c)	51000(a)	(c)	5100(a)	(c)	20(a)	100	X
DISULFOTON (g)	298-04-4	3.1(a)	760(d)	82(a)	760(d)	8.2(a)	3.8(a)	0.09(a)	0.45	X
EPTC (g)	759-94-4	2000(a)	960(d)	51000(a)	960(d)	5100(a)	960(d)	3.6(a)	18	X
ETHION (g)	563-12-2	39(a)	340(d)	1000(a)	340(d)	410(a)	340(d)	13(a)	67	X
ETHOXYETHYL ACETATE	111-15-9	23000(a)	30000(d)	610000(a)	30000(d)	61000(a)	30000(d)	8.7(a)	8.7	X
ETHYL ACETATE	141-78-6	70000(a)	10000(d)	1000000(a)	10000(d)	1000000(a)	10000(d)	26(a)	26	
ETHYL ACRYLATE	140-88-5	13(b)	2700(d)	120(b)	2700(d)	2600(b)	2700(d)	0.0081(b)	0.0081	

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ETHYLENE GLYCOL	107-21-1	160000(a)	100000(d)	1000000(a)	100000(d)	410000(a)	100000(d)	56(a)	56	X
ETHYLENE GLYCOL MONBUTYL ETHER	111-76-2	39000(a)	130000(d)	1000000(a)	130000(d)	100000(a)	22000(a)	15(a)	15	X
ETHYLENE THIOUREA	96-45-7	5.8(b)	29(b)	520(b)	56(b)	16(a)	78(b)	0.0031(b)	0.0031	X
ETHYL ETHER	60-29-7	16000(a)	8800(d)	410000(a)	8800(d)	410000(a)	8800(d)	6.1(a)	6.1	
FONOFOS (g)	944-22-9	160(a)	700(d)	4100(a)	700(d)	410(a)	700(d)	4.2(a)	21	X
FORMALDEHYDE	50-00-0	16000(a)	16(b)	410000(a)	30(b)	41000(a)	33(a)	5.7(a)	5.7	X
FURFURAL	98-01-1	230(a)	2600(a)	6100(a)	4200(a)	6100(a)	270(a)	0.086(a)	0.086	X
GLYPHOSATE (g)	1071-83-6	7800(a)	(c)	200000(a)	(c)	20000(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
HEXACHLOROBUTADIENE	87-68-3	78(a)	150(d)	2000(a)	150(d)	200(a)	70(e)	2.2(a)	11	X
HEXANE	110-54-3	(c)	290(d)	(c)	290(d)	(c)	16(a)	(c)	(c)	X
HMX	2691-41-0	3900(a)	(c)	50000(f)	(c)	50000(f)	(c)	5.7(a)	5.7	X
HYDRAZINE	302-01-2	0.21(b)	0.033(b)	1.9(b)	0.063(b)	41(b)	0.088(b)	0.0001(b)	0.0001	X
IMAZAQUIN (g)	81335-37-7	20000(a)	(c)	510000(a)	(c)	51000(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
IODINE	7553-56-2	780(a)	(c)	20000(a)	(c)	2000(a)	(c)	0.35 mg/l (TCLP or SPLP)	not available	X
IRON	7439-89-6	55000(a)	(c)	1000000(a)	(c)	140000(a)	(c)	5 mg/l (TCLP or SPLP)	5 mg/l (TCLP or SPLP)	X
ISOBUTANOL	78-83-1	23000(a)	11000(d)	610000(a)	11000(d)	610000(a)	11000(d)	8.8(a)	8.8	X
MALATHION (g)	121-75-5	1600(a)	190(d)	41000(a)	190(d)	4100(a)	170(a)	1.7(a)	1.7	X
MCPA (g)	94-74-6	39(a)	(c)	1000(a)	(c)	100(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
MCPP (g)	93-65-2	78(a)	(c)	2000(a)	(c)	2000(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
METHANOL	67-56-1	39000(a)	100000(d)	1000000(a)	100000(d)	1000000(a)	1400(a)	14(a)	14	X
METHYL ACETATE	79-20-9	78000(a)	27000(d)	1000000(a)	27000(d)	1000000(a)	27000(d)	29(a)	29	X
METHYL ACRYLATE	96-33-3	2300(a)	6500(d)	61000(a)	6500(d)	6100(a)	6500(d)	0.89(a)	0.89	
METHYLCYCLOHEXANE	108-87-2	(c)	120(d)	(c)	120(d)	(c)	45(a)	(c)	(c)	X
METHYLENEBIS(2-CHLOROANILINE), 4,4'	101-14-4	6.4(b)	(c)	57(b)	(c)	410(a)	(c)	0.26(b)	1.3	X
METHYLENE BROMIDE	74-95-3	780(a)	2700(d)	20000(a)	2700(d)	20000(a)	2700(d)	0.34(a)	0.34	X
METHYLENEDIANILINE, 4,4'	101-77-9	0.4(b)	1.5(b)	3.6(b)	2.9(b)	78(b)	4.1(b)	0.0003(b)	0.0003	X
METHYLETHYLKETONE	78-93-3	47000(a)	25000(d)	1000000(a)	25000(d)	120000(a)	710(a)	17(a)	17	X
METHYLISOBUTYLKETONE	108-10-1	(c)	3100(d)	(c)	3100(d)	(c)	340(a)	(c)	(c)	X
METHYLNAPHTHALENE, 1-	90-12-0	5500(a)	980(d)	140000(a)	980(d)	14000(a)	980(d)	130(a)	630	X
METHYLNAPHTHALENE, 2-	91-57-6	310(a)	(c)	8200(a)	(c)	820(a)	(c)	1.9(a)	9.5	X
METHYLPHENOL, 3-	108-39-4	3900(a)	8100(d)	100000(a)	8100(d)	100000(a)	8100(d)	2(a)	2	X
METHYLPHENOL, 4-	106-44-5	390(a)	(c)	10000(a)	(c)	1000(a)	(c)	0.2(a)	0.2	X
METOLACHLOR(g)	51218-45-2	12000(a)	3900(d)	310000(a)	3900(d)	31000(a)	3900(d)	55(a)	270	X
METRIBUZIN(g)	21087-64-9	2000(a)	(c)	52000(a)	(c)	5100(b)	(c)	1(b)	1	X
NITROANILINE, 2-	88-74-4	230(a)	35(a)	6100(a)	56(a)	610(a)	3.6(a)	0.14(a)	0.14	X
NITROANILINE, 3-	99-09-2	23(a)	250(a)	610(a)	400(a)	61(a)	26(a)	0.01(a)	0.01	X
NITROANILINE, 4-	100-01-6	230(a)	1000(a)	6100(a)	1600(a)	610(a)	110(a)	0.1(a)	0.1	X
NITROGLYCERINE	55-63-0	7.8(a)	460(d)	200(a)	460(d)	20(a)	460(d)	0.0044(a)	0.0044	X
NITROSODIMETHYLAMINE, N-	62-75-9	0.013(b)	0.012(b)	0.11(b)	0.023(b)	1.6(a)	0.032(b)	0.0000067(b)	0.0000067	X
NITROTOLUENE, 2-	88-72-2	2.8(b)	380(d)	25(b)	380(d)	540(b)	380(d)	0.0027(b)	0.0027	X
NITROTOLUENE, 3-	99-08-1	1600(a)	310(d)	41000(a)	310(d)	10000(a)	310(a)	0.065(a)	0.065	X
NITROTOLUENE, 4-	99-99-0	40(b)	(c)	360(b)	(c)	820(a)	(c)	0.067(b)	0.067	X
PARAQUAT DICHLORIDE (g)	1910-42-5	350(a)	(c)	9200(a)	(c)	920(a)	(c)	0.13(a)	0.13	X
PARATHION-ETHYL (g)	56-38-2	470(a)	230(d)	12000(a)	230(d)	1200(a)	230(d)	40(a)	200	X
PARATHION-METHYL (g)	298-00-0	20(a)	(c)	510(a)	(c)	140(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	X
PENDIMETHALIN (g)	40487-42-1	3100(a)	(c)	82000(a)	(c)	8200(a)	(c)	1400(a)	7000	X
PENTACHLORONITROBENZENE	82-68-8	230(a)	(c)	6100(a)	(c)	610(a)	(c)	31(a)	150	X
PHENANTHRENE	85-01-8	2300(a)	(c)	61000(a)	(c)	61000(a)	(c)	200(a)	1000	X
PHORATE (g)	298-02-2	16(a)	560(d)	410(a)	560(d)	41(a)	440(e)	0.11(a)	0.55	X
PROMETON (g)	1610-18-0	1200(a)	(c)	31000(a)	(c)	31000(a)	(c)	see pH-specific worksheet	see pH-specific worksheet	
PROPYLENE GLYCOL	57-55-6	1000000(a)	100000(d)	1000000(a)	100000(d)	1000000(a)	49(a)	560(a)	560	X
PROPYLENE GLYCOL MONOMETHYL ETHER	107-98-2	55000(a)	100000(d)	1000000(a)	100000(d)	1000000(a)	34000(a)	20(a)	20	X
PYRIDINE	110-86-1	78(a)	200000(d)	2000(a)	200000(d)	2000(a)	200000(d)	see pH-specific worksheet	see pH-specific worksheet	X
RDX	121-82-4	230(a)	(c)	6100(a)	(c)	610(a)	(c)	0.36(a)	0.36	X
STRONTIUM	7440-24-6	47000(a)	(c)	1000000(a)	(c)	120000(a)	(c)	4.2 mg/l (TCLP or SPLP)	not available	X
TEBUTHIURON (g)	34014-18-1	5500(a)	(c)	140000(a)	(c)	14000(a)	(c)	3.1(a)	3.1	
TERBUFOS (g)	13071-79-9	2(a)	130(d)	51(a)	130(d)	5.1(a)	130(d)	0.03(a)	0.15	X
TETRACHLOROETHANE, 1,1,1,2-	630-20-6	2300(a)	2100(d)	61000(a)	2100(d)	6100(a)	2100(d)	3.2(a)	17	X

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TETRACHLOROETHANE, 1,1,2,2-	79-34-5	4700(a)	2000(d)	120000(a)	2000(d)	12000(a)	2000(d)	3.3(a)	3.3	X
TETRACHLOROVINPHOS	961-11-5	2300(a)	(c)	61000(a)	(c)	6100(a)	(c)	26(a)	130	X
THIRAM (g)	137-26-8	390(a)	(c)	10000(a)	(c)	1200(a)	(c)	0.21(a)	0.21	X
TIN	7440-31-5	47000(a)	(c)	1000000(a)	(c)	120000(a)	(c)	4.2 mg/l (TCLP or SPLP)	not available	X
TRICHLOROFLUOROMETHANE	75-69-4	23000(a)	850(a)	610000(a)	1400(a)	140000(a)	88(a)	34(a)	170	X
TRICHLOROPHENOXYACETIC ACID, 2,4,5- (g)	93-76-5	780(a)	(c)	20000(a)	(c)	20000(a)	(c)	5.2 (a)	26	X
TRICHLOROPROPANE, 1,2,3-	96-18-4	0.092(b)	730(d)	0.82(b)	730(d)	18(b)	730(d)	0.0001(b)	0.0001	X
TRICHLORO-1,2,2-TRIFLUOROETHANE, 1,1,2-	76-13-1	1000000(a)	1000(d)	1000000(a)	1000(d)	1000000(a)	340(a)	11000(a)	56000	
TRIFLURALIN (g)	1582-09-8	590(a)	(c)	15000(a)	(c)	1500(a)	(c)	420(a)	2100	X
TRIMETHYLBENZENE, 1,2,4-	95-63-6	(c)	85(a)	(c)	140(a)	(c)	0.87(a)	(c)	(c)	X
TRIMETHYLBENZENE, 1,3,5-	108-67-8	3900(a)	45(a)	100000(a)	72(a)	10000(a)	4.6(a)	10(a)	51	X
TRINITROBENZENE, 1,3,5-	99-35-4	2300(a)	(c)	50000(f)	(c)	6100(a)	(c)	3.9(a)	3.9	X
TRINITROPHENYLMETHYLNITRAMINE, 2,4,6- (TETRYL)	479-45-8	310(a)	(c)	8200(a)	(c)	2000(a)	(c)	0.62(a)	0.62	X
TRINITROTOLUENE 2,4,6-	118-96-7	39(a)	(c)	1000(a)	(c)	2000(a)	(c)	0.077(a)	0.077	X

NOTE: ALL CONCENTRATIONS IN MG/KG

(a) Calculated using a target hazard quotient of 1
(b) Calculated using a cancer risk level of 1 in 1,000,000
(c) No toxicity criteria for this route of exposure
(d) Soil Saturation Concentration
(e) Objective based on PEL, REL, or TLV
(f) For soils contaminated with secondary explosives where no chunks of aggregated or precipitated material are present
(g) For agrichemical facilities, surface soil objectives based on field application rates may be more appropriate for currently registered pesticides.

REVISION DATE: 8/05/08

APPENDIX E

LABORATORY METHOD DETECTION LIMITS AND REPORTING LIMITS

Empirical Laboratories
MDL AND RL

Analyte	CAS Number	Analytical Method	SOLID MATRIX		AQUEOUS MATRIX	
			Method Detection Limit (mg/kg)	Reporting Limit (mg/kg)	Method Detection Limit (µg/L)	Reporting Limit (µg/L)
TAL Metals						
Aluminum	7429-90-5	6010B	5	10	75	200
Antimony	7440-36-0	6010B	0.25	0.5	5	15
Arsenic	7440-38-2	6010B	0.25	0.5	3	10
Barium	7440-39-3	6010B	0.25	10	5	200
Beryllium	7440-41-7	6010B	0.05	0.25	1	5
Cadmium	7440-43-9	6010B	0.05	0.25	1	5
Calcium	7440-70-2	6010B	200	1000	1000	5000
Chromium, total	7440-47-3	6010B	0.1	0.5	2	10
Cobalt	7440-48-4	6010B	1	3	5	15
Copper	7440-50-8	6010B	0.5	2	5	25
Iron	7439-89-6	6010B	6	20	30	100
Lead	7439-92-1	6010B	0.3	0.6	1.5	3
Magnesium	7439-95-4	6010B	200	1000	1000	5000
Manganese	7439-96-5	6010B	0.6	3	5	15
Mercury	7439-97-6	7470A/7471A	0.013	0.033	0.08	0.2
Nickel	7440-02-0	6010B	0.5	2	5	10
Potassium	7440-09-7	6010B	200	500	1000	2000
Selenium	7782-49-2	6010B	0.25	0.5	5	10
Silver	7440-22-4	6010B	0.25	0.5	2	10
Sodium	7440-23-5	6010B	200	1000	1000	5000
Thallium	7440-28-0	6010B	0.25	0.5	3	10
Vanadium	7440-62-2	6010B	0.25	2.5	5	50
Zinc	7440-66-6	6010B	1	4	10	20
Polycyclic Aromatic Hydrocarbons(Low Level)						
Acenaphthene	83-32-9	mod. 8270C	0.0011	0.0033	0.01	0.05
Acenaphthylene	208-96-8	mod. 8270C	0.00098	0.0033	0.0087	0.05
Anthracene	120-12-7	mod. 8270C	0.0011	0.0033	0.0093	0.05
Benzo(a)anthracene	56-55-3	mod. 8270C	0.00081	0.0033	0.01	0.05
Benzo(a)pyrene	50-32-8	mod. 8270C	0.00083	0.0033	0.0093	0.05
Benzo(b)fluoranthene	205-99-2	mod. 8270C	0.00062	0.0033	0.016	0.05
Benzo(g,h,I)perylene	191-24-2	mod. 8270C	0.0004	0.0033	0.013	0.05
Benzo(k)fluoranthene	207-08-9	mod. 8270C	0.00077	0.0033	0.013	0.05
Chrysene	218-01-9	mod. 8270C	0.00049	0.0033	0.0088	0.05
Dibenz(a,h)anthracene	53-70-3	mod. 8270C	0.00033	0.0033	0.012	0.05
Fluoranthene	206-44-0	mod. 8270C	0.0007	0.0033	0.011	0.05
Fluorene	86-73-7	mod. 8270C	0.00092	0.0033	0.013	0.05
2-Methylnaphthalene	91-57-6	mod. 8270C	0.0013	0.0033	0.016	0.05
1-Methylnaphthalene	90-12-0	mod. 8270C	0.0012	0.0033	0.01	0.05
Indeno(1,2,3-cd)pyrene	193-39-5	mod. 8270C	0.0008	0.0033	0.018	0.05
Napthalene	91-20-3	mod. 8270C	0.0013	0.0033	0.018	0.05
Phenathrene	85-01-8	mod. 8270C	0.00087	0.0033	0.014	0.05
Pyrene	129-00-0	mod. 8270C	0.00065	0.0033	0.011	0.05

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Test: ICP SOIL QSM/LCG
Method: EPA 6010B

Matrix: SOIL

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
Aluminum	7429-90-5	20	0.15	0.47	mg/kg
Antimony	7440-36-0	10	0.17	0.55	mg/kg
Arsenic	7440-38-2	1	0.5	1.6	mg/kg
Barium	7440-39-3	1	0.015	0.048	mg/kg
Beryllium	7440-41-7	1	0.004	0.014	mg/kg
Cadmium	7440-43-9	1	0.014	0.048	mg/kg
Calcium	7440-70-2	100	0.3	1.0	mg/kg
Chromium	7440-47-3	2	0.11	0.36	mg/kg
Cobalt	7440-48-4	2	0.028	0.094	mg/kg
Copper	7440-50-8	1	0.03	0.11	mg/kg
Iron	7439-89-6	20	0.19	0.63	mg/kg
Lead	7439-92-1	1	0.11	0.37	mg/kg
Magnesium	7439-95-4	100	1.1	3.8	mg/kg
Manganese	7439-96-5	1	0.028	0.092	mg/kg
Nickel	7440-02-0	2	0.021	0.069	mg/kg
Selenium	7782-49-2	1.3	0.4	1.3	mg/kg
Silver	7440-22-4	2	0.03	0.11	mg/kg
Thallium	7440-28-0	2	0.5	1.6	mg/kg
Vanadium	7440-62-2	1	0.08	0.27	mg/kg
Zinc	7440-66-6	1	0.22	0.74	mg/kg
Potassium	7440-09-7	500	18	60	mg/kg
Sodium	7440-23-5	100	10	32	mg/kg

Test: MERCURY SOIL QSM/LCG
Method: EPA 7471A

Matrix: SOIL

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
Mercury	7439-97-6	0.1	0.0021	0.0070	mg/kg

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Test: ICP TOTAL QSM/LCG
Method: EPA 6010B

Matrix: GROUND WATER

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
Total Aluminum	7429-90-5	200	5	16	ug/L
Total Antimony	7440-36-0	100	7	23	ug/L
Total Arsenic	7440-38-2	10	8	26	ug/L
Total Barium	7440-39-3	10	0.3	1.0	ug/L
Total Beryllium	7440-41-7	10	0.18	0.59	ug/L
Total Cadmium	7440-43-9	10	0.3	1.1	ug/L
Total Calcium	7440-70-2	1000	16	55	ug/L
Total Chromium	7440-47-3	20	4	13	ug/L
Total Cobalt	7440-48-4	20	0.8	2.8	ug/L
Total Copper	7440-50-8	10	1.2	4.0	ug/L
Total Iron	7439-89-6	1000	8	27	ug/L
Total Lead	7439-92-1	10	1.4	4.6	ug/L
Total Magnesium	7439-95-4	1000	5	17	ug/L
Total Manganese	7439-96-5	10	4	14	ug/L
Total Nickel	7440-02-0	20	1.0	3.5	ug/L
Total Selenium	7782-49-2	10	4	14	ug/L
Total Silver	7440-22-4	20	3	11	ug/L
Total Thallium	7440-28-0	10	8	26	ug/L
Total Vanadium	7440-62-2	10	1.5	4.9	ug/L
Total Zinc	7440-66-6	100	1.9	6.3	ug/L
Total Potassium	7440-09-7	5000	160	540	ug/L
Total Sodium	7440-23-5	1000	170	560	ug/L

Test: MERCURY TOT QSM/LCG
Method: EPA 7470

Matrix: GROUND WATER

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
Total Mercury	7439-97-6	0.50	0.05	0.15	ug/L

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Test: PAH SIM LCG LOD
Method: EPA 8270C-SIM

Matrix: SOIL

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
1-Methylnaphthalene	38072-94-5	4.43	1.33	4.43	ug/kg
2-Methylnaphthalene	91-57-6	4.60	1.38	4.60	ug/kg
Acenaphthene	83-32-9	4.72	1.42	4.72	ug/kg
Acenaphthylene	208-96-8	4.64	1.39	4.64	ug/kg
Anthracene	120-12-7	4.98	1.50	4.98	ug/kg
Benzo(a)anthracene	56-55-3	4.81	1.44	4.81	ug/kg
Benzo(a)pyrene	50-32-8	4.57	1.37	4.57	ug/kg
Benzo(b)fluoranthene	205-99-2	4.78	1.43	4.78	ug/kg
Benzo(g,h,i)perylene	191-24-2	4.75	1.43	4.75	ug/kg
Benzo(k)fluoranthene	207-08-9	4.95	1.48	4.95	ug/kg
Chrysene	218-01-9	5.11	1.53	5.11	ug/kg
Dibenzo(a,h)anthracene	53-70-3	4.87	1.46	4.87	ug/kg
Fluoranthene	206-44-0	5.21	1.56	5.21	ug/kg
Fluorene	86-73-7	5.20	1.56	5.20	ug/kg
Indeno(1,2,3-cd)pyrene	193-39-5	4.61	1.38	4.61	ug/kg
Naphthalene	91-20-3	4.34	1.33	4.34	ug/kg
Phenanthrene	85-01-8	5.25	1.58	5.25	ug/kg
Pyrene	129-00-0	4.93	1.48	4.93	ug/kg
Surr: 2-Fluorobiphenyl	321-60-8		50	150	% Recovery
Surr: Nitrobenzene-d5	4165-60-0		50	150	% Recovery
Surr: Terphenyl-d14	98904-43-9		50	150	% Recovery

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Test: PAH SIM LCG LOD
Method: EPA 8270C-SIM

Matrix: GROUND WATER

Analyte	CAS #	Reporting Limit	LOD/ MDL	LOQ/ PQL	Units
1-Methylnaphthalene	38072-94-5	0.020	0.006	0.020	ug/L
2-Methylnaphthalene	91-57-6	0.020	0.005	0.018	ug/L
Acenaphthene	83-32-9	0.020	0.005	0.016	ug/L
Acenaphthylene	208-96-8	0.020	0.004	0.014	ug/L
Anthracene	120-12-7	0.020	0.004	0.015	ug/L
Benzo(a)anthracene	56-55-3	0.020	0.004	0.015	ug/L
Benzo(a)pyrene	50-32-8	0.022	0.007	0.022	ug/L
Benzo(b)fluoranthene	205-99-2	0.021	0.006	0.021	ug/L
Benzo(g,h,i)perylene	191-24-2	0.022	0.007	0.022	ug/L
Benzo(k)fluoranthene	207-08-9	0.020	0.006	0.020	ug/L
Chrysene	218-01-9	0.020	0.004	0.012	ug/L
Dibenzo(a,h)anthracene	53-70-3	0.020	0.005	0.018	ug/L
Fluoranthene	206-44-0	0.020	0.005	0.015	ug/L
Fluorene	86-73-7	0.020	0.004	0.014	ug/L
Indeno(1,2,3-cd)pyrene	193-39-5	0.021	0.006	0.021	ug/L
Naphthalene	91-20-3	0.021	0.006	0.021	ug/L
Phenanthrene	85-01-8	0.020	0.004	0.015	ug/L
Pyrene	129-00-0	0.020	0.004	0.012	ug/L
Surr: 2-Fluorobiphenyl	321-60-8		50	150	% Recovery
Surr: Nitrobenzene-d5	4165-60-0		50	150	% Recovery
Surr: Terphenyl-d14	98904-43-9		50	150	% Recovery