Remediation Objectives Report

Former Griess-Pfleger Tannery Site
Waukegan, Illinois

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Prepared Under Contract to:

Commonwealth Edison Company on Behalf of
Commonwealth Edison and Beggs and Cobb Corporation

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EXHIBIT 645

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Section 1

1 Introduction

The RETEC Group, Inc. (RETEC) has prepared this report for Commonwealth Edison (ComEd) and Beggs and Cobb Corporation (Beggs and Cobb), collectively referred to as the potentially responsible parties (PRPs). This report presents the remediation objectives developed for the former Griess-Pfleger Tannery (tannery) site in Waukegan, Illinois, which satisfy the requirements of the Tiered Approach to Corrective Action Objectives (TACO) (Illinois Pollution Control Board (IPCB), 2001). The report was prepared under the Illinois Site Remediation Program (IPCB, 1998).

This report consists of seven sections and supporting appendices. Section 1 is the introduction. Section 2 presents a summary of background information on the site. Section 3 presents an initial evaluation of soil and groundwater pathways. Section 4 provides an evaluation of polychlorinated biphenyls (PCBs) in soil. Section 5 presents a more detailed evaluation of direct contact exposures to soil. Section 6 summarizes the proposed remediation objectives for the tannery site. Section 7 provides a list of references used in this report.

Appendix A provides an evaluation of source material. Appendix B presents 2002 groundwater analytical report, and the comparison of soil and groundwater samples to screening values. Appendix C provides supplemental Tier 1 screening values for selected constituents that have been developed by the Illinois Environmental Protection Agency (Illinois EPA). Appendix D provides supplemental Tier 1 screening values that have been calculated by RETEC. Appendix E presents the development of screening values for essential nutrients. Appendix F provides Tier 2 screening values for selected constituents. Appendix G presents the acute action level calculation for arsenic. Appendix H provides details of a Tier 3 evaluation for soils in Area 1B. Appendix I presents a proposed engineered barrier design for the tannery site.

Section 2

2 Background

2.1 Site Location

The former tannery is located at the northeast corner of Sand (also know as Pershing) and Dahringer Roads in Lake County, Waukegan, Illinois. More specifically, the site is located in the northwest corner of the southwest quarter of Section 15, Township 45 North, Range 12 East of the Third Principal Meridian in Lake County. The entire property encompasses approximately 38 acres. Figure 2-1 shows the location of the site relative to the surrounding area and Figure 2-2 is an expanded view of the site itself.

The City of Waukegan has a large industrial base, predominantly situated along Lake Michigan. The former tannery's eastern boundary is immediately bordered by the Elgin Joliet and Eastern (EJ&E) railroad. To the east of the railroad is the former ComEd Waukegan Generating Station, which was acquired by Midwest Generation in 2000. This property encompasses approximately 240 acres. Lake Michigan is located approximately 0.75 miles east of the site. To the north are several industrial buildings. The Illinois Beach State Park is located approximately 1 mile north of the site. To the west are Sand Road, Chicago and Northwestern Railroad, Amstuz Expressway, and various residential and commercial properties, respectively. Beyond the property's southern boundary are Dahringer Road and various vacant and occupied industrial/commercial properties. The property immediately south of Dahringer Road is a former North Shore Gas manufactured gas plant (MGP) site. The property located southeast of the tannery site is the North Shore Sanitary District wastewater treatment plant.

2.2 Site History

The tannery was built in 1917 and operated as a leather tanning facility from 1918 through early 1973. Shortly after the facility closed, a lacquer dust fire occurred which destroyed the interior of several of the main structures. ComEd acquired the property in 1973.

Based on historic information and analytical data, chrome-tanning processes were utilized at the site. The tanning process produced wastes in the form of gaseous reaction products, wastewater, sludge, and solid wastes.

2.3 Current and Potential Future Site Uses

At the present time, ComEd owns the property. ComEd is an Exelon Company. Currently, 4 acres of the site are used to store wood chips. Otherwise, the site is not used. ComEd/Exelon plans to retain ownership of this property for future use associated with the generation, transmission, and distribution of electricity.

2.4 Site Characterization Activities

Six investigations were conducted at the site. A preliminary site investigation was performed by the United States Environmental Protection Agency (USEPA). The other five investigations were performed by Metcalf & Eddy of Chicago, Illinois, which included Phase I investigation; Phase II investigation; Phase IIA investigation; Phase IIB investigations; and grid soil sampling for arsenic and lead.

2.4.1 Initial Investigation

In January of 1989, USEPA's Field Investigation Team performed a preliminary site investigation. Laboratory analyses indicated elevated levels of chromium and lead in soil.

2.4.2 Phase I Remedial Investigation

In May and June of 1993, Metcalf & Eddy performed a Phase I Remedial Investigation (Metcalf & Eddy, 1995). These activities included installation of seven shallow groundwater monitoring wells, collection of 11 sediment samples, 68 soil samples (43 subsurficial, 15 surficial, and 10 monitoring well soil boring samples), two geotechnical samples, nine production waste samples, one cistern water sample, seven groundwater samples, and performance of a magnetometer survey. The Phase I Remedial Investigation results indicated the following:

Soil

- Numerous inorganic analytes were identified and elevated levels of arsenic, chromium, and lead were detected in the surface and subsurface soil in various areas of the site.

- Pesticides, PCBs, and base-neutral acid extractable compounds (BNAs), which are predominantly polynuclear aromatic hydrocarbons (PAHs), were detected in the soil sporadically throughout the site.

Groundwater

- The groundwater analyses indicated that the BNAs, pesticides/PCBs, and volatile organic compounds (VOCs) were not present in any of the samples.

- Inorganic analytes were detected in groundwater samples.

2.4.3 Phase II Investigation

During January, February, and April of 1995, Metcalf & Eddy performed additional field activities as part of a Phase II investigation (Metcalf & Eddy, 1997a). The objectives of the Phase II activities were to define the magnitude

and extent of surface and subsurface impacts, characterize the type of constituents in the subsurface, and determine if off-site areas have been impacted by former tannery operations. To accomplish the Phase II objectives, Metcalf & Eddy performed chromium speciation, installed one exploratory soil boring and five additional monitoring wells (two shallow and three deep), and collected 81 soil samples (51 surface and 30 subsurface), three sediment/surface water samples, two dioxin/furan samples, two asbestos samples, and five groundwater samples.

Groundwater analytical results indicated the presence of only inorganic analytes, including arsenic, chromium (total), lead, and mercury. The groundwater investigation indicated that groundwater containing arsenic exceeding Tier 1 screening values for groundwater concentrations had migrated to the eastern edge of the tannery property boundary. A number of inorganic analytes were also detected in background monitoring wells.

Soil analytical results indicated that asbestos was not detected in either of the two soil samples collected. Detected concentrations of semivolatile organic compounds (SVOCs), mainly PAHs, were identified at various locations throughout the site. PCBs and selected pesticides were also detected in some soil samples. Dioxins and furans were identified in soil samples collected during the Phase II investigation. However, the levels of dioxin/furans identified were not above the USEPA screening levels for protection of human health and the environment. Seventeen soil samples exhibiting elevated levels of chromium were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) metals. The amount of leachable chromium in all of these samples was found to be below regulatory limits. Additionally, these samples were analyzed for hexavalent chromium. It was determined that 99.97% of the chromium is in the trivalent state, the more benign and less mobile form of chromium. Leachable metals were not identified in any of the samples above TCLP regulatory limits, with the exception of mercury at one sampling location.

2.4.4 Phase IIA Investigation

Two additional monitoring wells were installed on Waukegan Generating Station property downgradient of the tannery site as part of a Phase IIA investigation (Metcalf & Eddy, 1997b). Previous groundwater analytical results did not indicate the presence of any organic compounds, including pesticides/PCBs. Therefore, sampling and analysis in the Phase IIA investigation was for metals only. Analytical results from these two monitoring wells confirmed that groundwater containing arsenic had migrated under the EJ&E railroad tracks and onto the Waukegan Generating Station property.

2.4.5 Phase IIB Investigation

A Phase IIB investigation was undertaken to define the extent of the arsenic plume (Metcalf & Eddy, 1997b). Two additional monitoring wells were installed and sampled, and the results indicated that the arsenic plume had been delineated. More specifically, the results indicated that arsenic (exceeding 50 ppb) has migrated approximately 400 feet from the tannery site.

2.4.6 Arsenic and Lead Soil Grid Sampling Program

During the summer of 2000, Metcalf & Eddy performed soil sampling in both the northern and southern areas of the property to evaluate the extent of lead and arsenic impacted soils in these two areas (Metcalf & Eddy, 2000). Soil samples were collected on a 50 by 50 foot grid surveyed across both areas. Approximately 600 soil samples were collected as part of this program. The results of this sampling program were incorporated into drawings that identify the arsenic and lead concentrations in these areas. .

2.5 Geologic and Hydrogeologic Conditions

The site and immediate surrounding areas are comprised of made-land soils. Made-land soils have been removed or extensively reworked and are not classified as native soils. Since made-land soils can be formed in any location or under any condition, there are no typical properties of made-land soils. The soil material found at the site is generally silty sand to sand consisting predominantly of fine sands. A very thin layer of organic matter overlying peat and tannery residuals has been discovered in some on-site areas.

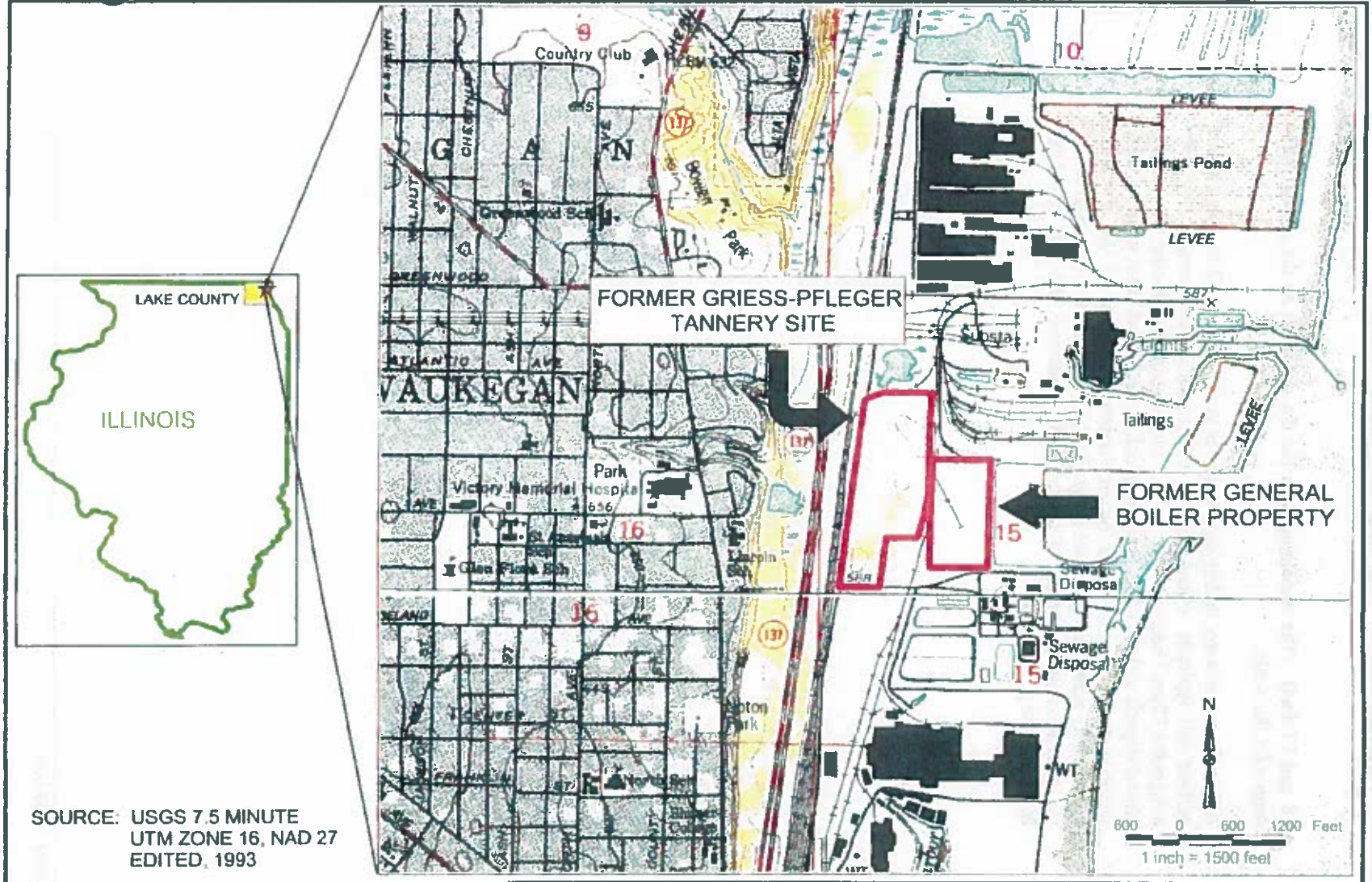
The regional topography is relatively flat with glacial moraines and man-made features providing the only relief in the area. Site elevation varies only slightly and is approximately 590 feet above mean sea level (MSL).

Based on the results of the Phase II site investigation, the site consists of a well graded to poorly graded sand to silty sand with fill and peat. Clay was apparent in two soil borings, but not in significant quantities to justify describing it as a confining layer. Saturated soil was found approximately 3 to 5 feet below grade. Static water conditions indicate that the shallow groundwater flow direction is to the east toward Lake Michigan under an average hydraulic gradient of 0.0016 feet per foot.

Potable water for residences and businesses is primarily supplied by the City of Waukegan water system, which obtains water from Lake Michigan. However, according to the 1990 U.S. Census, there are approximately 970 persons in Waukegan using private wells. Information obtained from the Illinois State Water Survey listed eight private wells within 1 mile of the site, including two wells used for lawn watering at a country club. The nearest residential well is located approximately 0.6 miles west of the site and was installed in 1980. This residential well is hydraulically upgradient of the site. Two of the eight wells tap gravel beds within the Wedron formation (depth of

88 and 97 feet). The remaining logs list the dolomite as the groundwater source for the wells.

Although groundwater underlying the site is very shallow at 3 to 5 feet below surface and typically would not be suitable for potable use, it has been designated Class I because there are no confining layers existing between the glacial deposit and the dolomite unit (which is the aquifer from which potable water is obtained). It should be emphasized that none of the properties immediately surrounding the site (upgradient, downgradient or cross-gradient) use groundwater and none of the properties between the site and Lake Michigan use groundwater.



SOURCE: USGS 7.5 MINUTE
UTM ZONE 16, NAD 27
EDITED, 1993

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COMMONWEALTH EDISON FORMER GRIESS-PFLEGER TANNERY SITE CED14-15159-000			SITE LOCATION MAP WAUKEGAN, ILLINOIS
DATE: 7/8/02	KBL/ftc	FILE: w:\commed\tannery\gis\projects\gw6_26_02.apr (Location)	FIGURE: 2-1

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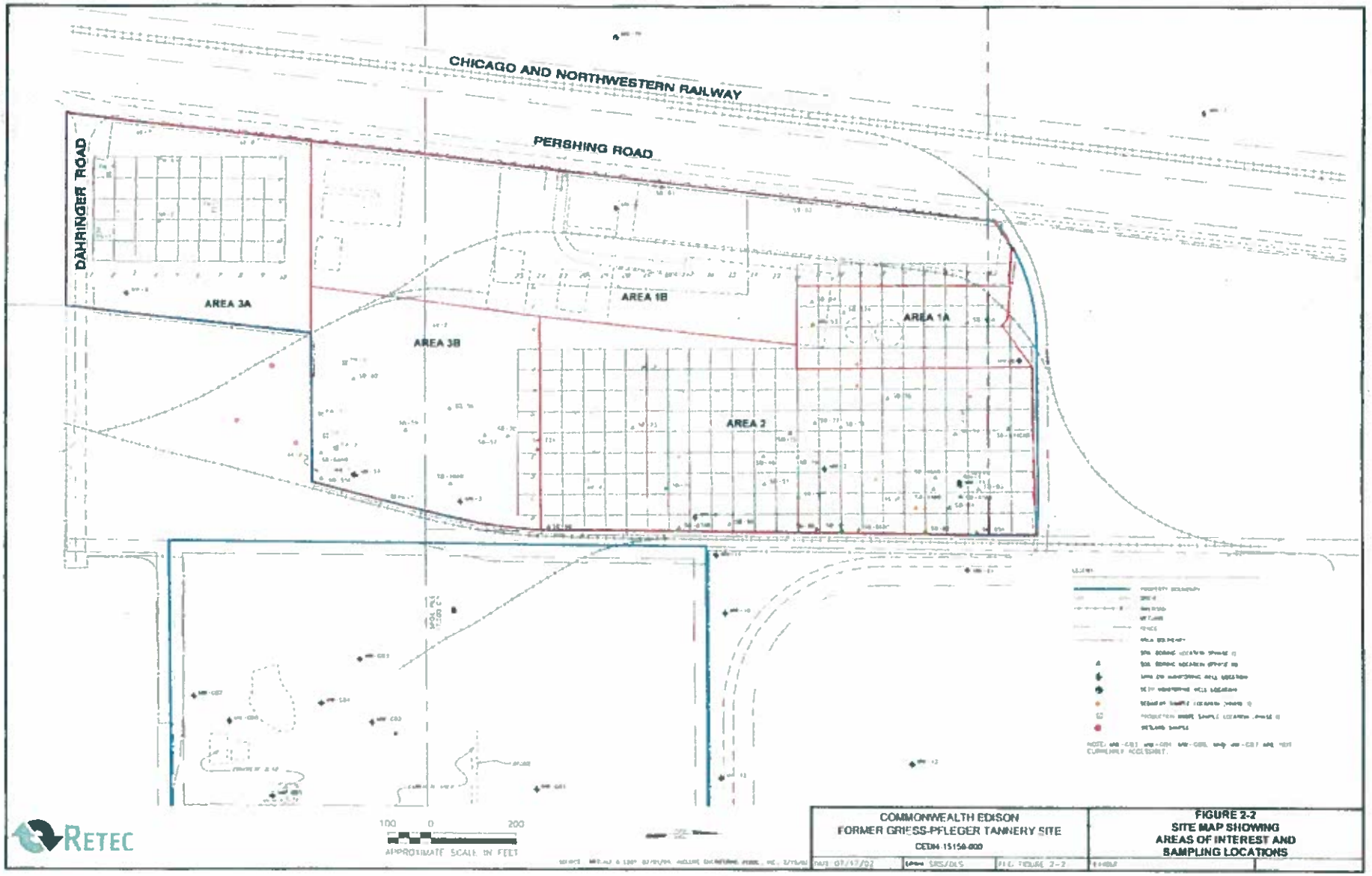

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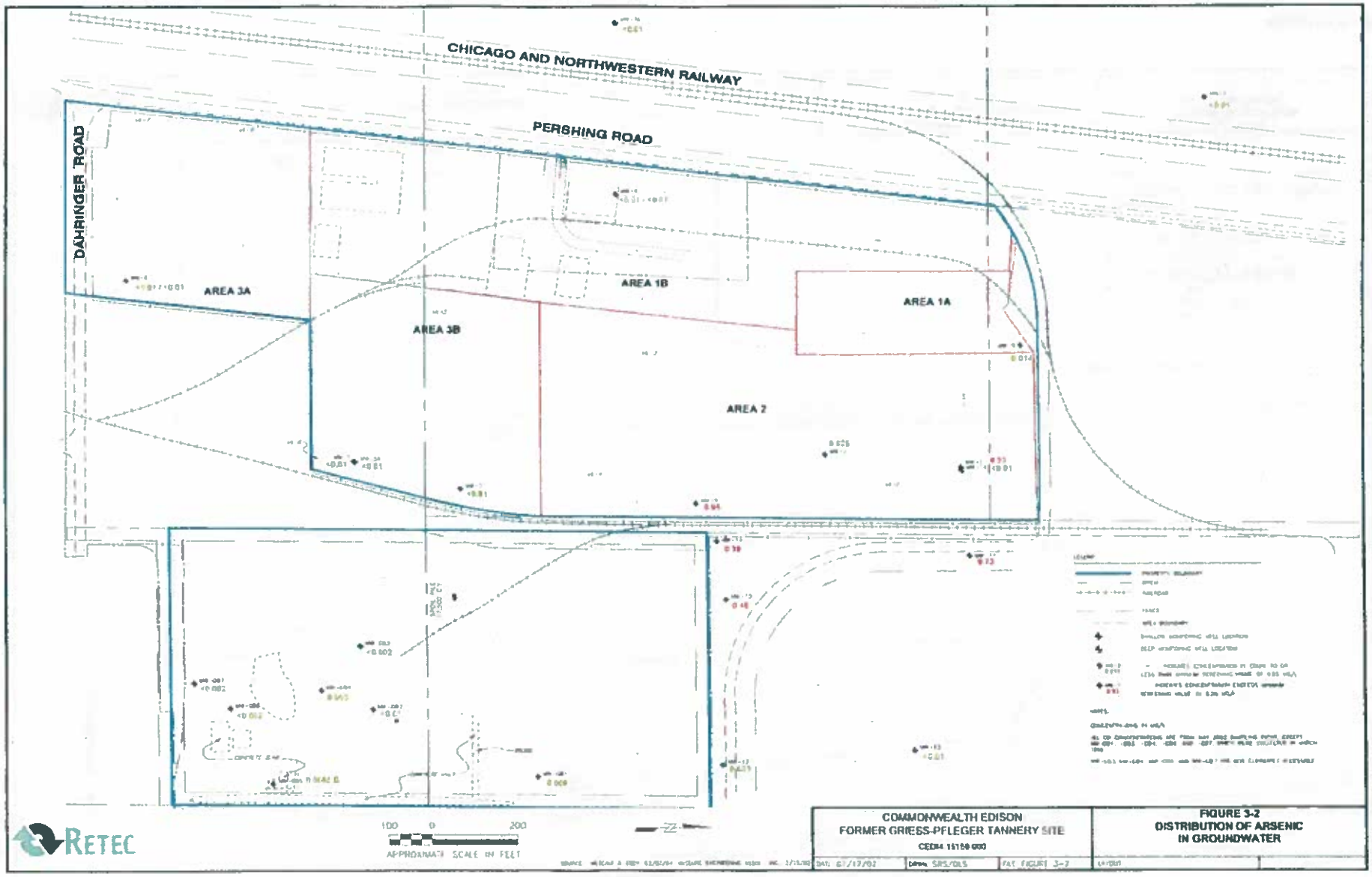

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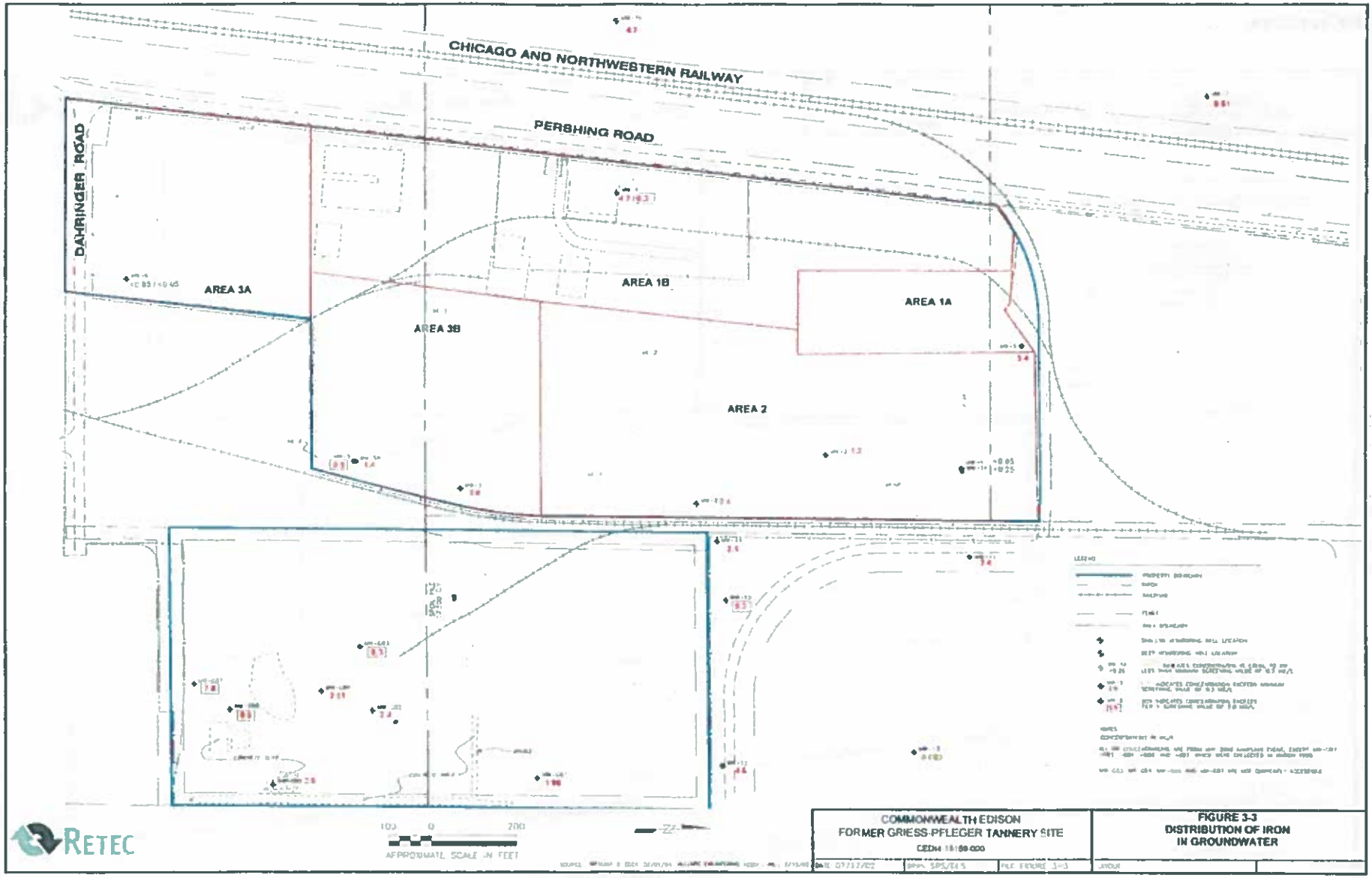

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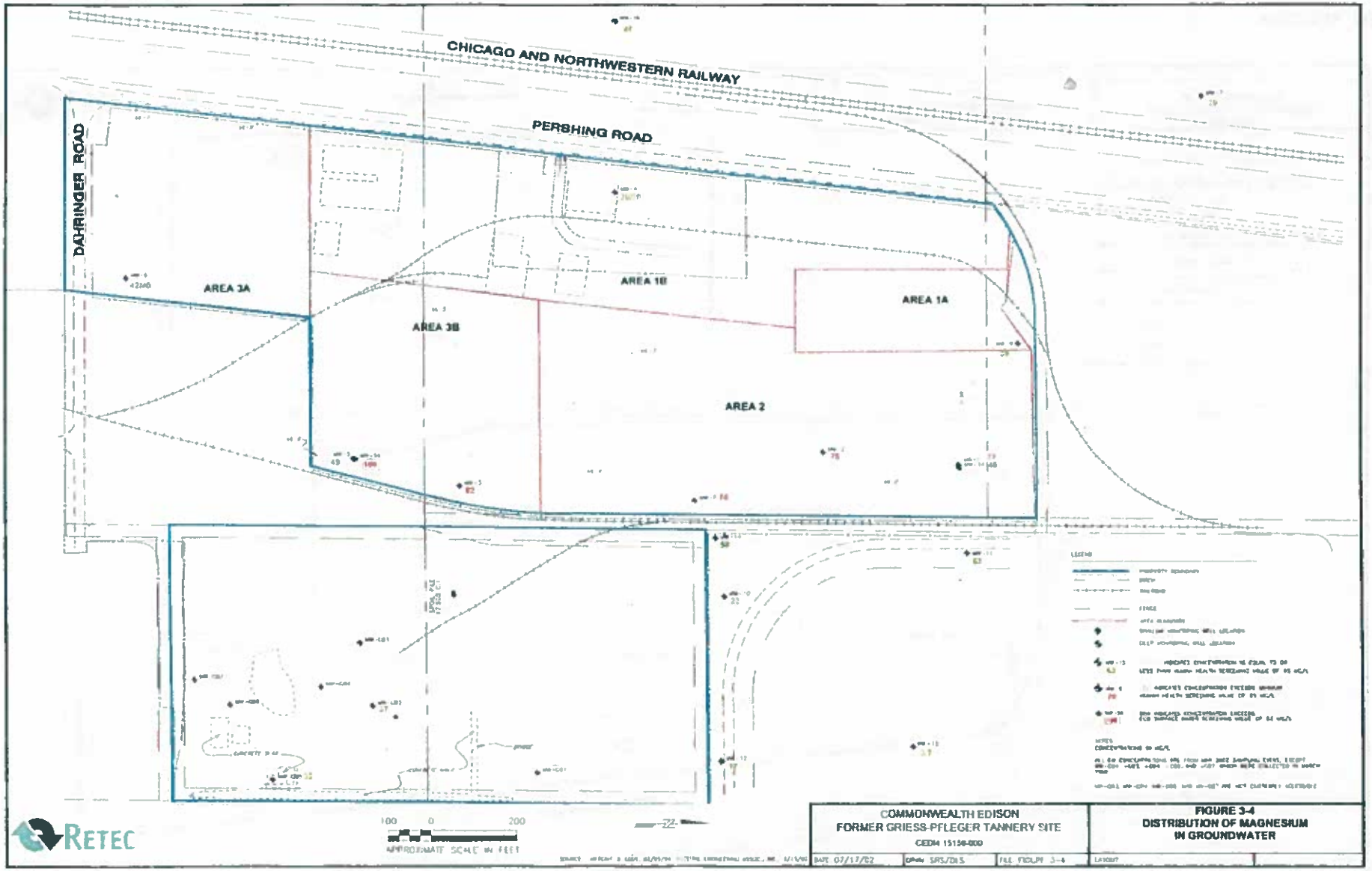

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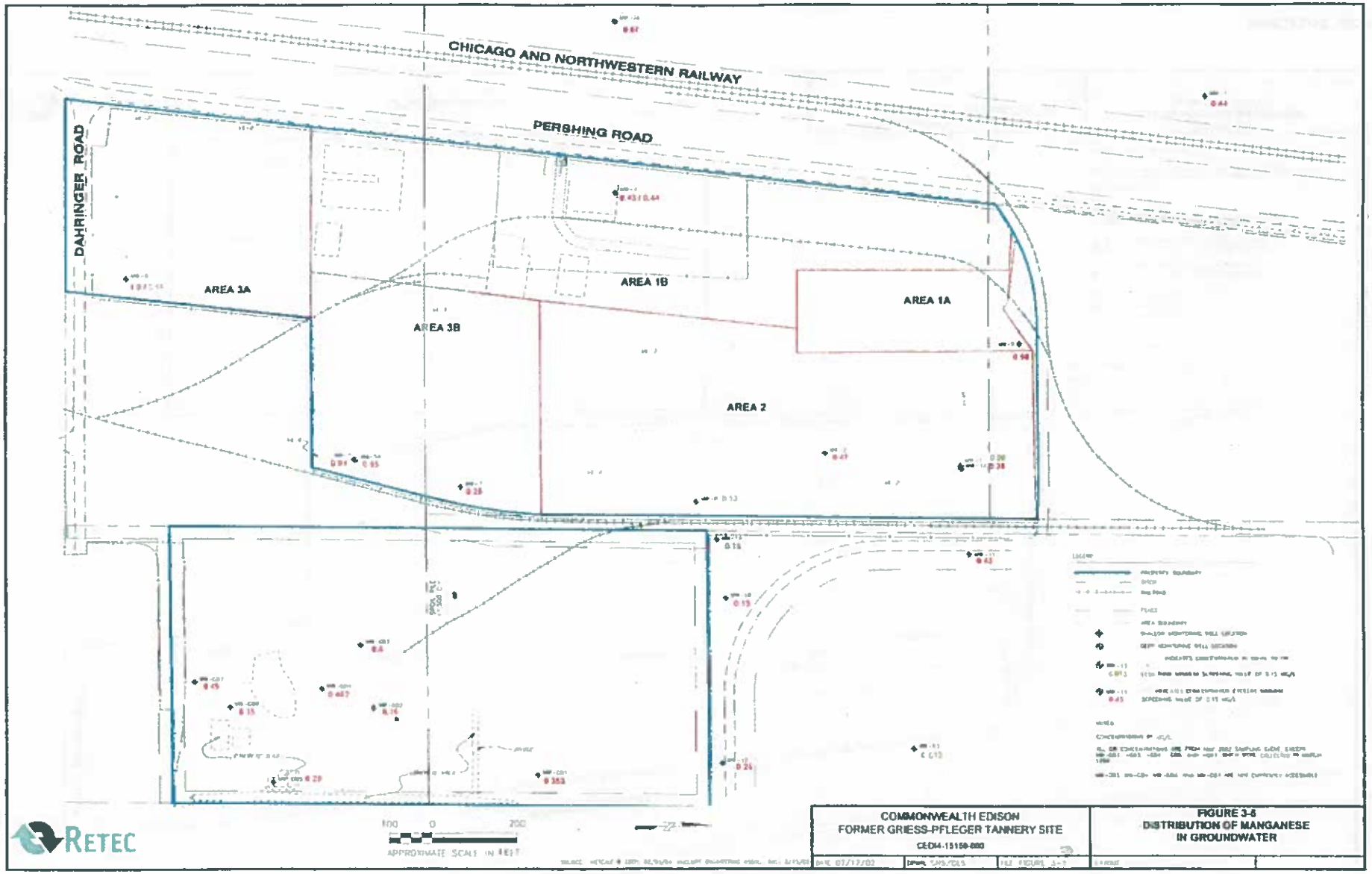

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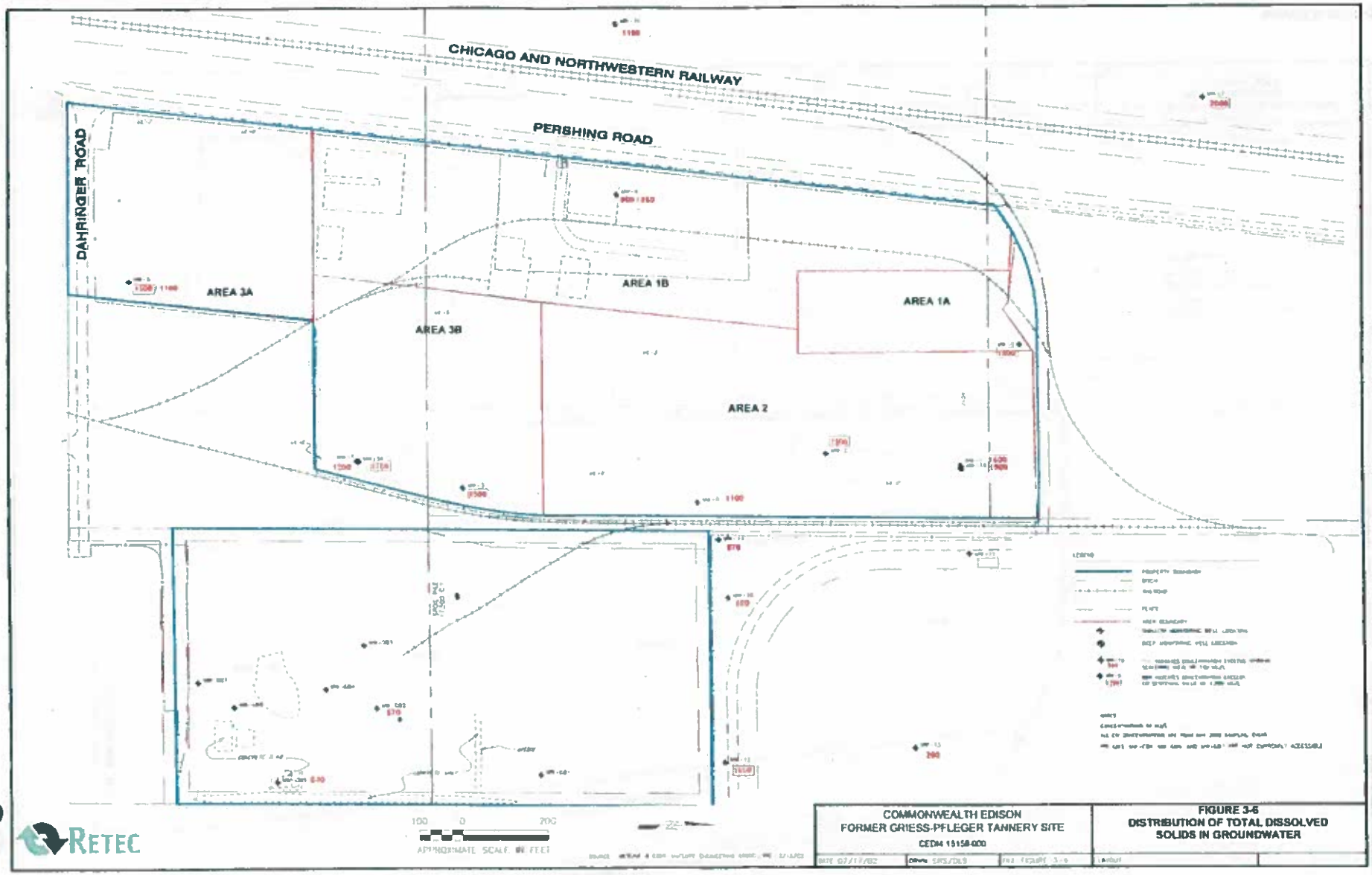

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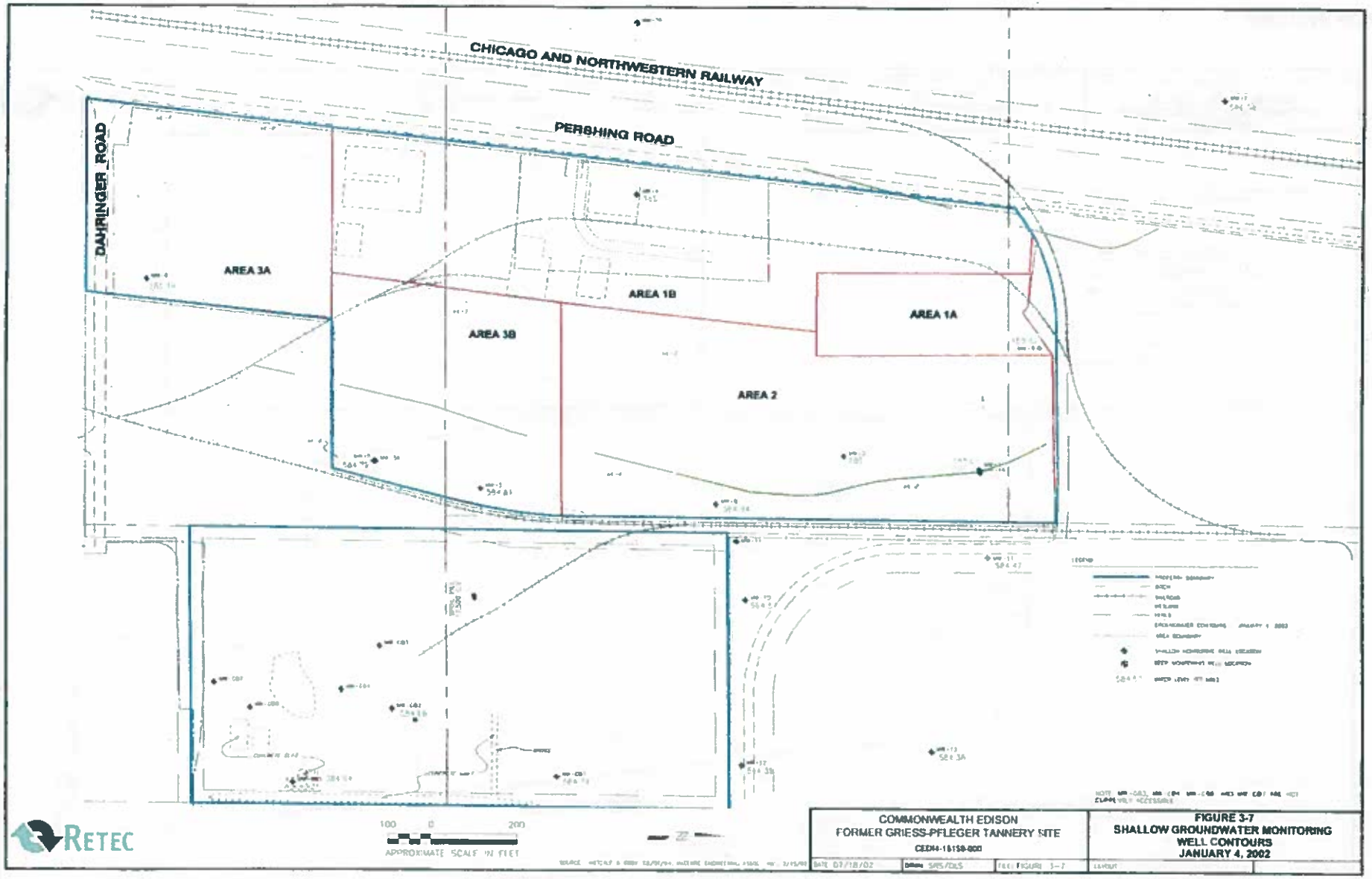

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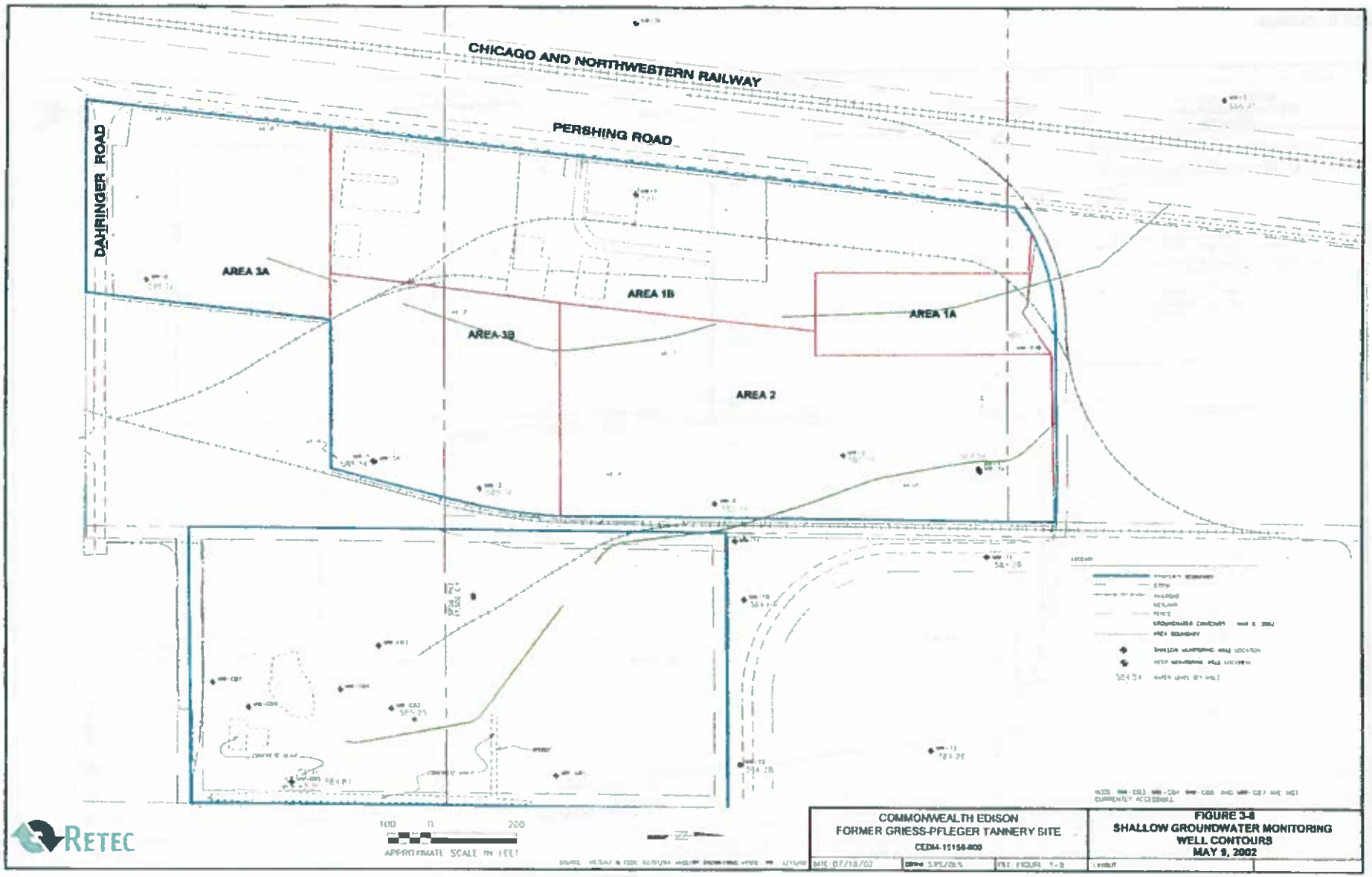

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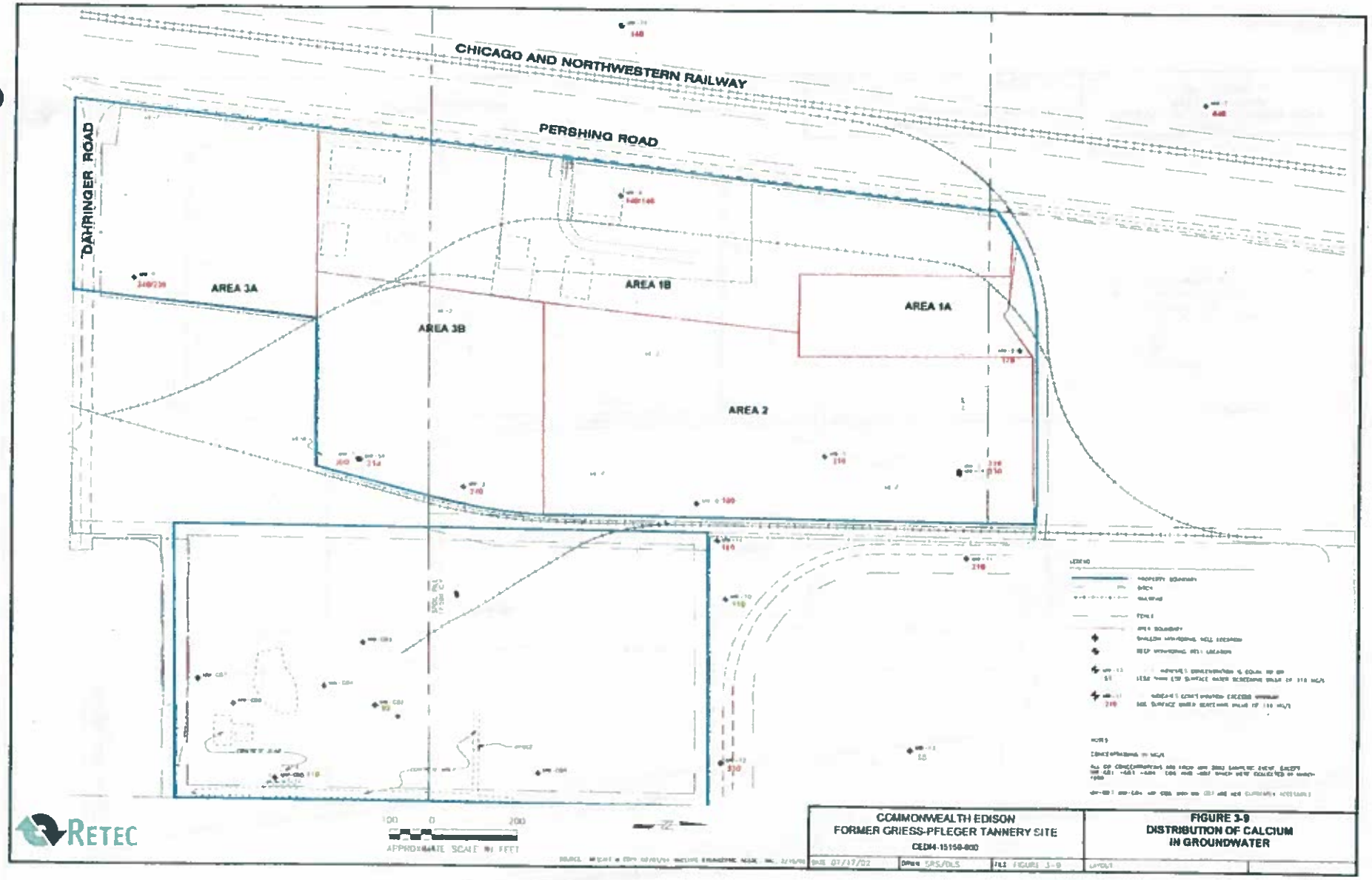

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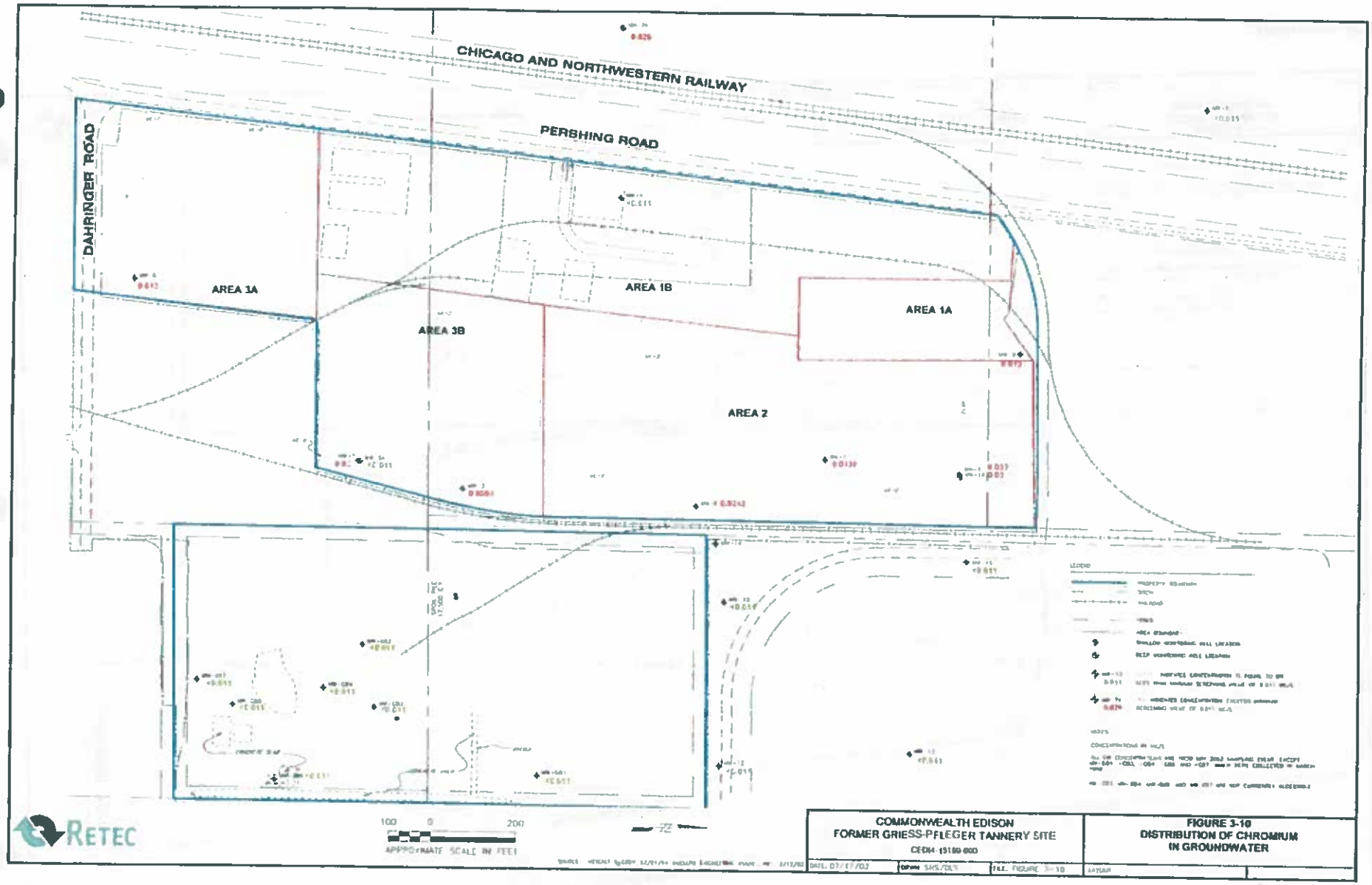

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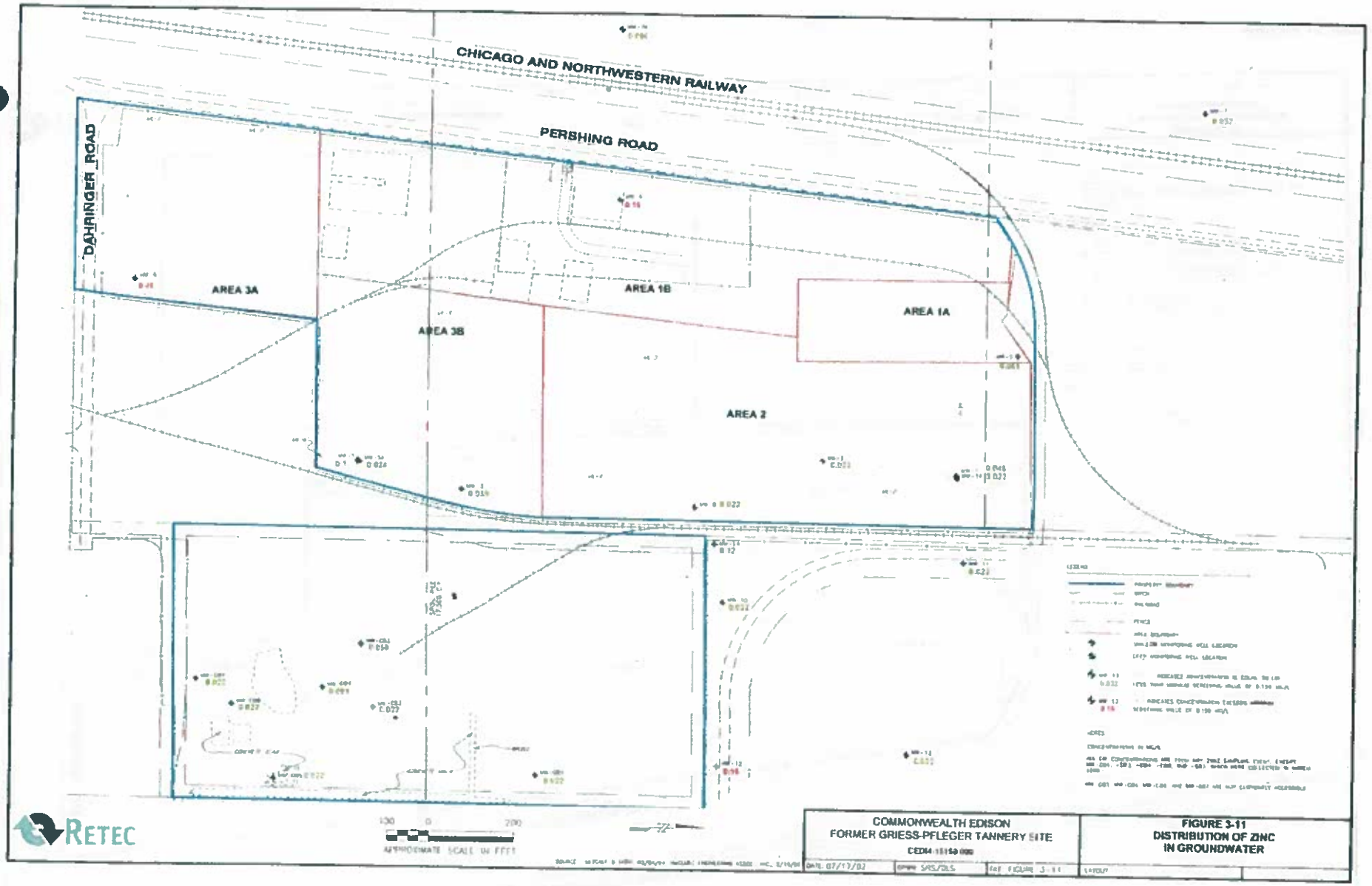

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4 Evaluation of PCBs in Soil

4.1 Overview

Concentrations of PCBs in soil at the tannery site are evaluated separately from other constituents because there are specific regulations that apply to PCBs. These regulations and the evaluation of PCBs in soil at the site are discussed in the following subsections.

4.2 Applicable Regulations for Evaluation of PCBs in Soil

According to Section 742.900 of TACO (IPCB, 2001) evaluation of PCBs in soil should address the applicability of 40 CFR 761 (referred to as the PCB Mega-Rule). Under 40 CFR 761.61(a), the USEPA provides a "self-implementing procedure" for characterizing a site, remediating the site, and verifying the remediation. If the self-implementing procedure is followed, remediation can be conducted without prior approval of USEPA. Procedures for characterizing a site, remediating a site, and verifying the remediation can be used under 40 CFR 761.61(c), the "risk-based procedure", but such site-specific procedures must be approved by USEPA prior to the implementation of remediation.

According to the self-implementing procedure under 40 CFR 761.61(a)(4)(i), the action levels for remediation of bulk PCB remediation waste (i.e., soil) are based on land use of the site. Land use is divided into two categories: low occupancy and high occupancy. According to 40 CFR 761.3, a low occupancy area for bulk PCB remediation waste is an area where occupancy for any individual not wearing dermal and respiratory protection is 335 hours or less for a calendar year (about 6.7 hours or less per week). Examples of low occupancy areas include an electrical substation or a location in an industrial facility where a worker spends small amounts of time per week. A high occupancy area, according to 40 CFR 761.3, is an area where occupancy for any individual not wearing dermal and respiratory protection is more than 335 hours for a calendar year (more than 6.7 hours per week). Examples of high occupancy areas include a residence, day care center, school, or a workstation in an industrial facility.

For a low occupancy area, the action level for bulk PCB remediation waste is less than or equal to 25 mg/kg total PCBs. At this concentration, the soil may remain at the site with no further action. At concentrations greater than 25 mg/kg and less than or equal to 50 mg/kg, the soil may remain at the site, but the area must be secured by a fence and marked with signs. Soil with concentrations of total PCBs greater than 50 mg/kg but less than or equal to 100 mg/kg may remain at the site, but must be covered with a soil cover. The soil cover should have a minimum of either 25 cm of clean compacted soil

(i.e., where clean soil is defined as soil with a maximum concentration of 1 mg/kg or less PCB per Aroclor) or 15 cm of asphalt or cement. When a fence is placed on a site, a deed restriction must be placed to ensure that the site remains a low occupancy area. In addition, the fence or cap must be properly maintained to prevent or minimize human exposure, infiltration and erosion. Soil with concentrations of total PCBs greater than 100 mg/kg must be remediated; where remediation typically involves removal and offsite management (i.e., treatment and/or disposal) or onsite treatment.

For a high occupancy area, the action level for bulk PCB remediation waste is less than or equal to 1 mg/kg total PCBs. At this concentration, the soil may remain at the site with no further action. At concentrations greater than 1 mg/kg and less than or equal to 10 mg/kg, the soil may remain at the site, but must be covered with a soil cover meeting the specifications discussed previously. Soil with concentrations of total PCBs greater than 10 mg/kg must be remediated, where remediation was previously discussed.

4.3 Evaluation of PCBs in Soil

4.3.1 Site-Wide Overview

As discussed in more detail below, the remediation of PCB affected soil at the tannery site will be conducted under the risk-based procedure. Under the risk-based procedure, site-specific action levels can be developed. However, remediation of the site, the action levels under the self-implementing procedure for a high occupancy area will be utilized. The use of action levels for a high occupancy area are necessary because it is likely that future uses of the site, while not precisely known at this time, will involve workers being on the site more than 6.7 hours per week.

The PCB data for soil samples are provided in Appendix B. PCBs detected at the tannery site include Aroclor 1248, Aroclor 1254, and Aroclor 1260. Since the PCB Mega-Rule provides action levels for total PCBs rather than specific Aroclors, the results for each Aroclor detected in a sample were summed to determine the total PCB result for that sample. Total PCB results were then classified into the following categories: less than or equal to 1 mg/kg (for no further action in a high occupancy area); 1 to 10 mg/kg (for soil cover requirement in a high occupancy area); and greater than 10 mg/kg (soil requiring remediation in a high occupancy area).

The results of the categorization of soil samples are presented in Figure 4-1 for surface soil samples and Figure 4-2 for subsurface soil samples, and summarized for each area below:

- Area 1A (Northeastern Portion of Former Production Area): four samples with no detected PCBs

- Area 1B (Main Portion of Former Production Area): one sample with total PCBs between 1 and 10 mg/kg; 16 samples with no detected PCBs
- Area 2 (Wastewater Discharge Area): three samples with total PCBs less than 1 mg/kg; 28 samples with no detected PCBs
- Area 3A (Southern Portion of Production Waste Disposal Area): three samples with total PCBs between 1 and 10 mg/kg; four samples with total PCBs less than 1 mg/kg; 10 samples with no detected PCBs
- Area 3B (Eastern Portion of Production Waste Disposal Area): six samples with total PCBs above 10 mg/kg; 12 samples with total PCBs between 1 and 10 mg/kg; 10 samples with total PCBs less than 1 mg/kg; 11 samples with no detected PCBs

These results indicate that Area 1A (Northeastern Portion of Former Production Area) and Area 2 (Wastewater Discharge Area) require no further action to meet the criteria for a high occupancy area. The results for the other areas are discussed in more detail below.

4.3.2 Area 1B: Main Portion of Former Production Area

Area 1B had no surface soil samples with exceedances of the 1 mg/kg action level, where surface soil samples are defined as those collected from 0-1 foot. However, the following subsurface soil sample in Area 1B had a concentration of total PCBs between 1 and 10 mg/kg: SB-33B (2'-3') – 5.1 mg/kg. No PCBs were detected in the surface soil sample, SB-33A (0'-1'), collected at this location. A soil cover is effectively in place and no further action would be needed except an institutional control ensuring that the soil cover remains in place or the soil may be removed.

4.3.3 Area 3A: Southern Portion of Production Waste Disposal Area

Area 3A had no surface soil samples with exceedances of the 1 mg/kg action level. The following subsurface soil samples in Area 3A had concentrations of total PCBs between 1 and 10 mg/kg:

- SB-24B (3'-4') – 3 mg/kg
- SB-25B (3.5' – 4.5') – 2.8 mg/kg
- MW-6A (2'-4') – 4.9 mg/kg

As discussed in more detail in Section 5, a soil cover and institutional controls are proposed for much of Area 3A. The cover will extend to the southern, eastern, and western boundaries. The northern extent of the soil cover has not been finalized. At a minimum, the soil cover will extend over locations SB-

24, SB-25, and MW-6. By using soil cover and institutional controls, the exceedances of the PCB action level of 1 mg/kg will be addressed.

4.3.4 Area 3B: Eastern Portion of Production Waste Disposal Area

Area 3B had six surface soil samples with concentrations of total PCBs exceeding 10 mg/kg:

- SB-10A (0'-1') – 56 mg/kg
- SB-15A (0'-1') – 30 mg/kg
- SB-56A (0'-1') – 116.8 mg/kg
- SB-57A (0'-1') – 58.2 mg/kg
- SB-59A (0'-1') – 37.6 mg/kg
- SB-105A (0'-1') – 82 mg/kg

This area also had three surface soil samples with concentrations falling between 1 and 10 mg/kg:

- SB-19A (0'-1') – 1.3 mg/kg
- SB-58A (0'-1') – 1.99 mg/kg
- SB-60A (0'-1') – 1.45 mg/kg

This area did not have any subsurface soil samples with concentrations of total PCBs greater than 10 mg/kg. However, this area did have seven subsurface soil samples with concentrations of PCBs greater than 1 mg/kg, but less than 10 mg/kg:

- SB-10B (2'-4') – 2.1 mg/kg
- SB-14B (2'-4') – 1.31 mg/kg
- SB-15B (2'-4') – 7.4 mg/kg
- SB-16B (2'-4') – 3.4 mg/kg
- SB-17B (2'-4') – 2.4 mg/kg
- SB-58B (1'-3') – 2.1 mg/kg
- SB-69B/CB (1'-3') – 1.08 mg/kg

Remediation of PCBs in Area 3B will involve the removal of soil with concentrations of PCBs exceeding 10 mg/kg and backfilling the excavation with clean soil. As discussed in greater detail in Section 5, after excavation, the PRPs will cover the majority of Area 3B. The cover will extend to the southern, eastern, and western boundaries of Area 3B. The extent of the cover to the north has not been determined. At a minimum, the soil cover will extend over any soil with concentrations of PCBs that are greater than 1 mg/kg, but equal to or less than 10 mg/kg. In addition, an institutional control will be placed on the site to ensure that the soil cover remains in place over soil with concentrations of total PCBs that are greater than 1 mg/kg, but equal to or less than 10 mg/kg.

4.3.5 Additional Considerations

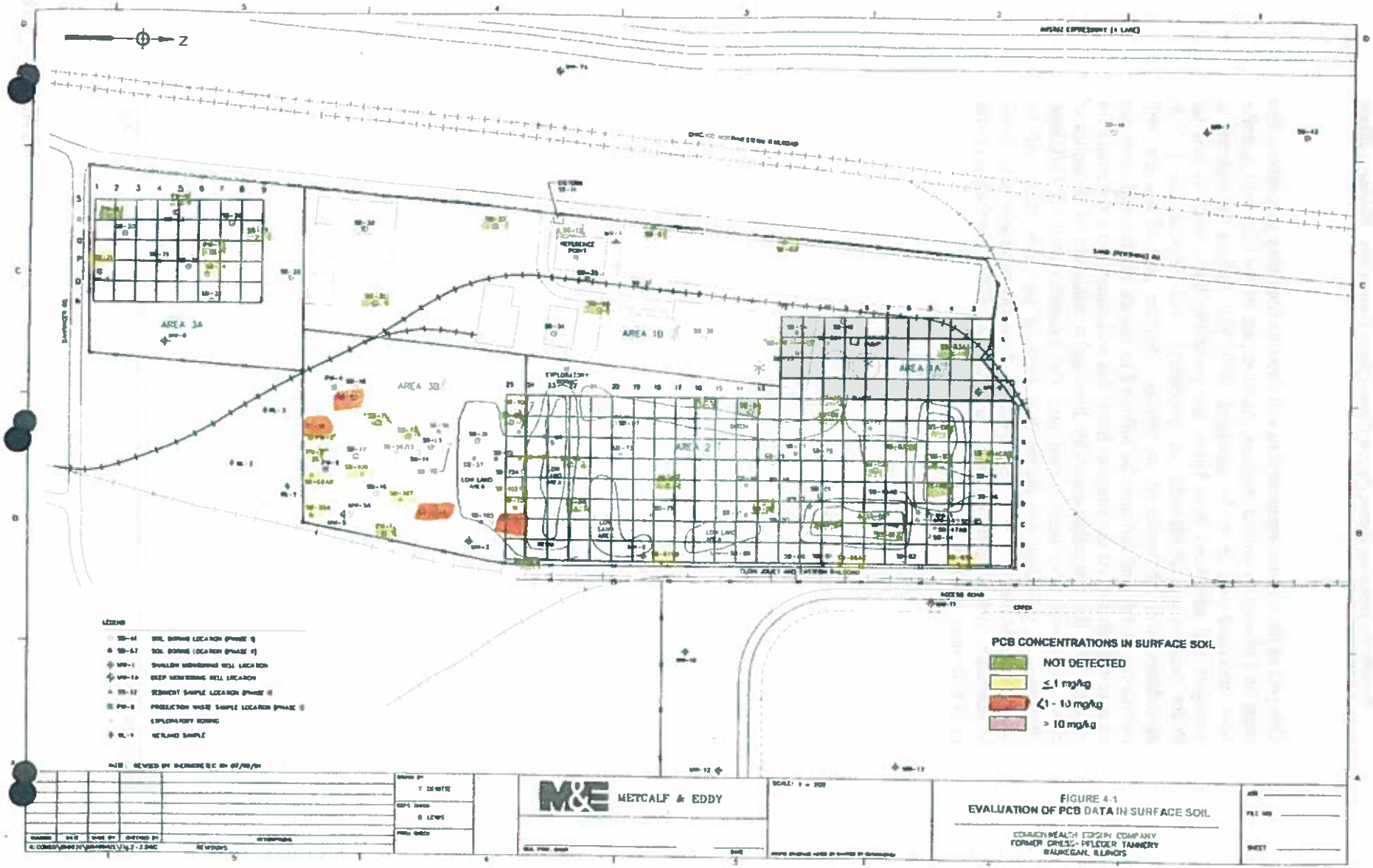
The self-implementing procedure in the PCB Mega-Rule includes sampling requirements for characterizing a site and verifying remediation that are geared to PCB impacts in a small area (on the order of an acre or less). The evaluation presented above indicates that the affected area is several acres in size, an area too large to cost-effectively implement the sampling requirements of the self-implementing procedure. Therefore, the risk-based procedure will be used to characterize the extent of PCB impacts and verify the cleanup. A separate submittal will be provided that presents the proposed confirmatory sampling plan for this project.

As discussed above, a compacted soil cover at least 10 inches thick can be placed over surface soil with concentrations of total PCBs between 1 and 10 mg/kg. Soil with total PCB concentrations exceeding 10 mg/kg will be removed. The compacted soil cover will be constructed of relatively permeable soil that will allow rainfall to percolate to the water table. If an impermeable cover were placed on the affected areas (which will be several acres in total), stormwater management would become a significant issue.

The use of a permeable cover will be acceptable from the perspective of protecting groundwater from PCBs leaching from unsaturated soil. The absence of detected values of PCBs in all of the groundwater samples indicates that PCBs are not leaching from the soil into the groundwater. This is particularly relevant in the case of groundwater samples from monitoring wells MW-3 and MW-5, which are downgradient from the area with the highest concentrations of PCBs in soil. While leaching of PCBs to groundwater is currently not significant, leaching will be even less significant after the soil with the highest PCB concentrations is removed. Consequently, implementing a soil cover with relatively permeable soil will not alter the fact that leaching of PCBs is insignificant at this site and the soil cover will address the only remaining risk issue--potential direct contact exposures to PCBs in soil.

For those areas of the property with a soil cover, it will be necessary to have an institutional control ensuring that the soil cover remains in place. To facilitate redevelopment of the property and also ensure that the soil cover remains in place, the following procedure is proposed. A soil management plan will be developed that will address the various aspects of soil management during excavation and construction. The plan will include a surveyed site map identifying the areas on the site where a soil cover is in place. Prior to placing this cover, the area will be graded as necessary and then covered with a permeable geotextile material. The geotextile material is intended to demarcate the depth where the clean soil cover ends and potentially impacted soil begins. If excavation occurs below the depth of the permeable geotextile, then this excavation must follow the soil management procedures outlined in the plan.

One part of the soil management plan will describe the safety precautions that must be followed to protect workers. Another part of the plan will describe how excavated soil is to be managed. This will include procedures to segregate soil excavated from below the geotextile liner, test this soil for PCBs (and other constituents, as necessary), and dispose the soil in accordance with the results of the testing. Another part of the plan will outline the procedures that must be followed to ensure that the soil cover has been re-established. At the simplest level, this will simply be a procedure for ensuring that the permeable geotextile liner and a minimum of 10 inches of clean soil cover have been placed over the excavated soil. If buildings, structures, or pavement are placed over parts of the area, these will be incorporated as part of the engineered barrier. This soil management plan will be developed and submitted to Illinois EPA and the USEPA for their approval prior to its implementation.



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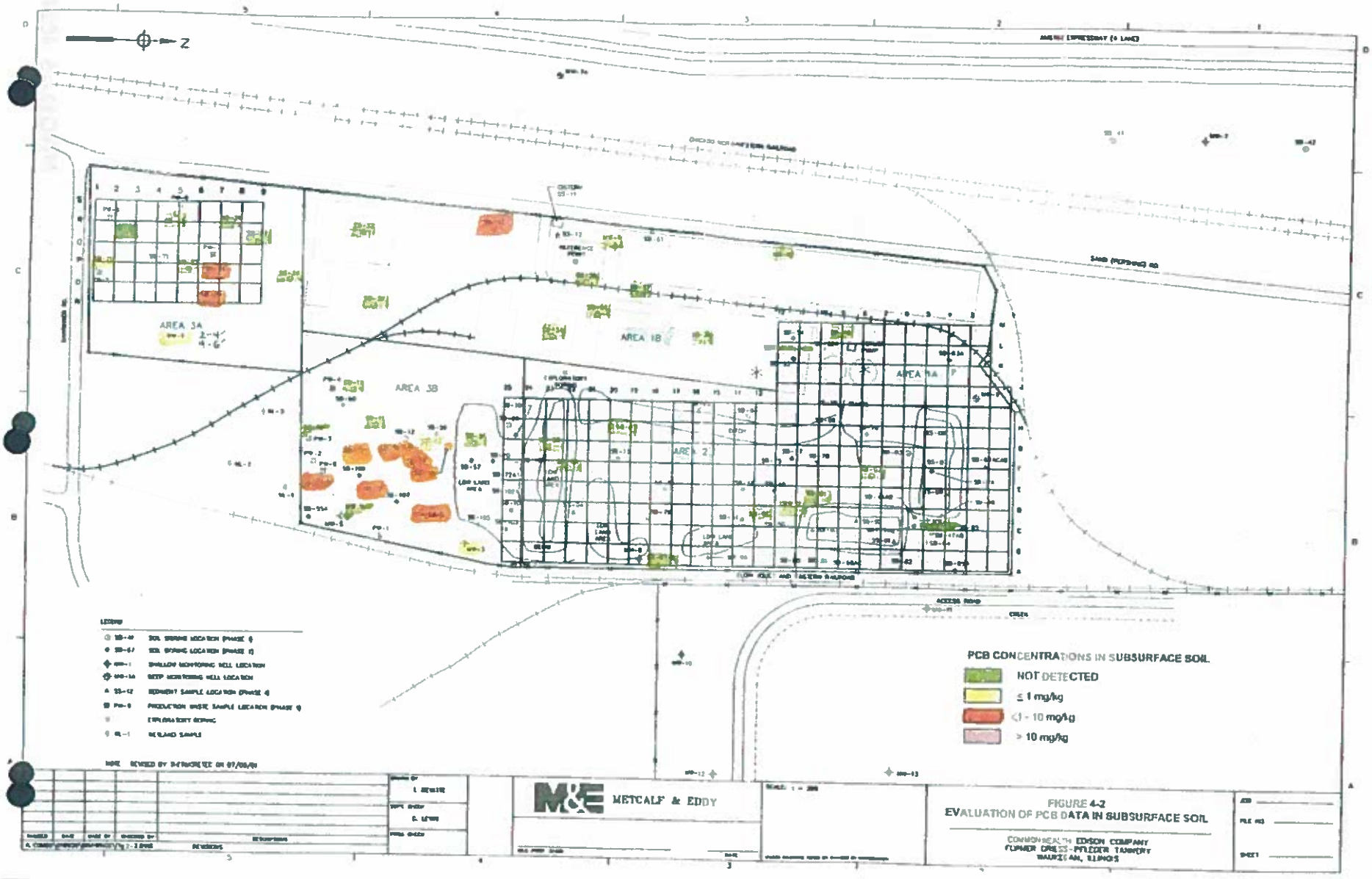

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Section 5

5 Additional Evaluation of Direct Contact Exposures to Soil

5.1 Overview

Sections 3 and 4 presented an initial evaluation of a number of potential exposure pathways, including direct contact exposure to soil (i.e., ingestion, dermal contact, etc.); the groundwater component of the groundwater ingestion exposure route and the soil component of the groundwater ingestion exposure route; and the groundwater to surface water pathway. Of these potential exposure pathways, only direct contact exposure pathways warranted further evaluation.

Section 3 presented the initial evaluation of soil pathways for all constituents except PCBs in soil. The following direct contact with soil pathways (i.e., ingestion, dermal contact, and inhalation of constituents emitted from the soil) were evaluated:

- **Ingestion of soil by an industrial/commercial worker:** There were exceedances of Tier 1 screening values for the industrial/commercial worker for at least one constituent in each area of interest.
- **Inhalation of constituents emitted from soil by the industrial/commercial worker:** There was an exceedance of the Tier 1 screening value for the industrial/commercial worker for arsenic in surface soil in Area 1A and Area 2, and subsurface soil in Area 2. There were no exceedances of Tier 1 screening values for any constituents in any other areas.
- **Ingestion of soil by a construction worker:** There were exceedances of the Tier 1 screening value for the construction worker in surface soil in Area 1A (arsenic and lead), Area 2 (arsenic, lead, and mercury), Area 3A (arsenic and lead), and Area 3B (arsenic and lead).
- **Inhalation of constituents emitted from soil by a construction worker:** There were no exceedances of Tier 1 screening values for this pathway for any constituents.

Section 4 presented the evaluation of PCBs in soil. The concentrations of total PCBs in surface and subsurface soil were compared to action levels under the PCB Mega-Rule for a high occupancy area. The concentrations of total PCBs in two areas, Area 1A (Northeastern Portion of the Former Production Area) and Area 2 (Wastewater Discharge Area), were below 1 mg/kg, so no additional evaluation is necessary in these areas. There were exceedances of action levels in the other three areas. The results of the comparison and the proposed additional actions are summarized below.

- Area 1B (Main Portion of Former Production Area): There was an exceedance of the PCB action level of 1 mg/kg in one subsurface soil sample but not in the surface soil sample collected above it. A soil cover is effectively in place, so no further action is needed except an institutional control ensuring that the soil cover remains in place or the soil may be removed.

- Area 3A (Southern Portion of Production Waste Disposal Area): There were three subsurface soil samples with exceedances of the PCB action level of 1 mg/kg (SB-24, SB-25, and MW-6). As discussed in detail later in this section, a soil cover and institutional controls are proposed for much of Area 3A. The cover will extend to the southern, eastern, and western boundaries. The northern extent of the soil cover has not been finalized. At a minimum, the soil cover will extend over locations SB-24, SB-25, and MW-6. By using soil cover and institutional controls, the exceedances of the PCB action level of 1 mg/kg will be addressed.

- Area 3B (Eastern Portion of Production Waste Disposal Area): There were surface soil samples with concentrations of PCBs exceeding the action level of 10 mg/kg, where removal of the soil is necessary. There were also surface and subsurface soil samples with concentrations between 1 mg/kg and 10 mg/kg, where a soil cover is needed. Therefore, remediation of PCBs in Area 3B will involve the removal of soil with concentrations of PCBs exceeding 10 mg/kg, backfilling the excavation with clean soil and ensuring through an institutional control that a compacted 10-inch soil cover remains in place over soil with concentrations of total PCBs that are greater than 1 mg/kg, but equal to or less than 10 mg/kg. The PRPs will cover the majority of Area 3B. The cover will extend to the southern, eastern, and western boundaries of Area 3B. The extent of the cover to the north has not been determined.

The following sections provide additional evaluations of direct contact exposures to soil in each area of interest. Areas 1A, 2, 3A, and 3B are grouped together in Section 5.2, while Area 1B is discussed separately in Section 5.3.

5.2 Areas 1A, 2, 3A, and 3B

5.2.1 Summary of Initial Evaluation

5.2.1.1 Area 1A: Northeastern Portion of Former Production Area

Area 1A includes part of the grid sampling performed for arsenic and lead in the northeastern part of the site. In Area 1A, there were exceedances of Tier 1

screening values for the ingestion pathway for an industrial/commercial worker for benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h,)anthracene, DDT, dieldrin, arsenic, and lead in soil samples. Arsenic exceeded the Tier 1 screening value for the inhalation pathway for the industrial/commercial worker. There were exceedances of the Tier 1 screening values for the ingestion pathway for the construction worker for arsenic and lead. No constituents exceeded Tier 1 screening values for the inhalation pathway for the construction worker.

The locations of surface and subsurface soil samples with exceedances of PAHs or pesticides are provided in Figures 5-1 and 5-2, respectively. Figures 5-3 and 5-4 present the results of arsenic and lead data, respectively, in the gridded area in the northeastern part of the site. The gridded area covers all of Area 1A, most of Area 2 and a small part of Area 3B, and provides results for samples collected over a 0 to 3 foot interval. Figures 5-5 and 5-6 provide information on arsenic and lead concentrations in subsurface soil, respectively, where subsurface soil samples are samples collected from a sampling interval that starts at least 1 foot below the surface.

Both surface soil samples analyzed for PAHs (SB-39A and SB-63A) had exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker for at least one PAH. Two subsurface soil samples were analyzed for PAHs (SB-39B and SB-40B) and one (SB-39B) had an exceedance for benzo(a) pyrene.

One of the two surface soil samples analyzed for pesticides in the Phase I investigation (SB-39A) had exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker for DDT and dieldrin. There were no exceedances of the Tier 1 screening values for these constituents for the industrial/commercial worker in the subsurface soil sample collected at this location. Three surface soil samples (SB-52A, SB-53A, and SB-54A) were collected around SB-39A during the Phase II investigation to delineate the extent of exceedances and there were no exceedances of the Tier 1 screening values for these constituents for the industrial/commercial worker in these samples.

There were 48 surface soil samples out of 84 grid samples that had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker for arsenic (13 mg/kg). Of these, two exceeded the Tier 1 screening value for inhalation by an industrial/commercial worker for arsenic (1,200 mg/kg), and 33 exceeded the Tier 1 screening value for ingestion by a construction worker for arsenic (61 mg/kg). Both subsurface soil samples analyzed for arsenic had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker and one of the two exceeded the Tier 1 screening value for ingestion by a construction worker.

There were 28 surface soil samples out of the 84 grid samples that had exceedances of the Tier 1 screening values for ingestion by an industrial/commercial worker and ingestion by a construction worker for lead (both Tier 1 screening values are 400 mg/kg). Neither subsurface soil sample analyzed for lead exceeded the Tier 1 screening values for ingestion by an industrial/commercial worker or ingestion by a construction worker.

No PCBs were detected in surface or subsurface soil samples collected from this area.

5.2.1.2 Area 2: Wastewater Discharge Area

Area 2 includes much of the grid sampling performed for arsenic and lead in the northeastern part of the site. In Area 2, there were exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker for benzo(a)pyrene, arsenic, and lead in soil samples. In addition, arsenic in soil exceeded the Tier 1 screening value for inhalation by an industrial/commercial worker. There were also exceedances of Tier 1 screening values for ingestion by a construction worker for arsenic, lead, and mercury in soil samples. No constituents exceeded their Tier 1 screening values for the inhalation by a construction worker.

The locations of surface and subsurface soil samples are provided in Figures 5-1 and 5-2, respectively, along with the results of benzo(a)pyrene. Figures 5-3 and 5-4 present the results of arsenic and lead data, respectively, in the gridded area in the northeastern part of the site. The gridded area covers all of Area 1A, most of Area 2 and a small part of Area 3B, and provides results for samples collected over a 0 to 3 foot interval. Figures 5-5 and 5-6 provide information on arsenic and lead concentrations in subsurface soil, respectively, where subsurface soil samples are samples collected from a sampling interval that starts at least 1 foot below the surface.

In surface soil, benzo(a)pyrene exceeded the Tier 1 screening value of 0.8 mg/kg for ingestion by an industrial/commercial worker in two of 21 samples: SS-09(0-1') and SS-10(0-1'). In subsurface soil, benzo(a)pyrene exceeded the Tier 1 screening value in one out of 10 samples: MW-2B(4-6').

There were 248 surface soil grid samples out of 397 that had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker for arsenic (13 mg/kg). Of these, 29 exceeded the Tier 1 screening value for inhalation by an industrial/commercial worker for arsenic (1,200 mg/kg), and 149 exceeded the Tier 1 screening value for ingestion by a construction worker for arsenic (61 mg/kg). In subsurface soil, 21 out of 30 samples analyzed for arsenic had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker, four exceeded the Tier 1 screening value for inhalation by an industrial/commercial worker, and 12 exceeded the Tier 1 screening value for ingestion by a construction worker,

There were 336 surface soil grid samples out of 397 that had exceedances of the Tier 1 screening values for ingestion by an industrial/commercial worker and ingestion by a construction worker for lead (both Tier 1 screening values are 400 mg/kg). Six out of 12 subsurface soil samples analyzed for lead exceeded the Tier 1 screening values for ingestion by an industrial/commercial worker or ingestion by a construction worker.

One out of 12 subsurface soil samples analyzed for mercury exceeded the Tier 1 screening value for ingestion by a construction worker: MW-2(6-8').

PCBs were not detected at concentrations above the action level of 1 mg/kg in the 21 surface or 10 subsurface soil samples from Area 2.

5.2.1.3 Area 3A: Southern Portion of Production Waste Disposal Area

Area 3A includes the grid sampling performed for arsenic and lead in the southwestern part of the site. In Area 3A, there were exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, arsenic, and lead in soil samples. There were also exceedances of Tier 1 screening values for ingestion by a construction worker for arsenic and lead. No constituents exceeded their Tier 1 screening values for the inhalation pathway by an industrial/commercial worker or a construction worker.

The locations of surface and subsurface soil samples are provided in Figures 5-1 and 5-2, respectively, along with the results for PAHs. Figures 5-7 and 5-8 present the results of arsenic and lead data, respectively, in the gridded area in the southwestern part of the site. This gridded area is entirely contained within Area 3A and provides results for samples collected over a 0 to 3 foot interval. Figures 5-5 and 5-6 provide subsurface soil concentrations for arsenic and lead, respectively, where subsurface soil samples are samples collected from a sampling interval that starts at least 1 foot below the surface.

In surface soil, no PAHs exceeded their Tier 1 screening value for industrial/commercial worker or construction worker in any of six samples. In subsurface soil, benzo(a)anthracene and benzo(b)fluoranthene exceeded the Tier 1 screening value of 8 mg/kg for ingestion by an industrial/commercial worker only in subsurface soil sample SB-26B(3-4'). Similarly, benzo(a)pyrene exceeded the Tier 1 screening value of 0.8 mg/kg for ingestion by an industrial/commercial worker in two out of 11 samples: SB-26B(3-4') and SB-28B(1-2').

There were 49 surface soil grid samples out of 94 that had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker for arsenic (13 mg/kg). Of these, five exceeded the Tier 1 screening value for ingestion by a construction worker for arsenic (61 mg/kg). In subsurface soil, five out of 12 samples analyzed for arsenic had exceedances of the Tier 1

screening value for ingestion by an industrial/commercial worker and one sample exceeded the Tier 1 screening value for ingestion by a construction worker.

There were 70 surface soil grid samples out of 94 that had exceedances of the Tier 1 screening values for ingestion by an industrial/commercial worker and ingestion by a construction worker for lead (both Tier 1 screening values are 400 mg/kg). Three out of 12 subsurface soil samples analyzed for lead exceeded the Tier 1 screening values for ingestion by an industrial/commercial worker or ingestion by a construction worker.

PCBs were not detected at concentrations above the action level of 1 mg/kg in the six surface soil samples from Area 3A; however, three of the 11 subsurface soil samples had detections between 1 and 10 mg/kg: SB-24B(3-4'), SB-25B(3.5-4.5'), and MW-6A(2-4'). Additional characterization will be needed of surface soil in the vicinity of sample locations SB-25 and MW-6 to determine the vertical extent of PCB impacted soil. If the results of this additional soil sampling show that PCB concentrations in surface soil are less than 1 mg/kg, a soil cover is effectively in place and no further action would be needed.

5.2.1.4 Area 3B: Eastern Portion of Production Waste Disposal Area

Area 3B includes a small portion of the grid sampling performed for arsenic and lead in the northeastern part of the site. In Area 3B, there were exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker for benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, aldrin, dieldrin, heptachlor epoxide, arsenic, and lead in soil samples. There were also exceedances of the Tier 1 screening value for ingestion by a construction worker for arsenic and lead in soil samples. No constituents exceeded their Tier 1 screening values for inhalation by an industrial/commercial worker or a construction worker. There were exceedances of the PCB action level of 1 mg/kg in surface and subsurface soil.

Figure 5-9 presents the location of surface soil samples in Area 3B and whether or not there were exceedances at each sample. Figure 5-10 presents the same information for subsurface soil samples. In surface soil, PAHs exceeded the Tier 1 screening values for ingestion by an industrial/commercial worker in four of 13 samples: SB-29B (0-1'), SB-12A (0-2'), SB-15A (0-1'), and SB-60A (0-1'). In subsurface soil, PAHs did not exceed the Tier 1 screening values in any of the 15 samples.

Only two of the 10 surface soil samples analyzed for pesticides had exceedances of Tier 1 screening values for ingestion by an industrial/commercial worker. Sample SB-10A (0-1') had an exceedance for dieldrin, and sample SB-15A (0-1') had exceedances for aldrin and heptachlor

epoxide. None of the 15 subsurface soil samples analyzed for pesticides had exceedances of the Tier 1 screening values.

There were seven out of 29 surface soil samples that had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker for arsenic (13 mg/kg). In subsurface soil, three out of 15 samples analyzed for arsenic had exceedances of the Tier 1 screening value for ingestion by an industrial/commercial worker.

There were 13 out of 29 surface soil samples that had exceedances of the Tier 1 screening values for ingestion by an industrial/commercial worker and ingestion by a construction worker for lead (both Tier 1 screening values are 400 mg/kg). Four out of 15 subsurface soil samples analyzed for lead exceeded the Tier 1 screening values for ingestion by an industrial/commercial worker or ingestion by a construction worker.

The concentrations of total PCBs exceeded the action level of 1 mg/kg in 10 out of 24 surface and seven out of 15 subsurface soil samples in Area 3B. Of these, six surface samples exceeded a concentration of 10 mg/kg.

5.2.2 Proposed Remediation Objectives for Direct Contact Pathways

Section 5.2.1 summarizes, in detail, the exceedances of Tier 1 screening values for direct contact pathways. The exceedances of the PCB action level of 1 mg/kg are also summarized. At the request of the Illinois EPA, an action level was developed for arsenic to address potential effects from acute exposures. This action level is 800 mg/kg and the calculation for this action level is provided in Appendix G. A number of soil samples in Areas 1A and 2 have arsenic concentrations that exceed this acute action level.

To address the exceedances of the acute arsenic action level of 800 mg/kg in Areas 1A and 2, it is proposed that all soil with concentrations exceeding this level will be removed and disposed of appropriately off-site. It should be noted that removal of all arsenic exceeding the acute action level of 800 mg/kg will remove the soil with the highest concentrations of arsenic. Based on the grid sampling data, this will reduce the average concentration of arsenic from 166.5 to 91.1 mg/kg in Area 1A (a 45 percent reduction) and from 283.3 to 78.7 mg/kg in Area 2 (a 72 percent reduction). This will significantly reduce the mass of arsenic potentially available to leach into groundwater.

To address the exceedances of the PCB action level of 10 mg/kg in Area 3B, it is proposed that all soil exceeding this action level will be removed and disposed of appropriately off-site.

To address the exceedances of Tier 1 screening value for direct contact pathway and the PCB action level of 1 mg/kg, an engineered barrier with

institutional controls is proposed for Areas 1A, 2, 3A, and 3B. The proposed minimum extent of soil cover for the site is presented in Figure 5-11.

A confirmatory soil sampling program will be developed to determine how much soil exceeds the PCB action level of 10 mg/kg and needs to be removed. In addition, the sampling program will identify the extent of soil cover along the western sides of Areas 1A, 2, and 3B, and the northern side of Area 3A. The grid sampling in Areas 1A and 2 have sufficiently delineated the location of arsenic concentrations exceeding the acute action level of 800 mg/kg.

It is proposed that the engineered barrier will consist of clean material of 10-inch thick gravel and 6 inch topsoil placed over a permeable geotextile liner. The specifications for this engineered barrier are presented in Appendix I. The proposed engineered barrier must be approved by the Illinois EPA since it is less than 3 feet of soil cover according to Section 742.1105 of TACO.

The proposed engineered barrier will address all direct contact exposure routes for an industrial/commercial worker. It will prevent incidental ingestion of, dermal contact with, and inhalation of particulates emitted from soil beneath the cover. None of the constituents of interest (various PAHs, pesticides, arsenic, lead, and mercury) are considered to volatilize to a significant extent; therefore, volatilization from soil is not a pathway that must be addressed. However, an engineered barrier will reduce what little volatilization may occur.

Institutional controls will be needed in addition to the engineered barrier. An institutional control will be required to ensure that the engineered barrier is maintained. Since soil will be left in place with concentrations of arsenic, lead, or mercury that exceed Tier 1 screening values for ingestion by the construction worker, an institutional control will be imposed on the site requiring that safety precautions be taken when performing excavation work under the engineered barrier and a requirement to restore the cover after such activity.

To summarize, the proposed remediation objectives for direct contact exposure to soil will be as follows for all constituents:

- Direct contact exposures to an industrial/commercial worker:
    - Ingestion pathway:

      For all constituents except those that exceed Tier 1 screening values for ingestion --Tier 1 screening values.

      For those constituents that exceed Tier 1 screening values for ingestion--Pathway exclusion through an engineered barrier and an institutional control where a 10-inch thick layer of

gravel and 6 inches of top soil placed over a permeable geotextile liner, are placed over soil exceeding Tier 1 screening values and the PCB action level of 1 mg/kg.

- Inhalation pathway:

  For all constituents --Tier 1 screening values for inhalation. It should be noted that removal of soil with arsenic concentrations that exceed 800 mg/kg will eliminate exceedances of the inhalation pathway for arsenic, since the Tier 1 industrial/commercial worker inhalation screening value for arsenic is 1,200 mg/kg.

- Direct contact exposures to a construction worker:

  - Ingestion pathway:

    For all constituents except arsenic, lead, and mercury (mercury exceeds Tier 1 screening value in Area 2)--Tier 1 screening values for ingestion.

    For arsenic, lead, and mercury--Pathway exclusion through an institutional control that requires safety precautions be taken during excavation activity to address potential exposures to construction workers.

  - Inhalation pathway:

    For all constituents--Tier 1 screening values for inhalation.

If plans to redevelop this part of the site are finalized before the site is remediated, then the engineered barrier may be modified to include building or pavement (e.g., parking lots or roads), as appropriate. In other words, if a part of the area is designated for a building or pavement, then these structures will become the engineered barrier and will not be covered with clean soil, except as is necessary to prepare the foundation for the building or the base for the pavement. During construction of the structures, appropriate health and safety precautions will be taken.

5.3 Area 1B: Main Portion of Former Production Area

5.3.1 Summary of Initial Evaluation

In Area 1B, there were exceedances of Tier 1 screening values for the ingestion pathway for an industrial/commercial worker for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene,

dibenz(a,h,)anthracene, and arsenic in soil samples. No constituents exceeded Tier 1 screening values for the inhalation pathway for the industrial/commercial worker, the ingestion pathway for the construction worker, or the inhalation pathway for the construction worker.

The locations of surface and subsurface soil samples with exceedances are provided in Figures 5-1 and 5-2, respectively. Five of the six surface soil samples had exceedances of Tier 1 screening values for one or more PAHs. Three of the 10 subsurface soil samples had exceedances of Tier 1 screening values for one or more PAHs or arsenic.

The concentrations of total PCBs exceeded the action level of 1 mg/kg in the subsurface soil sample collected at SB-33 (see Figure 4-2), which also had exceedances of Tier 1 screening levels for PAHs. PCBs were not detected in any of the six surface soil samples analyzed.

5.3.2 Proposed Remediation Objectives for Direct Contact Pathways

The initial evaluation identified exceedances of the Tier 1 screening values for the industrial/commercial worker for the ingestion pathway for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and arsenic, and the action level of 1 mg/kg for PCBs. These exceedances will be addressed as follows:

- For all constituents except PCBs that exceed Tier 1 screening values, the exceedances will be addressed through a Tier 3 risk evaluation. This Tier 3 evaluation is presented in Appendix H and discussed below.

- For PCBs, the exceedance will be addressed by either removal, or pathway exclusion through the use of an existing soil cover with an institutional control ensuring the cover is maintained.

The proposed remediation objectives for direct contact exposure to soil will be as follows for all constituents, except PCBs:

- Direct contact exposures to an industrial/commercial worker:

    - Ingestion pathway:

      For those constituents that exceeded Tier 1 screening values for ingestion---Tier 3 evaluation. Tier 3 risk evaluation was completed for a current maintenance worker and a future outdoor worker for a central tendency exposure (CTE) scenario and a reasonable maximum exposure (RME) scenario. The exposure parameters for the maintenance worker reflect actual worker patterns at the site. The exposure parameters for the

future outdoor worker are based on the assumption that the area could be used for any industrial purpose. Therefore, the exposure parameters were conservatively selected to allow for any future industrial use of the area. The Tier 3 evaluation is presented in Appendix H.

The results of the Tier 3 evaluation indicate that all surface and subsurface soil CTE and RME noncancer hazard indices are below an acceptable chronic threshold level of 1, indicating no potential for adverse noncancer effects to either the maintenance or outdoor worker.

When evaluating carcinogenic risks, an acceptable cancer risk range of 10^{-6} to 10^{-4} is consistent with the National Oil and Hazardous Substance Pollution Contingency Plan (1990) and with Illinois regulations (Section 742.900; Subpart I of TACO). According to the Illinois EPA, a site with carcinogenic risks less than 10^{-6} generally should be considered a no-action site. For sites with carcinogenic risks greater than 10^{-6}, further risk evaluation of the site is required. For sites with a carcinogenic risk greater than 10^{-4}, corrective action is normally required (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002). All surface and subsurface soil RME cancer risks are above Illinois EPA no-action level of 10^{-6}, but fall within the carcinogenic risk range of 10^{-6} to 10^{-4}, where additional site evaluation is required. The CTE cancer risk calculations provide that additional evaluation. The CTE cancer risks are all below the Illinois EPA no-action level of 10^{-6} (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002).

As discussed above, the RME and CTE assumptions were conservative to allow for unrestricted industrial use. While it is possible that Area 1B will be used in the future, the majority of the site is expected to be covered with buildings or surface cover (pavement, gravel, etc.), which would limit direct contact. This, along with the results of the Tier 3 risk evaluation, indicates little or no potential for adverse effects to either the maintenance or outdoor worker.

- Inhalation pathway:

For all constituents--Tier 1 screening values for inhalation. Although no constituents exceeded Tier 1 screening values for inhalation, the inhalation pathway was incorporated into the Tier 3 risk evaluation for those constituents which exceeded Tier 1 screening values for ingestion. The Tier 3 evaluation is

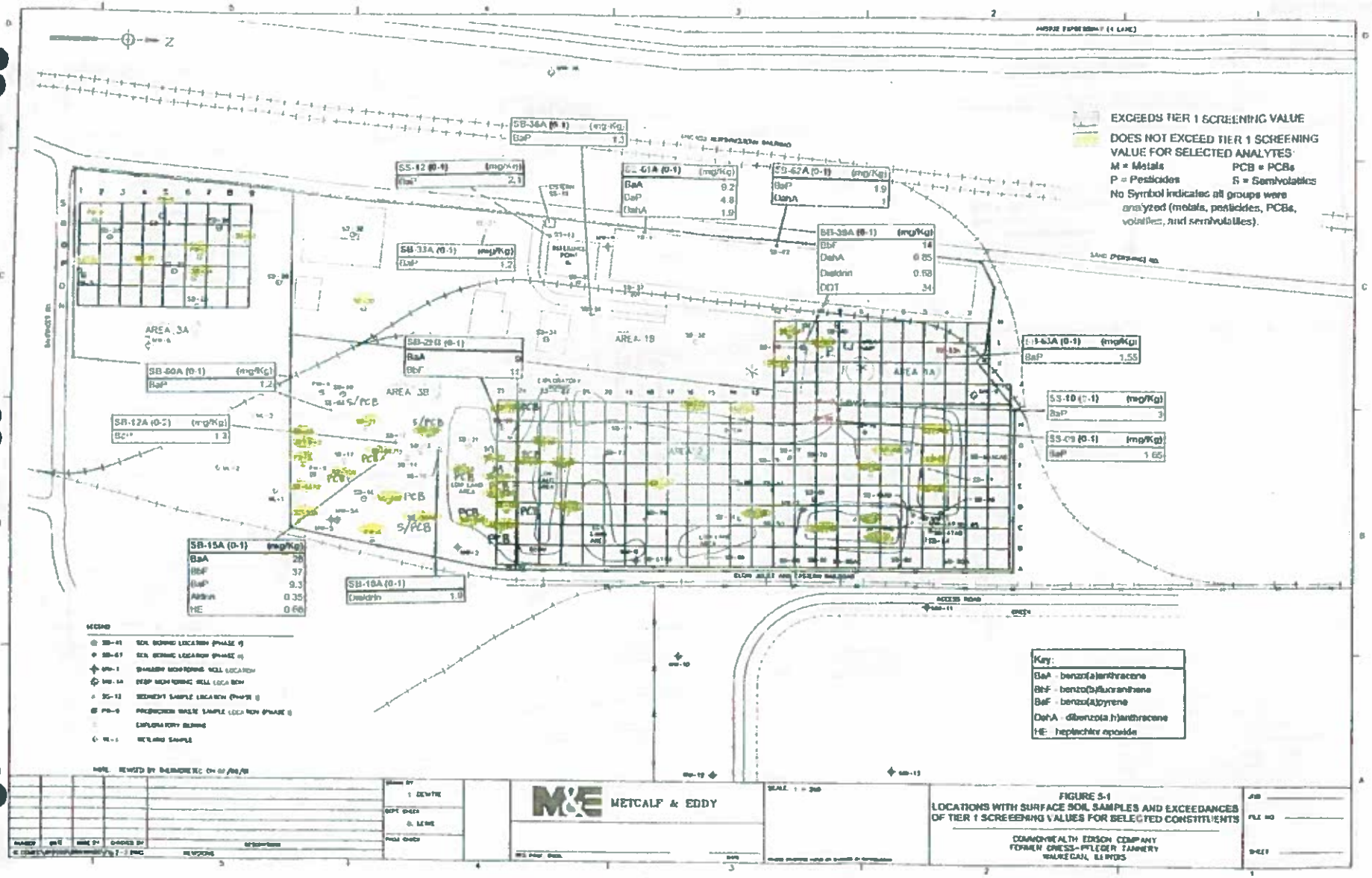
presented in Appendix H. This allowed cumulative risks and hazard indices associated with all relevant direct contact pathways to be evaluated. As discussed above, the Tier 3 risk evaluation indicated little or no potential for adverse effects to either the maintenance or outdoor workers. The inhalation pathways represented less than one percent of the total risks and hazard indices calculated.

- Direct contact exposures to a construction worker:
  - Ingestion pathway:

    For all constituents--Tier 1 screening values for ingestion
  - Inhalation pathway:

    For all constituents--Tier 1 screening values for inhalation

For PCBs, the proposed remediation objective is pathway exclusion through a soil cover or removal. As indicated earlier, there were no PCB concentrations greater than 10 mg/kg in Area 1B. There was one subsurface soil sample which exceeded 1 mg/kg, but the corresponding surface soil sample was not detected for PCBs. Therefore, a soil cover is effectively in place.



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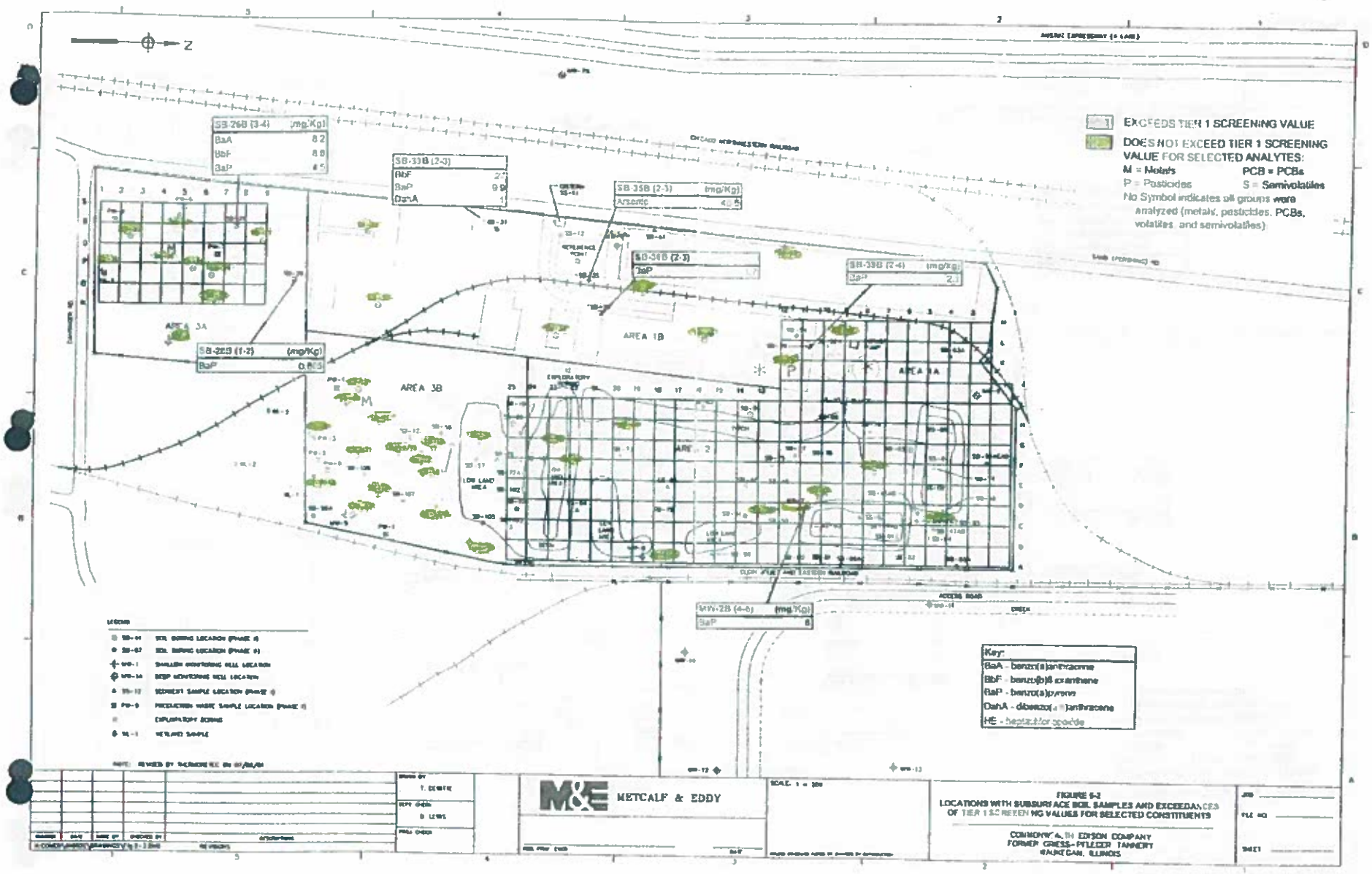

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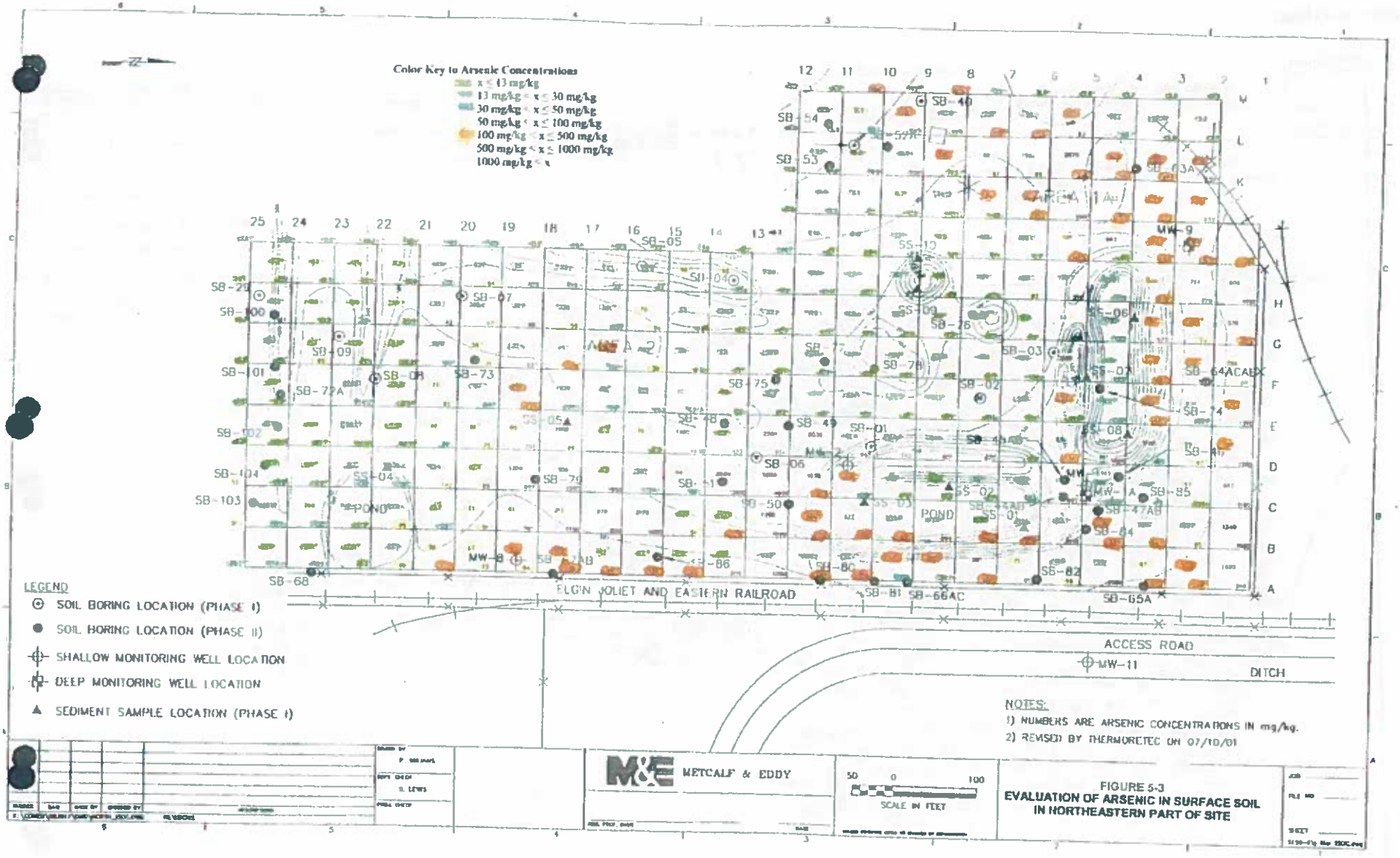

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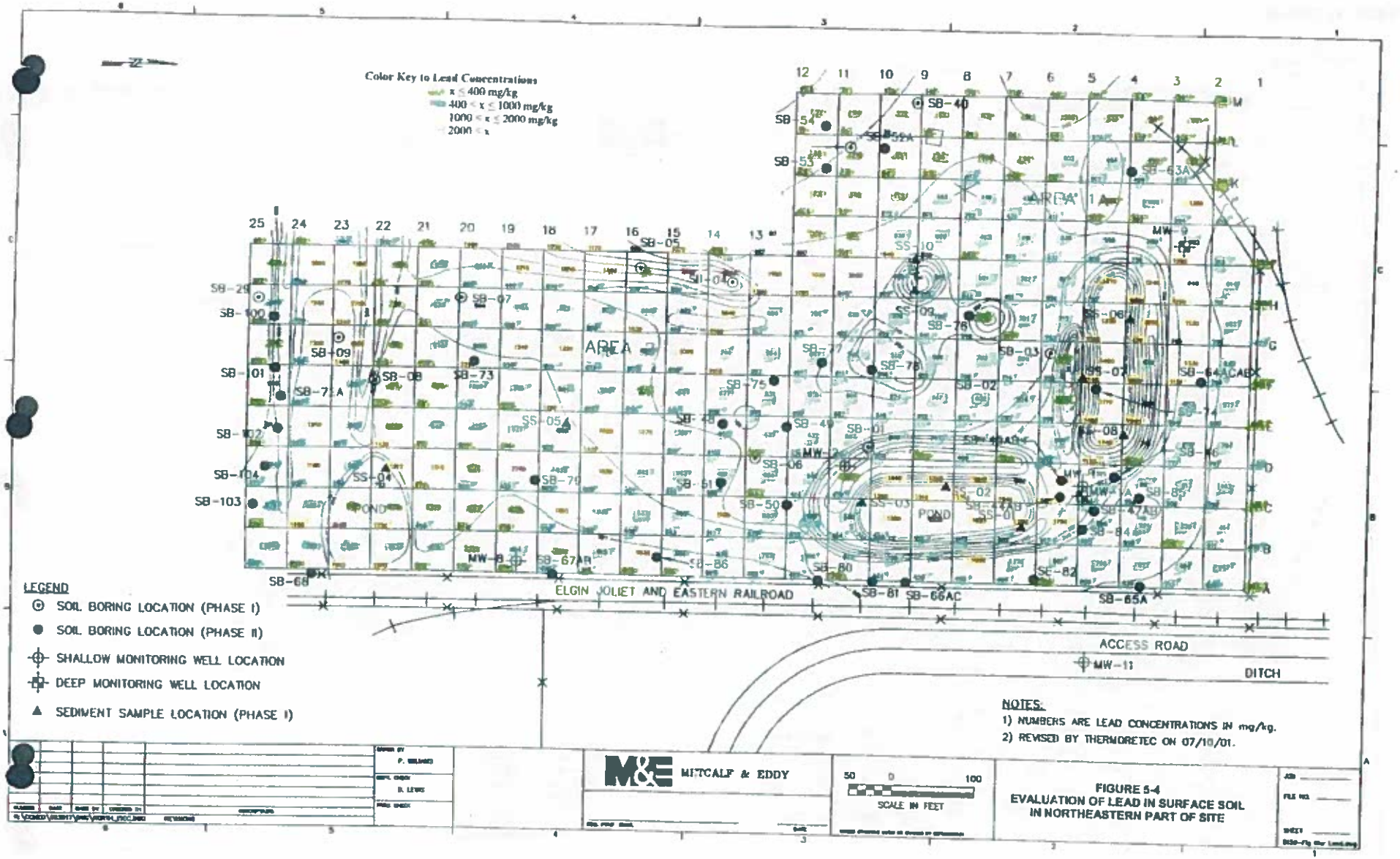

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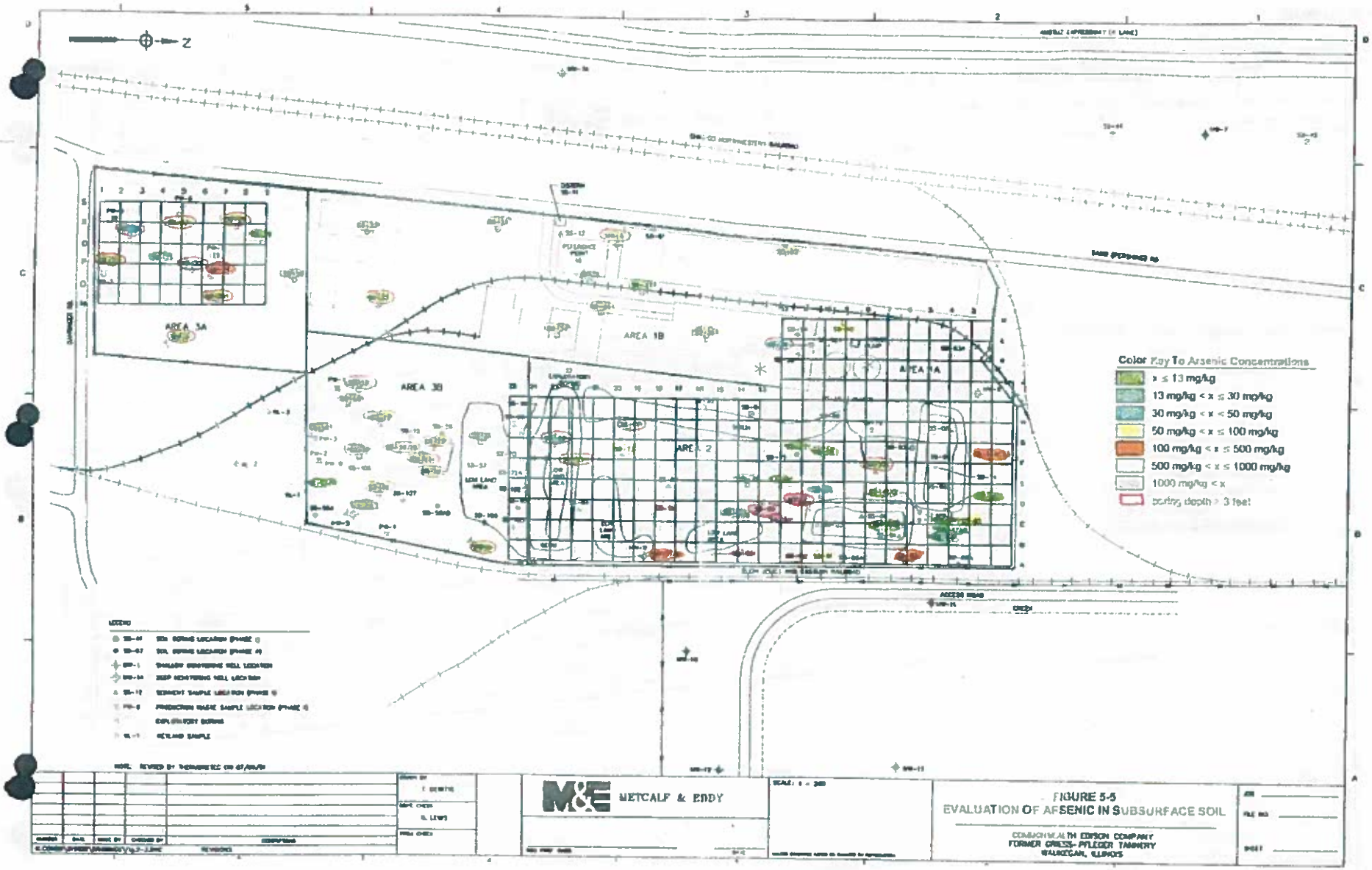

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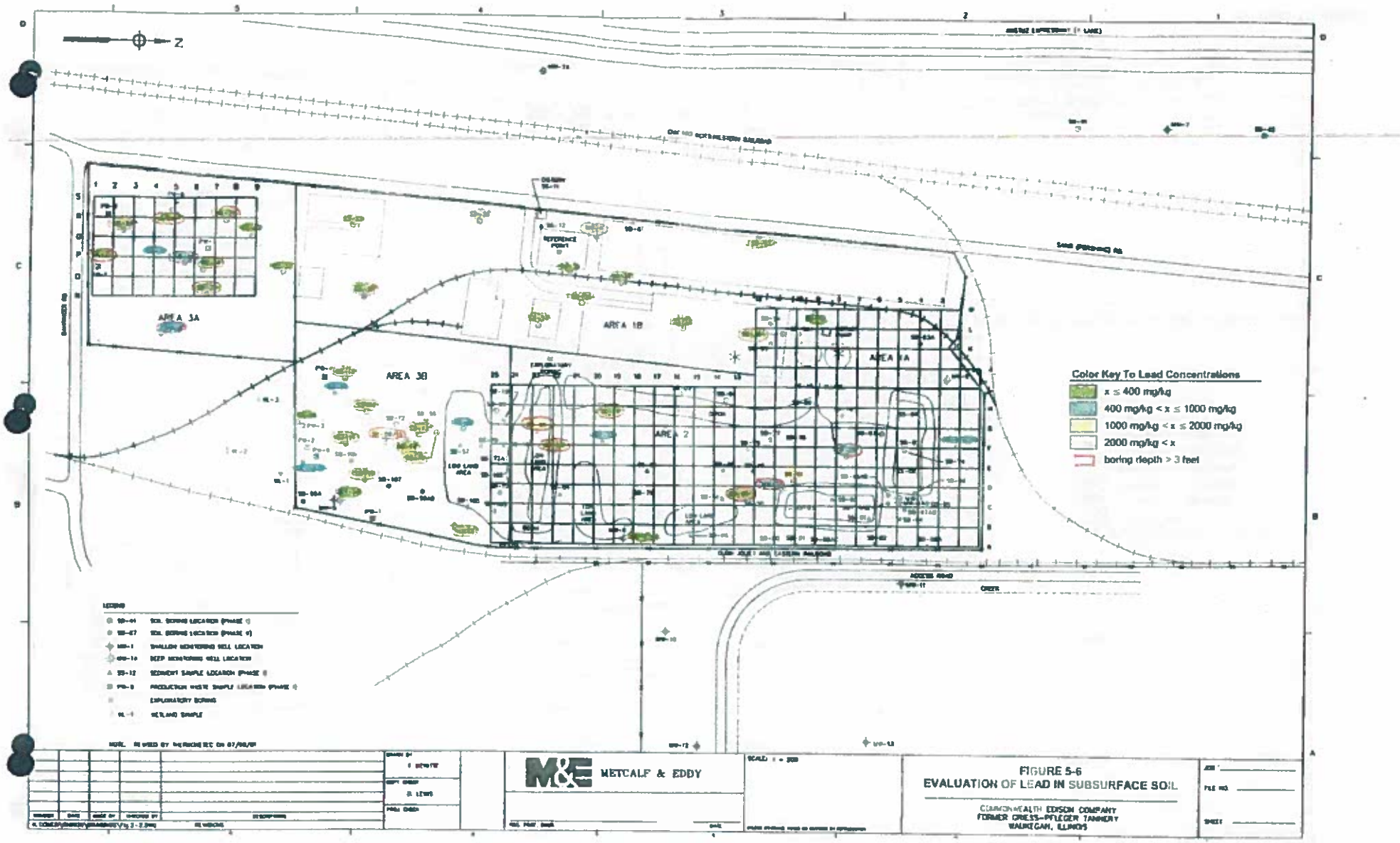

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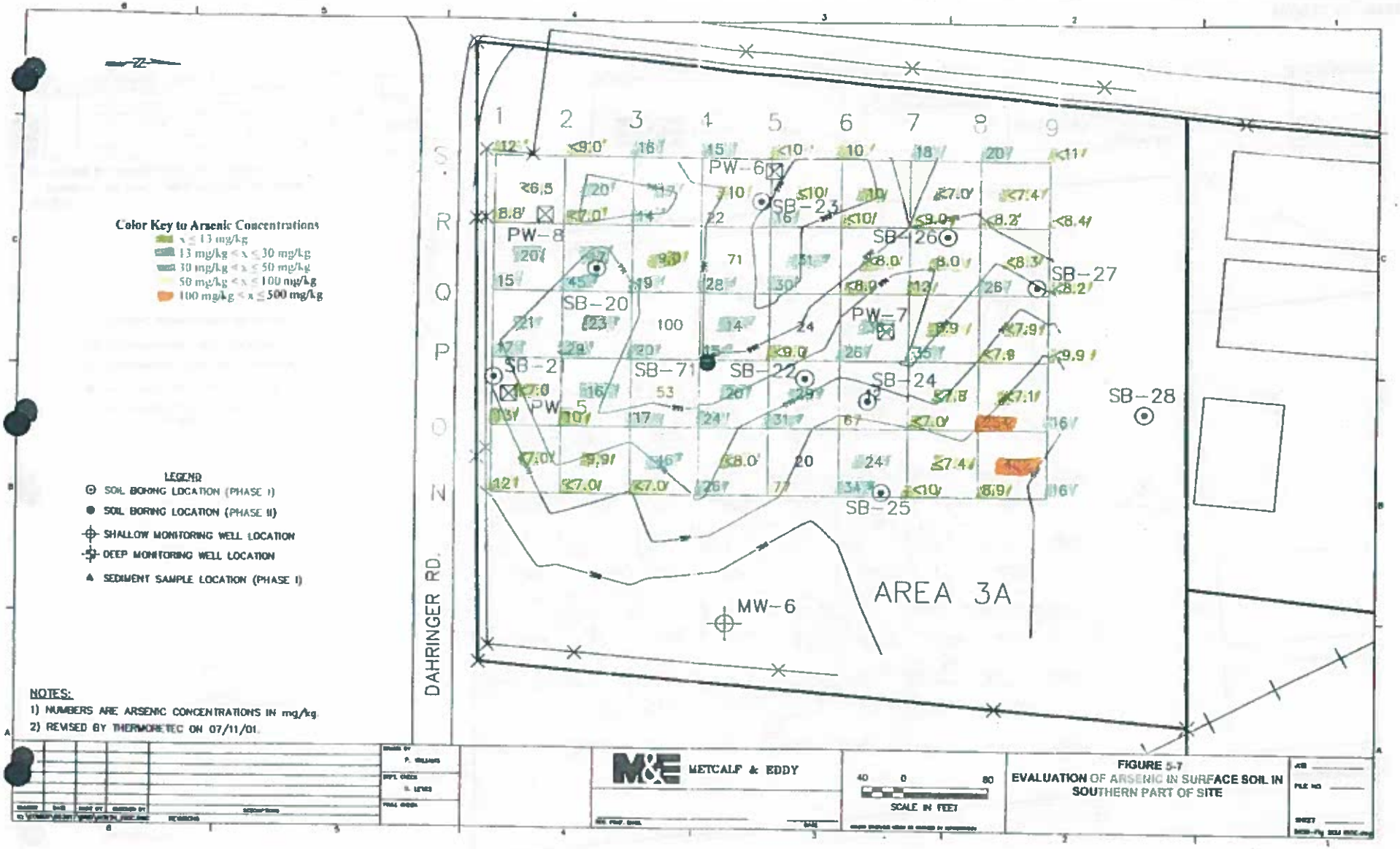

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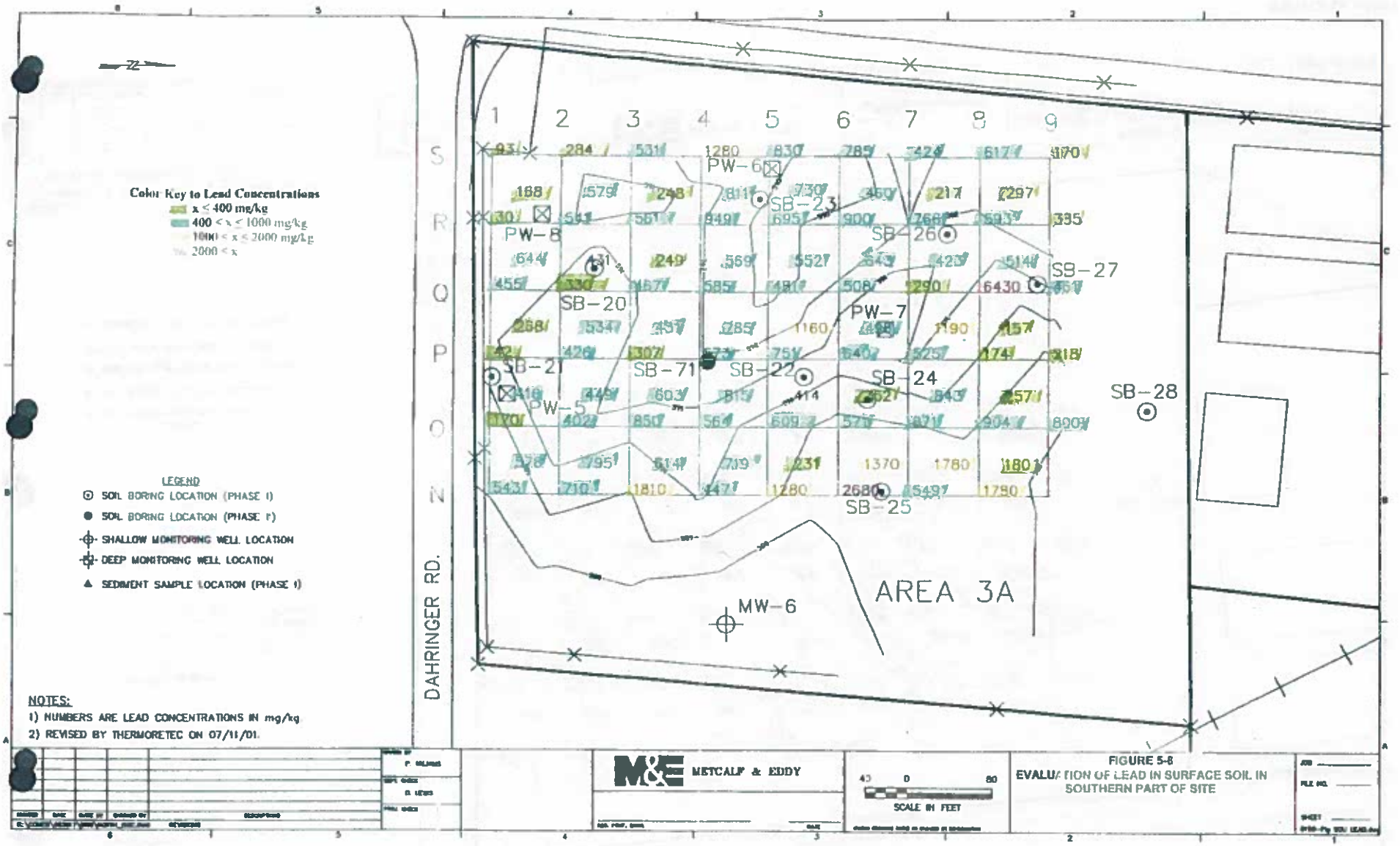

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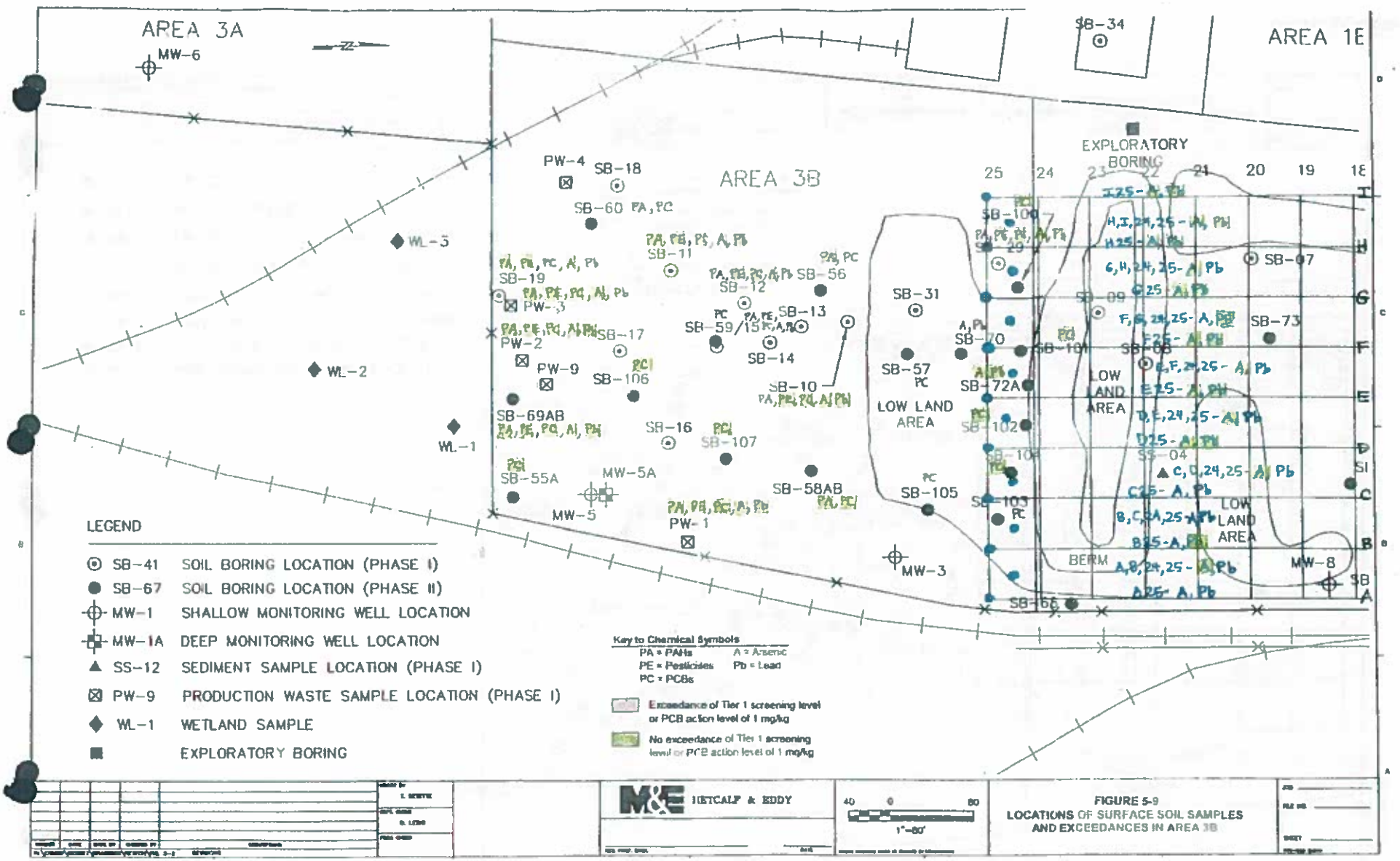

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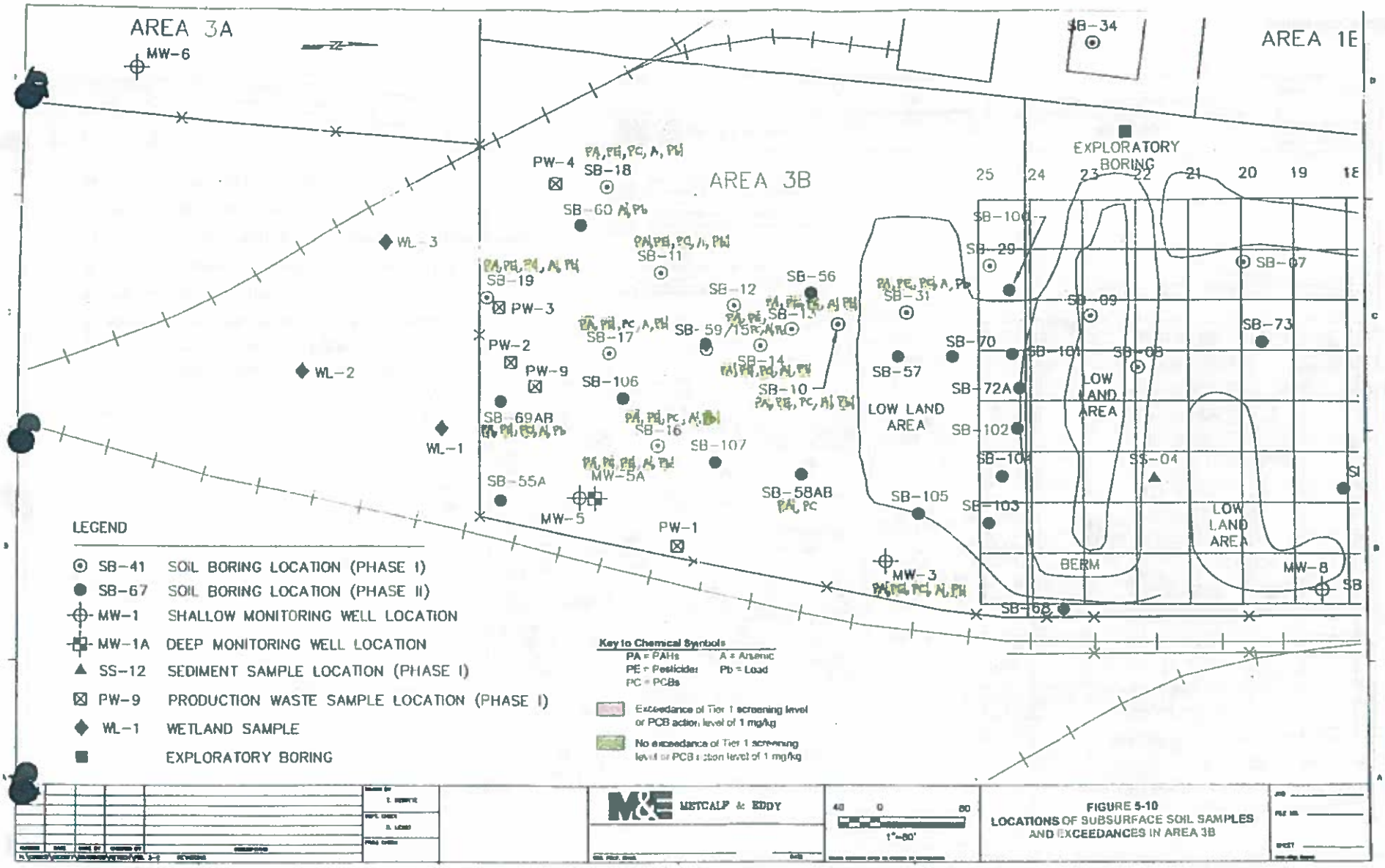

FIGURE 5-10
LOCATIONS OF SUBSURFACE SOIL SAMPLES AND EXCEEDANCES IN AREA 3B

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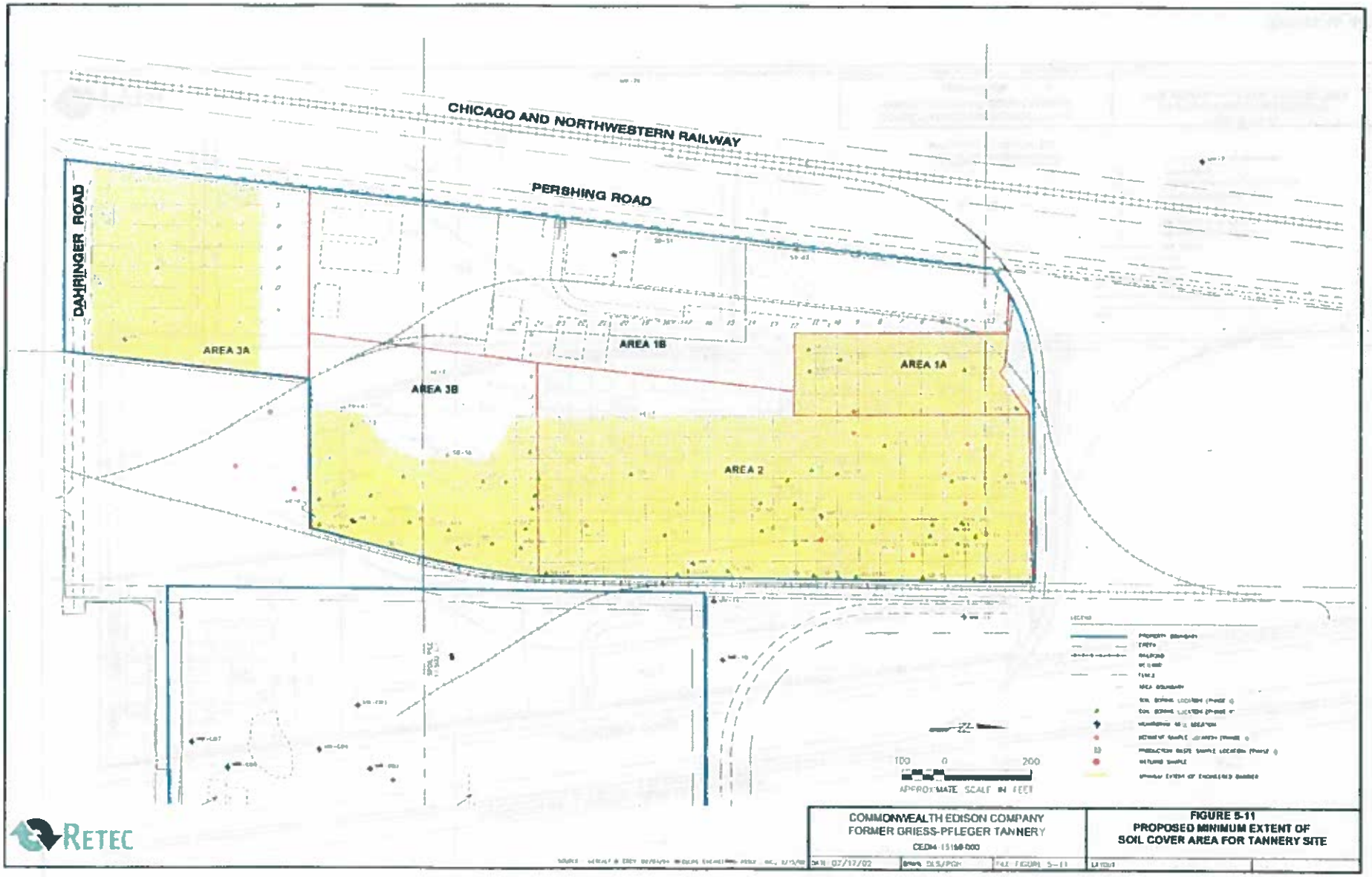

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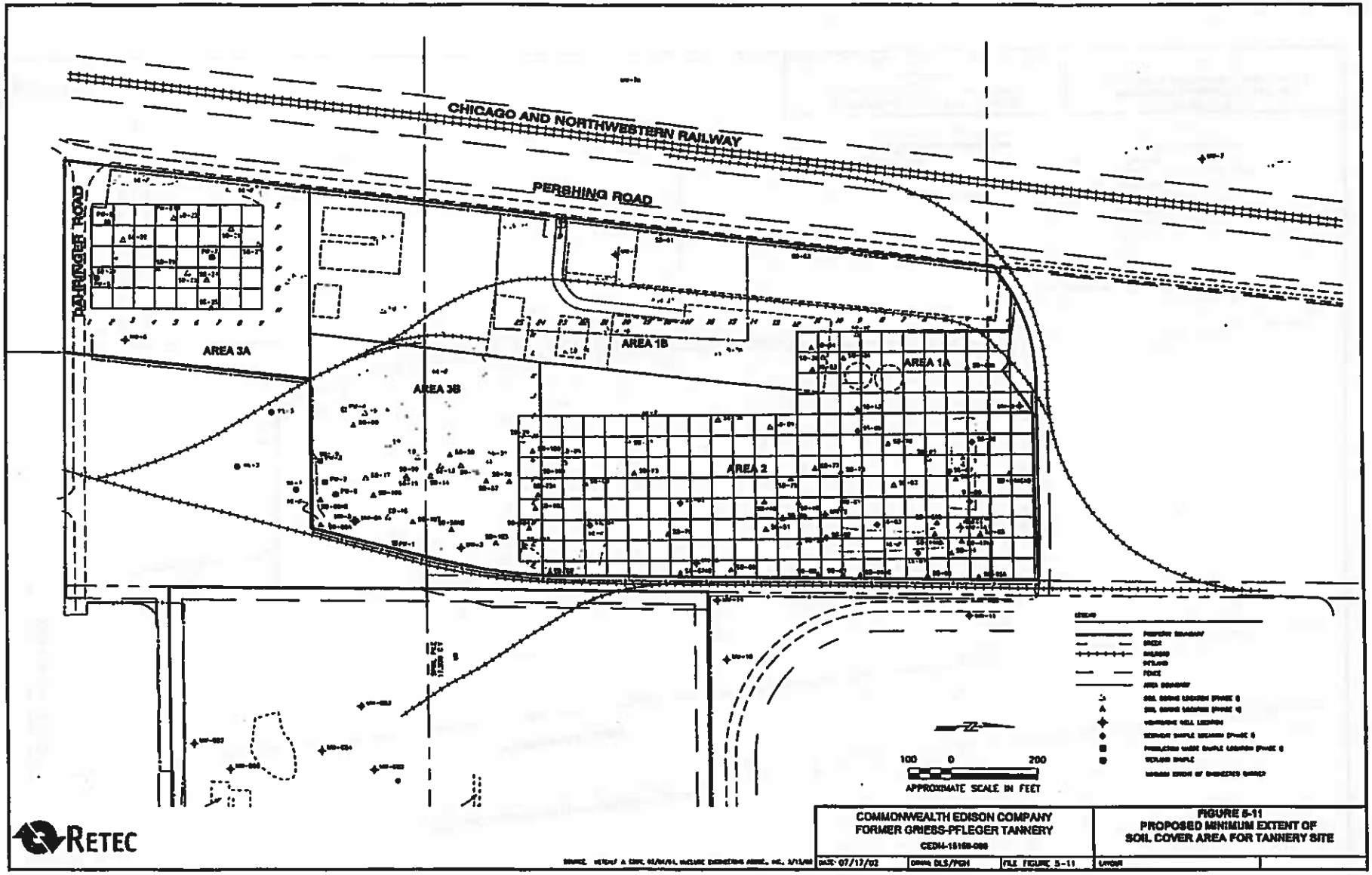

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Section 6

6 Summary of Remediation Objectives

6.1 Introduction

This document presented an evaluation of soil and groundwater exposure pathways for the tannery site. The purpose of this evaluation was to determine remediation objectives for the site. The following pathways were evaluated:

- Direct contact exposures with soil pathways (incidental ingestion and inhalation for industrial/commercial workers and construction workers)
- Groundwater pathway
    - the groundwater component of the groundwater ingestion exposure route
    - the soil component of the groundwater ingestion exposure route
- Groundwater to surface water pathway

In addition, the presence of PCBs in soil was evaluated utilizing the procedures provided in the PCB Mega-Rule.

A summary of the results of the evaluation of each pathway and the selection of remediation objectives are provided in the following subsections. A summary of the evaluation of source material is also provided.

6.2 Summary of Source Material Evaluation

The data for the tannery site were evaluated to determine if there is any source material on the site as defined under Section 742.305 of TACO (IPCB, 2001). The only source materials currently on the site were materials associated with four samples that exceeded the toxicity characteristic of TCLP.

The first type of source material was the contents of a rusted 5-gallon pail. The sample associated with this material, PW-4, exceeded the TCLP regulatory limit for lead. The material from this rusted pail was subsequently removed and disposed off-site in an appropriate manner.

The second type of source material was gray, white, and pink hide material with a slight odor. The sample associated with this material, PW-9, exceeded the TCLP limit for chromium. As discussed in detail in the Phase II Remedial Investigation Report (Metcalf & Eddy, 1995), this material would not be classified as a hazardous waste because it meets the requirements of the

chromium waste exclusion. However, this material is considered a source material under TACO. The material associated with PW-9 will be removed. In addition, the surface of the site will be surveyed and any material that is similar to this material (i.e., gray, white, and pink hide material with a slight odor) will be identified and then removed.

The third type of source material was soil at soil boring SB-69. The samples associated with this soil, SB-69A/CA and SB-69B/CB, exceeded the TCLP limit for mercury. The soil from this location will be removed. These samples are located very close to PW-9.

6.3 Exposures with Soil Pathways

The selection of remediation objectives for Areas 1A, 2, 3A, and 3B is provided in Section 6.3.1. Area 1B is discussed separately in Section 6.3.2. A summary of remediation objectives for soil is presented in Table 6-1.

6.3.1 Proposed Remediation Objectives for Direct Contact Pathways for Areas 1A, 2, 3A, and 3B

Tier 1 screening value exceedances for Areas 1A, 2, 3A, and 3B will be addressed by pathway exclusion through the use of an engineered barrier with institutional controls that:

- Ensure the engineered barrier is maintained
- Require safety precautions be taken during excavation activity to address potential exposures to construction workers

It is proposed that the engineered barrier will consist of clean material of 10-inch thick gravel and 6 inch topsoil placed over a permeable geotextile liner. The specifications for this engineered barrier are presented in Appendix I. The proposed minimum extent of the engineered barrier for the site is presented in Figure 5-11.

A confirmatory sampling program will be developed to determine how much soil exceeds the PCB action level of 10 mg/kg and needs to be removed. In addition, the sampling program will identify the extent of soil cover along the western sides of Areas 1A, 2, and 3B, and the northern side of Area 3A. The grid sampling in Areas 1A and 2 have sufficiently delineated the location of arsenic concentrations exceeding the acute action level of 800 mg/kg.

Institutional controls will be needed in addition to the engineered barrier. An institutional control will be required to ensure that the engineered barrier is maintained. Since soil will be left in place with concentrations of arsenic, lead, or mercury that exceed Tier 1 screening values for ingestion by the construction worker, an institutional control will be imposed on the site requiring that safety precautions be taken when performing excavation work

under the engineered barrier and a requirement to restore the cover after such activity.

To summarize, the proposed remediation objectives for direct contact exposure to soil will be as follows for all constituents:

- Direct contact exposures to an industrial/commercial worker:
  - Ingestion pathway:

    For all constituents except those that exceed Tier 1 screening values for ingestion--Tier 1 screening values.

    For those constituents that exceed Tier 1 screening values for ingestion--Pathway exclusion through an engineered barrier and institutional control where a soil cover is placed over soil exceeding Tier 1 screening values and the PCB action level of 1 mg/kg.
  - Inhalation pathway:

    For all constituents --Tier 1 screening values for inhalation. It should be noted that removal of soil with arsenic concentrations that exceeds 800 mg/kg will eliminate exceedances of the inhalation pathway for arsenic, since the Tier 1 industrial/commercial worker inhalation screening value for arsenic is 1,200 mg/kg.
- Direct contact exposures to a construction worker:
  - Ingestion pathway:

    For all constituents except arsenic, lead and mercury (mercury exceeds Tier 1 screening value in Area 2)--Tier 1 screening values for ingestion.

    For arsenic, lead, and mercury--Pathway exclusion through an institutional control that requires safety precautions be taken during excavation activity to address potential exposures to construction workers.
  - Inhalation pathway:

    For all constituents--Tier 1 screening values for inhalation.

If plans to redevelop this part of the site are finalized before the site is remediated, then the engineered barrier may be modified to include building or pavement (e.g., parking lots or roads), as appropriate. In other words, if a

part of the area is designated for a building or pavement, then these structures will become the engineered barrier and will not be covered with clean soil, except as is necessary to prepare the foundation for the building or the base for the pavement. During construction of the structures, appropriate health and safety precautions will be taken.

6.3.2 Proposed Remediation Objectives for Area 1B

In Area 1B, there were exceedances of Tier 1 screening values for the ingestion pathway for an industrial/commercial worker for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h,)anthracene, and arsenic in soil samples. No constituents exceeded Tier 1 screening values for the inhalation pathway for the industrial/commercial worker, the ingestion pathway for the construction worker, or the inhalation pathway for the construction worker. The concentration of total PCBs exceeded the action level of 1 mg/kg in one subsurface soil sample. PCBs were not detected in any of the surface soil samples analyzed.

These exceedances will be addressed as follows:

- For all constituents except PCBs that exceed Tier 1 screening values, the exceedances will be addressed through a Tier 3 risk evaluation. This Tier 3 evaluation is presented in detail in Appendix H.

- For PCBs, the exceedance will be addressed by pathway exclusion through the use of an existing soil cover with an institutional control ensuring the cover is maintained

The remediation objectives for direct contact exposures to soil in Area 1B are as follows for all constituents, except PCBs:

- Direct contact exposures to an industrial/commercial worker:
    - Ingestion pathway:

      For those constituents that exceed Tier 1 screening values for ingestion—Tier 3 evaluation. A Tier 3 risk evaluation was completed for a current maintenance worker and a future outdoor worker for a CTE scenario and a RME scenario. The exposure parameters for the maintenance worker reflect actual work patterns at the site. The exposure parameters for the future outdoor worker are based on the assumption that the area could be used for any institutional purpose. Therefore, the exposure parameters were conservatively selected to allow any future institutional use of the area.

The results of the Tier 3 evaluation indicate that all surface and subsurface soil CTE and RME noncancer hazard indices are below an acceptable chronic threshold level of 1, indicating no potential for adverse noncancer effects to either the maintenance or outdoor worker. In addition, all surface and subsurface soil RME cancer risks are above Illinois EPA no-action level of 10^{-6}, but fall within the carcinogenic risk range of 10^{-6} to 10^{-4}, where additional site evaluation is required. The CTE cancer risk calculations provide that additional evaluation. The CTE cancer risks are below the Illinois EPA no-action level of 10^{-6} (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002).

As discussed above, the RME and CTE assumptions were conservative to allow for unrestricted industrial use. Additionally, through expected redevelopments, the majority of the site (including Area 1B) is expected to be covered with buildings or surface cover (pavement, gravel etc.) which would limit direct contact. This, along with the results of the Tier 3 risk evaluation, indicates little or no potential for adverse effects to either the maintenance or outdoor worker.

- Inhalation pathway:

  For all constituents--Tier 1 screening values for inhalation. Although no constituents exceeded the Tier 1 screening values for inhalation, the inhalation pathway was incorporated as part of Tier 3 risk evaluation for those constituents that exceeded Tier 1 screening values for ingestion.

  The Tier 3 risk evaluation indicated little or no potential for adverse effects to either the maintenance or outdoor workers. The inhalation pathways represented less than one percent of the total risks and hazard indices calculated.

- Direct contact exposures to a construction worker:

  - Ingestion pathway:

    For all constituents--Tier 1 screening values for ingestion

  - Inhalation pathway:

    For all constituents--Tier 1 screening values for inhalation

For PCBs, the proposed remediation objective is pathway exclusion through a soil cover. As indicated earlier, there were no PCB concentrations greater than 10 mg/kg. There was one subsurface soil sample which exceeded 1 mg/kg, but

the corresponding surface soil sample was not detected for PCBs. Therefore, a soil cover is effectively in place or soil may be removed.

6.4 Groundwater Ingestion Exposures

Groundwater ingestion exposures were evaluated for the groundwater component of the groundwater ingestion exposure route and the soil component of the groundwater ingestion exposure route.

6.4.1 Groundwater Component of the Groundwater Ingestion Exposure Route

The groundwater component of the groundwater ingestion exposure route was evaluated by first eliminating from consideration any constituents that were not detected, which eliminated all organic constituents (VOCs, SVOCs, pesticides, and PCBs) as well as beryllium, cobalt, copper, nickel, thallium, and vanadium. For the constituents that remained, the measured groundwater concentrations were compared to Tier 1 screening values for the groundwater component of the groundwater ingestion exposure route for Class I groundwater. All but arsenic, iron, magnesium, manganese, and TDS were present in groundwater below Tier 1 screening values. These exceedances will be addressed through an institutional control that will prevent groundwater from being used as a source of drinking water. The remediation objectives for the groundwater component of the groundwater ingestion exposure route are summarized in Table 6-2 for constituents that were detected in groundwater.

The extent of off-site migration of arsenic, iron, magnesium, manganese, and TDS was evaluated using equation R26 of TACO. The R26 models the steady state concentration of a dissolved constituent along the center-line of the groundwater plume of some distance from the source. The results of the groundwater modeling indicated that arsenic and manganese concentrations will not exceed their Tier 1 screening values at approximately 750 and 1,000 feet, respectively, downgradient from the source. For the remaining constituents, the concentrations of iron, magnesium and TDS will not exceed their Tier 1 screening values at less than 500 feet from the source. Therefore, the extent of the institutional control required for the groundwater should not extend more than 1,000 feet downgradient of the source.

6.4.2 Soil Component of the Groundwater Ingestion Exposure Route

The remediation objectives for the soil component of the groundwater ingestion exposure route are Tier 1 screening values for Class I groundwater for all constituents except methylene chloride, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, carbazole, pentachlorophenol, beta-BHC, DDT, dieldrin, antimony, arsenic, barium, lead, mercury, selenium, and silver. For methylene chloride, benzo(a)anthracene, benzo(b)fluoranthene,

benzo(a)pyrene, carbazole, beta-BHC, and DDT, the remediation objectives for the soil component of the groundwater ingestion exposure route are Tier 2 screening values. For pentachlorophenol, dieldrin, antimony, barium, lead, mercury, selenium, and silver, the remediation objectives are pathway exclusion under Tier 3 through a qualitative analysis which demonstrated that leaching from soil to groundwater is not significant for these constituents. For arsenic, the remediation objectives are pathway exclusion through an institutional control that prevents groundwater from being used as a source of drinking water. The remediation objectives for the soil component of the groundwater ingestion exposure route are summarized in Table 6-1.

6.5 Groundwater to Surface Water Pathway

The groundwater to surface water pathway was evaluated by first eliminating from consideration any constituents that were not detected, which eliminated all organic constituents (VOCs, SVOCs, pesticides, and PCBs) as well as beryllium, cobalt, copper, nickel, thallium, and vanadium. For the constituents that remained, the measured groundwater concentrations were compared to human health and ecological surface water quality standards. All but arsenic, calcium, chromium, iron, magnesium, manganese, mercury, zinc, and TDS were present below surface water quality standards. Mercury was detected in only two of 24 groundwater samples and both detects were at the detection limits. Therefore, mercury is not believed to be present in groundwater at significant concentrations. Arsenic, calcium, chromium, iron, magnesium, manganese, zinc, and TDS were further investigated through a Tier 2 fate and transport analysis used to predict the concentrations of these constituents in groundwater at Lake Michigan, the nearest surface water body.

The migration of arsenic, calcium, chromium, iron, magnesium, manganese, zinc, and TDS was modeled using equation R26 of TACO. This equation models the steady state concentration of dissolved constituents along the center-line of the groundwater plume at distance from the source. The results of this modeling indicated that the steady state concentrations of arsenic, calcium, chromium, iron, magnesium, manganese, zinc, and TDS will be significantly below the minimum surface water quality standard, at a distance of 3,100 feet from the respective sources where groundwater is discharging to Lake Michigan water. Therefore, the remediation objectives are surface water quality standards for all constituents including arsenic, calcium, chromium, iron, magnesium, manganese, zinc, and TDS as determined by a Tier 2 quantitative fate and transport analysis. The remediation objectives for the groundwater to surface water pathway are summarized in Table 6-2.

Table 6-1 Summary of Remediation Objectives for Soil

Area	Exceed Tier 1 Screening Values for Soil				Exceed Tier 2 Soil Component of Groundwater Ingestion (a)	PCB Exceedances	Remediation Objective for Soil Ingestion and Inhalation	Remediation Objective for Soil Component of GW Ingestion	Mechanism for Pathway Exclusion	Conc of COC for Required Soil Cover	Highest Conc of COC to Remain at Site (beneath engineered barrier)
	Ingestion - IW	Inhalation - IW	Ingestion - CW	Inhalation - CW							
1A	Arsenic Lead Benzo(a)pyrene Benzo(b)fluoranthene Dibenz(a,h)anthracene Dieldrin DDT	Arsenic	Arsenic Lead	None	Arsenic Antimony (b) Barium (b) Lead (b) Mercury (b) Selenium (b) Silver (b)	None	PE-EB/Tier 1	PE-Tier 3/Tier 2 /Tier 1	Soil: Engineered barrier (soil cover) and institutional controls; GW: Institutional controls to prevent groundwater use for soil component of groundwater ingestion	Arsenic > 13 mg/kg Lead > 400 mg/kg	Arsenic = 800 mg/kg Lead = 1200 mg/kg @ J, K, 2, 3 (comp) Benzo(a)pyrene = 2.1 mg/kg @ SB-39B (2-4') Benzo(b)fluoranthene = 14 mg/kg @ SB-39A (0-1') Dibenz(a,h)anthracene = 1.1 mg/kg @ %b-40B (2-3') Dieldrin = 0.68 mg/kg @ SB-39A (0.1') DDT = 34 mg/kg @ SB-39A (0-1')
1B	Arsenic Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenz(a,h)anthracene	None	None	None	Dieldrin (b) Pentachlorophenol (b)	1 subsoil conc > 1 mg/kg, but <10 mg/kg; not detected in surface sample (soil cover effectively in place)	PE-Tier 3/Tier 1		Soil: Tier 3 risk evaluation indicates little or no potential for adverse risk to receptors on site, GW: Institutional controls to prevent groundwater use for soil component of groundwater ingestion	NA	Arsenic = 40.6 mg/kg @ SB-35B (2-3') Benzo(a)anthracene = 9.2 mg/kg @ SB-61A (0-1') Benzo(a)pyrene = 9.9 mg/kg @ SB-33D (2-3') Benzo(b)fluoranthene = 27 mg/kg @ SB-33B (2-3') Dibenz(a,h)anthracene = 1.9 mg/kg @SB-61A (0-1')
2	Arsenic Lead Benzo(a)pyrene	Arsenic	Arsenic Lead Mercury	None		None	PE-EB/Tier 1		Soil: Engineered barrier (soil cover) and institutional controls; GW: Institutional controls to prevent groundwater use for soil component of groundwater ingestion	Arsenic > 13 mg/kg Lead > 400 mg/kg	Arsenic = 800 mg/kg Lead = 2250 mg/kg @ SB-04B (0-1') Benzo(a)pyrene = 6 mg/kg @ MW-2B (4-6') Mercury = 111 mg/kg @ MW-2C (5-6')
3A	Arsenic Lead Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene	None	Arsenic Lead	None		3 subsoil samples > 1 mg/kg, but < 10 mg/kg; surface soil data gap for 2 of 3 subsoil locations; 3rd surface soil location PCB <1 mg/kg	PE-EB/Tier 1		Soil: Engineered barrier (soil cover) and institutional controls, GW: Institutional controls to prevent groundwater use for soil component of groundwater ingestion	Arsenic > 13 mg/kg Lead > 400 mg/kg PCB > 1 mg/kg	Arsenic = 164 mg/kg @ SB-24B (3-4') Lead = 2680 @ N6 (comp) Benzo(a)anthracene = 8.2 mg/kg @ SB-26B (3-4') Benzo(a)pyrene = 4.6 mg/kg @ SB-26B (3-4') Benzo(b)fluoranthene = 8.8 mg/kg @ SB-26B (3-4')
3B	Arsenic Lead Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Aldrin Dieldrin Heptachlor epoxide	None	Arsenic Lead	None		6 surface soil > 10 mg/kg; 3 surface soil & 7 subsoil <10 mg/kg, but >1 mg/kg	PE-EB/Tier 1		Soil: Engineered barrier (soil cover) and institutional controls; GW: Institutional controls to prevent groundwater use for soil component of groundwater ingestion	Arsenic > 13 mg/kg Lead > 400 mg/kg PCB > 1 mg/kg	Arsenic = 55 mg/kg @ C25 (comp) Lead = 4250 mg/kg @ SB-12A (0-2') Benzo(a)anthracene = 28 mg/kg @ SB-15A(0-1') Benzo(a)pyrene = 9.3 mg/kg @ SB-15A (0-1') Benzo(b)fluoranthene = 37 mg/kg @ SB-15A (0-1') Aldrin = 0.36 mg/kg @ SB-15A (0-1') Dieldrin = 1.9 mg/kg @ SB-10A (0-1') Heptachlor epoxide = 0.68 @ SB-15A (0-1')

Notes:
(a) Tier 2 screening value is same as Tier 1 for inorganics.
(b) Groundwater not impacted due to absence of detected groundwater concentrations or groundwater concentrations below groundwater screening levels
PE-EB/Tier 1: Pathway exclusion through an engineered barrier (soil cover) and institutional controls at locations where Tier 1 screening values are exceeded for non-PCB constituents. For PCB constituents, pathway exclusion through existing engineered barrier (soil cover) and institutional controls.
PE-Tier 3/Tier 1: Pathway exclusion through Tier 3 evaluation at locations where Tier 1 screening values are exceeded
PE-Tier 3/Tier 2/Tier 1: Pathway exclusion through Tier 3 evaluation at locations where Tier 1 or Tier 2 screening values are exceeded except for arsenic. For arsenic, the remediation objective is pathway exclusion through an institutional control to prevent groundwater use.
IW = Industrial Worker
CW = Construction Worker
COC = Constituent of Concern

Table 6-2 Summary of Remediation Objectives for Groundwater

Exceed Tier 1 Groundwater/Surface Water Values						
Ingestion - Class I	GW to SWQS	R26 Modeling - GW [b]	R26 Modeling - SW [c]	GW Remediation Objective	GW - SW Remediation Objective	Mechanism for Pathway Exclusion
Arsenic	Arsenic	750 ft	None	PE-IC/Tier 1	SWQS-Tier 2	GW: pathway exclusion through an institutional control (either an ordinance or ELUC) to prevent groundwater use; GW-SW: Tier 2 quantitative fate and transport analysis
Iron	Calcium	1000 ft		PE-IC/Tier 1	SWQS-Tier 2	
Magnesium	Chromium	<500 ft		PE-IC/Tier 1	SWQS-Tier 2	
Manganese	Iron	<500 ft		PE-IC/Tier 1	SWQS-Tier 2	
Total Dissolved Solids	Magnesium	<500 ft		PE-IC/Tier 1	SWQS-Tier 2	
[redacted]	Manganese	[redacted]		[redacted]	SWQS-Tier 2	
	Mercury [a]				SWQS-Tier 1	
	Total Dissolved Solids				SWQS-Tier 2	
	Zinc				SWQS-Tier 2	

Notes:
[a] Not believed to be present in groundwater at significant concentrations
[b] R26 modeled results used to identify extent of institutional control
[c] R26 modeling results for nearest groundwater/surface water receptor (Lake Michigan)
PE-IC/Tier 1: Pathway exclusion through an institutional control (either an ordinance or ELUC) to prevent groundwater use at locations where Tier 1 screening values are exceeded
SWQS-Tier 1: Surface water quality standard through Tier 1 analysis
SWQS-Tier 2: Surface water quality standard through Tier 2 analysis
ELUC = Environmental land use control

Section 7

7 References

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Appendix A

MWG13-15_46286

Appendix A

Source Material Evaluation

1.0 Overview

This appendix presents an evaluation of data for the tannery site to determine if source material, as defined under TACO, exists on the site. The determination of source material is based on the criteria set forth in Section 742.305 of TACO (IPCB, 2001). The criteria require examinations of the following:

- Soil attenuation capacity (Section 742.305(a) of TACO)
- Soil saturation limit (Section 742.305(b) of TACO)
- Characteristics of reactivity for hazardous waste (Section 742.305(c) of TACO)
- pH (Section 742.305(d) of TACO)
- Characteristics of inorganic chemical toxicity for hazardous waste (Section 742.305(e) of TACO)

2.0 Soil Attenuation Capacity

To be classified as source material based on the soil attenuation capacity criterion, either the sum of the concentrations of all organic constituents of interest, or the TPH, must exceed the attenuation capacity of the native soil. The attenuation capacity is defined by the fraction of natural organic carbon (foc) in the soil.

The average organic carbon content in soil was determined to be 5.13% (Metcalf & Eddy, 1998). As a very conservative measure of the sum of organic constituents, the maximum detected concentration of each organic constituent was summed. These results are presented in Table 1. The total is 419 mg/kg, which is well below 51,300 mg/kg.

No TPH analysis was performed on samples from the site so a comparison of TPH concentrations to the attenuation capacity of the soil could not be done. No samples were analyzed for TPH because organic constituents were not present on the site at elevated concentrations, as the above evaluation indicates.

3.0 Soil Saturation Limit

To be classified as source material based on the soil saturation limit criterion, the concentrations of organic chemicals whose melting points are less than 30°C must exceed their soil saturation limits (Csat). Generic, non-site specific values for Csat for each applicable chemical can be obtained from the values listed in Section 742 Appendix A, Table A of TACO.

Table 1 provides values of Csat for constituents with melting points below 30°C. The maximum detected concentration of each constituent is below its Csat value.

4.0 Reactivity

To be classified as source material based on the reactivity criterion, the material must exhibit the characteristics of reactivity for hazardous waste as determined under 35 IAC Section 721.123. No samples were analyzed for reactivity, so this evaluation cannot be performed. However, no samples were analyzed for reactivity because no materials on the site appeared to be reactive.

Several soil samples were analyzed for cyanide and the maximum concentration of total cyanide was 1.23 mg/kg, well below a concentration that would exhibit reactive characteristics.

5.0 pH

To be classified as source material based on the pH criterion, the material must exhibit a pH less than or equal to 2.0 or greater than or equal to 12.5. Fifty soil samples were analyzed for pH. The results are provided in Table 2. The pH values ranged from 5.5 to 9.0, indicating that the soil is not a source material by this criterion.

6.0 Inorganic Chemical Toxicity

To be classified as source material based on the inorganic chemical toxicity criterion, the material must exhibit the characteristics of toxicity for hazardous waste as determined under 35 IAC 721.124 for arsenic, barium, cadmium, chromium, lead, mercury, selenium, or silver.

In the Phase I investigation, nine "production waste" samples (PW-1 through PW-9) were collected and subjected to TCLP analysis for metals. The results were provided in Table 6-5 of that report (Metcalf & Eddy, 1995). A copy of that table is included. Sample PW-4, which was taken from a rusted 5-gallon pail, exceeded the TCLP criterion for lead. The material from this rusted pail was subsequently removed and disposed offsite in an appropriate manner. Sample PW-5 had an exceedance for chromium. This material was resampled in the Phase II investigation and was below the criterion. The TCLP results from the Phase II investigation were provided on one page of Table 4-2 and all of Table 4-5 in the Phase II Remedial Investigation Report (Metcalf & Eddy, 1997). Copies of these tables are attached. Sample PW-9 from the Phase I investigation had an exceedance for chromium. This material was resampled in the Phase II investigation and this also had an exceedance for chromium. As discussed in detail in the Phase II Remedial Investigation Report (Metcalf & Eddy, 1997), this material would not be classified as a hazardous waste because it meets the requirements of the chromium waste exclusion. However, this material would be considered a source material under TACO. The material associated with PW-9 will be removed. In addition, the surface of the site will be surveyed and any material that is similar to this material (i.e., it is a gray, white and pink hide material with a slight odor) will be identified and subsequently removed.

In the Phase II investigation, 17 soil samples were subjected to TCLP analysis (see Table 4-2 (Continued)). In 15 of the samples, there were no exceedances of the TCLP criteria. In samples SB-69A/CA and SB-69B/CB there were exceedances for mercury. Since this soil is considered source material under TACO, it will be removed. These samples are located very close to PW-9.

In the Phase II investigation, two soil samples with elevated arsenic concentrations (one from the location with the highest concentration of arsenic measured on the site) were subjected to TCLP analysis. The results are provided in Table 4-5. Neither sample failed the TCLP criterion of 5 mg/L for arsenic.

During the grid sampling, several samples were collected and subjected to TCLP testing for arsenic and lead. The result of this testing is presented in Table 3. None of the samples exceeded the TCLP criterion for either arsenic or lead.

7.0 References

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Table 1 Maximum Detected Concentration of Organic Constituents in Soil and Evaluation of Soil Saturation Limit

Constituent of Interest	CAS No. Value	Maximum Detected Concentration (mg/kg)	Soil Saturation Limit (Csat) (mg/kg)	Does Max. Det. Conc. Exceed Csat?
VOCs				
Acetone	67641	0.31	100000	NO
2-Butanone	78933	0.02		
Carbon disulfide	75150	0.022	720	NO
Methylene Chloride	75092	0.046	2400	NO
Toluene	108883	0.008	650	NO
Trichloroethene	79016	0.014	1300	NO
SVOCs				
PAHs				
Acenaphthene	83329	1.8		
Acenaphthylene	208968	0.48		
Anthracene	120127	15		
Benzo(a)anthracene	56553	28		
Benzo(b)fluoranthene	205992	37		
Benzo(k)fluroanthene	207089	10		
Benzo(a)pyrene	50328	9.9		
Benzo(g,h,i)perylene	191242	6.1		
Carbazole	86748	2		
Chrysene	218019	30		
Dibenzo(a.h)anthracene	53703	1.9		
Dibenzofuran	132649	1.9		
Fluoranthene	206440	71		
Fluorene	86737	2.2		
Indeno(1,2,3-c,d)pyrene	193395	6.8		
2-Methylnaphthalene	91576	3.5		
Naphthalene	91203	1.8		
Phenanthrene	85018	67		
Pyrene	129000	45		
Other SVOCs				
Bis(2-ethylhexyl)phthalate	117817	24	31000	NO
Di-n-butyl phthalate	84742	0.83	2300	NO
Pentachlorophenol	87865	1.2		
Pesticides				
Aldrin	309002	0.35		
beta-BHC	319857	0.038		
alpha-Chlordane	57749	0.37		
gamma-Chlordane	57749	0.25		
DDD	72548	8		
DDE	72559	5.4		
DDT	50293	34		
Dieldrin	60571	1.9		
Endrin	72208	0.05		
Endosulfan	115297	0.017		
Heptachlor	76448	0.043		
Heptachlor epoxide	1024573	0.68		
Methoxychlor	72435	0.078		
Total		419		

Table 2 Results of pH Analysis of Soil Samples

Sample Number	pH Result	Sample Number	pH Result
1	5.5	26	7.8
2	5.8	27	7.9
3	6	28	7.9
4	6.2	29	7.9
5	6.6	30	7.9
6	6.8	31	8.1
7	7.1	32	8.1
8	7.2	33	8.1
9	7.4	34	8.1
10	7.5	35	8.1
11	7.7	36	8.1
12	7.7	37	8.1
13	7.8	38	8.2
14	7.8	39	8.2
15	7.8	40	8.2
16	7.8	41	8.3
17	7.8	42	8.3
18	7.8	43	8.3
19	7.8	44	8.4
20	7.8	45	8.4
21	7.8	46	8.4
22	7.8	47	8.5
23	7.8	48	8.6
24	7.8	49	8.6
25	7.8	50	9
Summary Statistics			
Minimum			5.5
Median			7.8
Mean			7.77
Maximum			9

Table 3 Results of TCLP Testing of Grid Samples

A. Arsenic

Sample ID	Soil Concentration mg/kg	TCLP Result mg/L	TCLP Criterion mg/L
C,D,12,13	5980	1.52	5
C,D,13,14	2590	0.563	5
F,G,5,6	2560	0.745	5
A4	2550	0.305	5
D,E,12,13	2380	< 0.005	5
B,C,15,16	2170	0.327	5
C12	4650	1.57	5
B15	4080	0.887	5

B. Lead

Sample ID	Soil Concentration mg/kg	TCLP Result mg/L	TCLP Criterion mg/L
C,D,18,19	7740	0.099	5
H,I,14,15	3500	0.036	5
H,I,13,14	2500	< 0.005	5
H,I,10,11	2100	< 0.005	5
I19	2100	< 0.005	5
F,G,14,15	2000	< 0.005	5
H,I,12,13	1980	< 0.005	5
B23	2100	< 0.0075	5
D,E,23,24	1950	< 0.0075	5
C,D,21,22	1910	0.0488	5

TABLE 6-5
PRODUCTION WASTE TCLP RESULTS
FORMER GREISS-PFLEGER TANNERY
COMMONWEALTH EDISON COMPANY
WAUKEGAN, ILLINOIS

	PW-1	PW-2	PW-3	PW-4	PW-5	PW-6	PW-7	PW-8	PW-9	Regulatory Limits
TCLP METALS										
ARSENIC	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	5.0
BARIUM	0.647	0.272	0.229	0.731	2.03	13.1	0.325	1.18	0.145	100.0
CADMIUM	<0.005	0.176	<0.005	0.046	<0.005	<0.005	<0.005	0.314	<0.005	1.0
CHROMIUM	0.017	0.075	<0.010	0.260	8.06	<0.010	<0.010	0.071	24.2	5.0
LEAD	<0.050	<0.050	<0.050	68.9	0.054	<0.050	<0.050	0.756	<0.050	5.0
MERCURY*	0.0003	0.0002	<0.0002	0.004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.2
SELENIUM	<0.075	<0.375	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	<0.075	1.0
SILVER	<0.010	<0.050	<0.010	<0.010	0.010	<0.010	<0.010	<0.010	<0.010	5.0

* Mercury value reported from analysis outside of methods holding time.
All units mg/l.
-- Indicates exceedance of regulatory limits.

From Remedial Investigation Report - Phase I for the Former Griess-Pfleger Tannery Site, Prepared by Metcalf & Eddy, 1995.

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TABLE 4-2 (continued)
SOIL ANALYTICAL RESULTS
FORMER GRIESS-PFLEGER TANNERY
COMMONWEALTH EDISON COMPANY
WAUKEGAN, ILLINOIS

Sample ID Number	SB-60B	SB-64A/CA	SB-64CB	SB-66A/CA	SB-67A/CA	SB-67B/CB	SB-69A/CA	SB-69B/CB	SB-70A	Regulatory
IEA Sample ID Number	950188014	950182012	950182013	950182016	950182016	950182017	950182019	950182020	950188001	Limit
TCLP INORG. COMPOUNDS										
Arsenic	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.0
Barium	0.33	0.60	0.72	0.86	0.76	0.87	1.1	0.70	0.040	100.0
Cadmium	0.030	<0.005	<0.005	<0.005	<0.005	<0.005	0.0088	<0.005	0.042	1.0
Chromium	0.050	0.37	0.24	0.066	0.076	0.045	0.015	0.012	0.097	5.0
Lead	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	5.0
Mercury	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.57	0.58	<0.002	0.2
Selenium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Silver	0.033	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5.0

Sample ID Number	SB-71A	SB-71B	SB-72A	SB-73A	SB-73B	SB-74A	SB-75A	SB-76A	PW-5	Regulatory
IEA Sample ID Number	950188002	950188003	950188004	950188006	950188007	950188008	950188009	950188010	950188005	Limit
TCLP INORG. COMPOUNDS										
Arsenic	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.0
Barium	0.20	0.14	0.18	0.14	0.2	0.35	0.26	0.44	0.15	100.0
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1.0
Chromium	0.24	0.27	0.28	0.19	0.24	0.42	0.30	0.65	0.60	5.0
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	5.0
Mercury	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.2
Selenium	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Silver	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	5.0

Sample ID Number	PW-9	Regulatory
IEA Sample ID Number	950188011	Limit
TCLP INORG. COMPOUNDS		
Arsenic	<0.1	5.0
Barium	0.093	100.0
Cadmium	<0.005	1.0
Chromium	14	5.0
Lead	<0.05	5.0
Mercury	<0.0002	0.2
Selenium	<0.1	1.0
Silver	0.033	5.0

Units are in mg/L (ppm)

Reference:
From Phase II Remedial Investigation Report, Former Griess Pfleger Tannery Site, Prepared by Metcalf and Eddy, 1997

TABLE 4-5
SOIL ANALYTICAL RESULTS
FORMER GRIESS-PFLEGER TANNERY
COMMONWEALTH EDISON COMPANY
WAUKEGAN, ILLINOS

Sample ID Number	SB-44A	SB-44B	SB-45A	SB-45B	SB-46A	SB-46B	SB-47A	SB-47B	SB-48A	SB-48B
IEA Sample ID Number	950153001	950153002	950153003	950153004	950153005	950153005	950153006	950153007	950153008	950153009
INORG. COMPD - Arsenic Only										
Arsenic	4600	5.0	24	1.2	17	13	46	15	25	23

Units are in mg/kg (ppm)

Sample ID Number	SB-44A	Regualtory
IEA Sample ID Number	950153010	Limit
INORG. COMPD - Arsenic Only		
TCLP Arsenic	0.4	5.0

Units are in mg/L (ppm)

Sample ID Number	SB-49A	SB-49B	SB-50A	SB-50B	SB-51A	SB-51B	SB-77A	SB-77B	SB-78A	SB-78B
IEA Sample ID Number	950153010	950153011	950153012	950153014	950153015	950153016	950248015	950248016	950248017	950248018
INORG. COMPD - Arsenic Only										
Arsenic	18	9.5	3.5	10000	16	25	8.5	8.5	13	7.8

Units are in mg/kg (ppm)

Sample ID Number	SB-50B	Regualtory
IEA Sample ID Number	950153011	Limit
INORG. COMPD - Arsenic Only		
TCLP Arsenic	2.2	5.0

Units are in mg/L (ppm)

Sample ID Number	SB-79A	SB-79B	SB-80A	SB-80B	SB-81A	SB-81B	SB-82A	SB-82B	SB-83A	SB-83B
IEA Sample ID Number	950248013	950248014	950248019	950248020	950153001	950153002	950153003	950153004	950153005	950153006
INORG. COMPD - Arsenic Only										
Arsenic	23	780	1600	710	49	55	180	240	12	22

Units are in mg/kg (ppm)

Sample ID Number	SB-84A	SB-84B	SB-85A	SB-85B	SB-86A	SB-86B
IEA Sample ID Number	950153007	950153008	950153009	950153010	950153011	950153012
INORG. COMPD - Arsenic Only						
Arsenic	7.1	19	210	70	21	4800

Units are in mg/kg (ppm)

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From Phase II Remedial Investigation Report, Former Griess-Pfleger Tannery Site, Prepared by Metcalf & Eddy, 1997.

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Appendix B

Appendix B

Site Data and Comparison to Screening Values, and 2002 Groundwater Analytical Report

Overview

This appendix provides site data for constituents evaluated in more detail based on the results of the initial evaluation and the requirements for a risk assessment. Tables 1 through 10 provide a comparison of soil data to Tier 1 screening values for direct contact pathways for nonresidential receptors (i.e., industrial/commercial workers via ingestion, industrial/commercial workers via inhalation, construction workers via ingestion, and construction workers via inhalation). The comparison is by area, beginning with Area 1A for surface soil (Table 1) and subsurface soil (Table 2), and then proceeding to Area 1B (Tables 3 and 4), Area 2 (Tables 5 and 6), Area 3A (Tables 7 and 8), and Area 3B (Tables 9 and 10). A comparison of total PCBs to the action level of 1 mg/kg is also provided in these tables.

Tables 11 through 20 provide a comparison of soil data to Tier 1 or Tier 2 screening values for the soil component of the groundwater ingestion exposure route. Once again, the comparison is by area, beginning with Area 1A for surface soil (Table 11) and subsurface soil (Table 12), and then proceeding to Area 1B (Tables 13 and 14), Area 2 (Tables 15 and 16), Area 3A (Tables 17 and 18), and Area 3B (Tables 19 and 20).

Table 21 presents the Tier 1 and Tier 2 screening values used in the comparison, as well as the action level for total PCBs.

Table 22 presents groundwater data.

Notes for Data and Comparison Tables

ND - Not Detected
NA - Not Analyzed
J - Estimated value – organic constituents
B - Estimated value – inorganic constituents
/I - Exceedance of the Tier 1 ingestion soil screening value for the industrial/commerical worker
/N - Exceedance of the Tier 1 inhalation soil screening value for the industrial/commerical worker
/C - Exceedance of the Tier 1 ingestion soil screening value for the construction worker
/GW - Exceedance of the Tier 1 screening value for the soil component of the groundwater ingestion route
/P Exceedance of the PCB action level of 1 mg/kg

Table 1

Comparison of Surface Soil Data In Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-39A		SB-62A	SB-63A	SB-64A	SB-83A	J2	K2
IEA Sample ID Number				950153017	950153018	950153020	950182011		
Depth		0-1		0-1	0-1	0-1	0-1		
Phase I/Phase II		Phase I		Phase II	Phase II	Phase II	Phase II		
Sample Type		Investigation		Investigation	Investigation	Investigation	Combined	Investigation	Investigation
In-Place/Removed		In-Place		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	1					1.5		
Chrysene	218019	5.1					1.7		
Benzo(b)fluoranthene	205992	14	/I				1.8		
Benzo(k)fluoranthene	207089	2					1.235		
Benzo(a)pyrene	50328	0.1	J				1.55	/I	
Indeno(1,2,3-cd)pyrene	193395	1					1.3		
Dibenzo(a,h)anthracene	53703	0.85	/I				< 0.33		
Pesticide Compounds (mg/Kg)									
Aldrin	309002	< 0.12		< 0.008	< 0.008	< 0.008	< 0.0017		
Heptachlor Epoxide	1024573	< 0.12		< 0.008	< 0.008	< 0.008	< 0.0017		
Dieldrin	60571	0.68	/I	< 0.016	< 0.016	U	< 0.0017		
4,4'-DDT	50293	34	/I	0.59	0.04	0.15	0.89		
PCBs (mg/Kg)									
Aroclor - 1248	1336363	< 2.2		NA	NA	NA	< 0.033		
Aroclor - 1254	1336363	< 2.2		NA	NA	NA	< 0.033		
Aroclor - 1260	1336363	< 2.2		NA	NA	NA	< 0.033		
Total PCBs		ND		NA	NA	NA	< ND		
Inorganic Compounds (mg/Kg)									
Antimony	7440360	< 3.6							
Arsenic	7440382	15.9	/I				111 /I/C	832 /I/C	537 /I/C
Barium	7440393	85.1					140		
Beryllium	7440417	0.57							
Cadmium	7440439	1.2					22		
Chromium	16065831	832					36000		
Hexavalent Chromium	18540299								
Lead	7439921	212					488 /I/C	475 /I/C	341
Mercury	7439976	1.6					5		
Nickel	7440020	12.5							
Selenium	7782492	< 0.38					< 2.5		
Silver	7440224	< 0.57					< 20		
		/I					/I/C	/I/C	/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		L2	M2	I,J,2,3	J,K,2,3	K,L,2,3	L,M,2,3	J3
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	< 7	< 6.5	200 I/C	110 I/C	110 I/C	< 6.2	170 I/C
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	59	36	882 I/C	1200 I/C	69	39	694 I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
				I/C	I/C	I/C		I/C

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Table 1

Comparison of Surface Soil Data In Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		K3		L3		M3		I,J,3,4		J,K,3,4		K,L,3,4		L,M,3,4	
IEA Sample ID Number															
Depth															
Phase I/Phase II															
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 1A		Area 1A		Area 1A		Area 1A		Area 1A		Area 1A		Area 1A	
CAS No.															
CPAHs (mg/Kg)															
Benzo(a)anthracene	56553														
Chrysene	218019														
Benzo(b)fluoranthene	205992														
Benzo(k)fluoranthene	207089														
Benzo(a)pyrene	50328														
Indeno(1,2,3-cd)pyrene	193395														
Dibenzo(a,h)anthracene	53703														
Pesticide Compounds (mg/Kg)															
Aldrin	309002														
Heptachlor Epoxide	1024573														
Dieldrin	60571														
4,4'-DDT	50293														
PCBs (mg/Kg)															
Aroclor - 1248	1336363														
Aroclor - 1254	1336363														
Aroclor - 1260	1336363														
Total PCBs															
Inorganic Compounds (mg/Kg)															
Antimony	7440360														
Arsenic	7440382	373	I/C	< 6.5		< 5.8		295	I/C	298	I/C	130	I/C	19	I
Barium	7440393														
Beryllium	7440417														
Cadmium	7440439														
Chromium	16065831														
Hexavalent Chromium	18540299														
Lead	7439921	573	I/C	245		34		565	I/C	540	I/C	110		81	
Mercury	7439976														
Nickel	7440020														
Selenium	7782492														
Silver	7440224														
		I/C						I/C		I/C		I/C		I	

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		J4	K4	L4	M4	I,J,4,5	J,K,4,5	K,L,4,5
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	374 /I/C	150 /I/C	28 /I	< 5.7	883 /I/C	623 /I/C	160 /I/C
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	397	459 /I/C	227	4.6	859 /I/C	294	454 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C	/I/C	/I		/I/C	/I/C	/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Comparison of Sur
Former Griess-Pfle
Commonwealth Ed
Waukegan, Illinois

Sample ID Number		L,M,4,5	J5	K5	L5	M5	I,J,5,6	J,K,5,6	K,L,5,6
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	48 /I	1600 /I/N/C	203 /I/C	83 /I/C	< 5.8	100 /I/C	681 /I/C	2870 /I/N/C
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	233	393	517 /I/C	574 /I/C	16	539 /I/C	527 /I/C	503 /I/C
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								
		/I	/I/N/C	/I/C	/I/C		/I/C	/I/C	/I/N/C

Table 1

face Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
ger Tannery
lson Company

Sample ID Number	L,M,5,6	J6	K6	L6	M6
IEA Sample ID Number					
Depth					
Phase I/Phase II					
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type	Surface	Surface	Surface	Surface	Surface
Area	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene 56553					
Chrysene 218019					
Benzo(b)fluoranthene 205992					
Benzo(k)fluoranthene 207089					
Benzo(a)pyrene 50328					
Indeno(1,2,3-cd)pyrene 193395					
Dibenzo(a,h)anthracene 53703					
Pesticide Compounds (mg/Kg)					
Aldrin 309002					
Heptachlor Epoxide 1024573					
Dieldrin 60571					
4,4'-DDT 50293					
PCBs (mg/Kg)					
Aroclor - 1248 1336363					
Aroclor - 1254 1336363					
Aroclor - 1260 1336363					
Total PCBs					
Inorganic Compounds (mg/Kg)					
Antimony 7440360					
Arsenic 7440382	437 /I/C	263 /I/C	69 /I/C	120 /I/C	8.4
Barium 7440393					
Beryllium 7440417					
Cadmium 7440439					
Chromium 16065831					
Hexavalent Chromium 18540299					
Lead 7439921	398	411 /I/C	381	171	185
Mercury 7439976					
Nickel 7440020					
Selenium 7782492					
Silver 7440224					
	/I/C	/I/C	/I/C	/I/C	

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Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		I,J,6,7	J,K,6,7	K,L,6,7	L,M,6,7	J7	K7	L7
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	19 /I	120 /I/C	46 /I	25 /I	< 11	61 /I	110 /I/C
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	451 /I/C	470 /I/C	56	31	433 /I/C	250	98
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C	/I/C	/I	/I	/I/C	/I	/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		M7	I,J,7,8	J,K,7,8	K,L,7,8	L,M,7,8	J8	K8
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	15 /I	< 11	130 /I/C	96 /I/C	35 /I	< 11	13
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	148	463 /I/C	449 /I/C	208	131	752 /I/C	417 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I	/I/C	/I/C	/I/C	/I	/I/C	/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		L8	M8	I,J,8,9	J,K,8,9	K,L,8,9	L,M,8,9	J9
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	11	409 I/C	< 12	14 I	140 I/C	< 5.9	< 11
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	91	70	829 I/C	533 I/C	85	43	601 I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
			I/C	I/C	I/C	I/C		I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number IEA Sample ID Number Depth Phase I/Phase II Sample Type In-Place/Removed Soil Type Area CAS No.	K9 Investigation In-Place Surface Area 1A	L9 Investigation In-Place Surface Area 1A	M9 Investigation In-Place Surface Area 1A	I,J,9,10 Investigation In-Place Surface Area 1A	J,K,9,10 Investigation In-Place Surface Area 1A	K,L,9,10 Investigation In-Place Surface Area 1A	L,M,9,10 Investigation In-Place Surface Area 1A
CPAHs (mg/Kg)							
Benzo(a)anthracene 56553							
Chrysene 218019							
Benzo(b)fluoranthene 205992							
Benzo(k)fluoranthene 207089							
Benzo(a)pyrene 50328							
Indeno(1,2,3-cd)pyrene 193395							
Dibenzo(a,h)anthracene 53703							
Pesticide Compounds (mg/Kg)							
Aldrin 309002							
Heptachlor Epoxide 1024573							
Dieldrin 60571							
4,4'-DDT 50293							
PCBs (mg/Kg)							
Aroclor - 1248 1336363							
Aroclor - 1254 1336363							
Aroclor - 1260 1336363							
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony 7440360							
Arsenic 7440382	7.7	14 /I	12	22 /I	8.7	< 6.2	140 /I/C
Barium 7440393							
Beryllium 7440417							
Cadmium 7440439							
Chromium 16065831							
Hexavalent Chromium 18540299							
Lead 7439921	315	50	142	538 /I/C	110	85	229
Mercury 7439976							
Nickel 7440020							
Selenium 7782492							
Silver 7440224							
		/I		/I/C			/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		J10	K10	L10	M10
IEA Sample ID Number					
Depth					
Phase I/Phase II					
Sample Type		Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A
	CAS No.				
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553				
Chrysene	218019				
Benzo(b)fluoranthene	205992				
Benzo(k)fluoranthene	207089				
Benzo(a)pyrene	50328				
Indeno(1,2,3-cd)pyrene	193395				
Dibenzo(a,h)anthracene	53703				
Pesticide Compounds (mg/Kg)					
Aldrin	309002				
Heptachlor Epoxide	1024573				
Dieldrin	60571				
4,4'-DDT	50293				
PCBs (mg/Kg)					
Aroclor - 1248	1336363				
Aroclor - 1254	1336363				
Aroclor - 1260	1336363				
Total PCBs					
Inorganic Compounds (mg/Kg)					
Antimony	7440360				
Arsenic	7440382	< 11	< 6	32 /I	364 /I/C
Barium	7440393				
Beryllium	7440417				
Cadmium	7440439				
Chromium	16065831				
Hexavalent Chromium	18540299				
Lead	7439921	872 /I/C	98	32	189
Mercury	7439976				
Nickel	7440020				
Selenium	7782492				
Silver	7440224				
		/I/C		/I	/I/C

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		I,J,10,11	J,K,10,11	K,L,10,11	L,M,10,11	J11	K11	L11	M11
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	9.8	8.1	6	9.7	< 5.5	< 5.6	< 5.9	< 5.8
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	82	148	110	64	53	7	31	11
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								

Table 1

Comparison of Surface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number	I,J,11,12	J,K,11,12	K,L,11,12	L,M,11,12	J12	K12	L12	M12
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene 56553								
Chrysene 218019								
Benzo(b)fluoranthene 205992								
Benzo(k)fluoranthene 207089								
Benzo(a)pyrene 50328								
Indeno(1,2,3-cd)pyrene 193395								
Dibenzo(a,h)anthracene 53703								
Pesticide Compounds (mg/Kg)								
Aldrin 309002								
Heptachlor Epoxide 1024573								
Dieldrin 60571								
4,4'-DDT 50293								
PCBs (mg/Kg)								
Aroclor - 1248 1336363								
Aroclor - 1254 1336363								
Aroclor - 1260 1336363								
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony 7440360								
Arsenic 7440382	14 /1	< 5.5	24 /1	< 5.9	< 5.5	< 5.6	< 6	< 5.7
Barium 7440393								
Beryllium 7440417								
Cadmium 7440439								
Chromium 16065831								
Hexavalent Chromium 18540299								
Lead 7439921	110	7.3	59	72	< 4.4	5.5	11	< 4.6
Mercury 7439976								
Nickel 7440020								
Selenium 7782492								
Silver 7440224								
	/1		/1					

Table 2

Comparison of Subsurface Soil Data in Area 1A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-39B		SB-40B		SB-53B
IEA Sample ID Number						950153019
Depth		2-4		2-3		1-3
Phase I/Phase II		Phase I		Phase I		Phase II
Sample Type		Investigation		Investigation		Investigation
In-Place/Removed		In-Place		In-Place		In-Place
Soil Type		Subsurface		Subsurface		Subsurface
Area		Area 1A		Area 1A		Area 1A
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene	56553	4.7		0.62	J	
Chrysene	218019	4.1		0.46	J	
Benzo(b)fluoranthene	205992	7		1.1		
Benzo(k)fluoranthene	207089	2.3		0.39	J	
Benzo(a)pyrene	50328	2.1	/I	< 1.1		
Indeno(1,2,3-cd)pyrene	193395	0.91		< 1.1		
Dibenzo(a,h)anthracene	53703	0.22	J	< 1.1		
Pesticide Compounds (mg/Kg)						
Aldrin	309002	< 0.0024		< 0.0029		< 0.008
Heptachlor Epoxide	1024573	< 0.0024		< 0.0029		< 0.008
Dieldrin	60571	< 0.0047		< 0.0056		< 0.016
4,4'-DDT	50293	0.084		< 0.0056		0.033
PCBs (mg/Kg)						
Aroclor - 1248	1336363	< 0.047		< 0.056		NA
Aroclor - 1254	1336363	< 0.047		< 0.056		NA
Aroclor - 1260	1336363	< 0.047		< 0.056		NA
Total PCBs		ND		ND		NA
Inorganic Compounds (mg/Kg)						
Antimony	7440360	< 3.8		7.5		
Arsenic	7440382	37.9	/I	65.8	/I/C	
Barium	7440393	39		229		
Beryllium	7440417	0.28		< 0.34		
Cadmium	7440439	< 0.83		15.8		
Chromium	16065831	278		816		
Hexavalent Chromium	18540299					
Lead	7439921	47.6		290		
Mercury	7439976	2.7		25.6		
Nickel	7440020	6.9		29.1		
Selenium	7782492	0.63		< 0.48		
Silver	7440224	< 0.6		< 0.71		
		/I		/I/C		

Table 3

Comparison of Surface Soil Data in Area 1B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-30A	SB-33A	SB-36A	SS-12	SB-61A	SB-62A
IEA Sample ID Number						950182008	950182009
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 0.82	1.2	2.6	3.4	9.2 /I	2.9
Chrysene	218019	< 0.82	1.8	2.5	2.8	8.9	3
Benzo(b)fluoranthene	205992	< 0.82	2.4	2.4	3.6	8	2.7
Benzo(k)fluoranthene	207089	< 0.82	0.76	0.92	1.3	3.3	1.6
Benzo(a)pyrene	50328	< 0.82	1.2 /I	1.3 /I	2.1 /I	4.8 /I	1.9 /I
Indeno(1,2,3-cd)pyrene	193395	< 0.82	0.73	0.11 J	< 1.3	6.8	2.6
Dibenzo(a,h)anthracene	53703	< 0.82	0.13 J	0.2 J	< 1.3	1.9 /I	1 /I
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0023	< 0.0019	< 0.0018	< 0.0029	< 0.0017	< 0.0017
Heptachlor Epoxide	1024573	0.023	0.015	0.0079	< 0.0029	< 0.0017	< 0.0017
Dieldrin	60571	< 0.0045	0.016	< 0.0035	< 0.0055	< 0.0017	< 0.0017
4,4'-DDT	50293	< 0.0045	0.066	0.023	< 0.0055	0.21	0.03
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Aroclor - 1254	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Aroclor - 1260	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 3.6	< 2.9	< 2.8	< 4.4	NA	NA
Arsenic	7440382	12.1	4.4	0.77	6.4	6	5
Barium	7440393	18.3	86.9	10.4	30.9	520	180
Beryllium	7440417	1.2	0.27	< 0.21	< 0.34	NA	NA
Cadmium	7440439	< 0.78	1.2	< 0.61	< 0.97	4.7	1.4
Chromium	16065831	14.2	104	75.1	2600	1100	180
Hexavalent Chromium	18540299					NA	NA
Lead	7439921	27	45.7	16.2	99.6	220	170
Mercury	7439976	< 0.07	0.08	0.14	1.7	0.96	0.092
Nickel	7440020	3.8	16.7	3.5	8.1	NA	NA
Selenium	7782492	2	< 0.31	< 0.29	0.62	< 1.5	< 1.7
Silver	7440224	< 0.57	< 0.47	< 0.44	< 0.7	< 0.91	< 1.1
			/I	/I	/I	/I	/I

Table 4

Comparison of Subsurface Soil Data in Area 1B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Comparison of Si
Former Griess-Pf
Commonwealth E
Waukegan, Illinoi

Sample ID Number		SB-30B	SB-32B	SB-33B	SB-34B	SB-35B	SB-36B	SB-37B	SB-38B	MW-4A	In
IEA Sample ID Number											
Depth		2-4	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-4	
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	
Area		Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	
CAS No.											
CPAHs (mg/Kg)											
Benzo(a)anthracene	56553	< 0.74	< 0.79	< 0.85	< 0.36	< 0.42	3.6	3	< 0.4	< 0.37	
Chrysene	218019	< 0.74	< 0.79	< 0.85	< 0.36	< 0.42	3.4	3	< 0.4	< 0.37	
Benzo(b)fluoranthene	205992	< 0.74	< 0.79	27 /I	< 0.36	< 0.42	5.3	4.5	< 0.4	< 0.37	
Benzo(k)fluoranthene	207089	< 0.74	< 0.79	9.4	< 0.36	< 0.42	1.4	1.3	< 0.4	< 0.37	<
Benzo(a)pyrene	50328	< 0.74	< 0.79	9.9 /I	< 0.36	< 0.42	1.7 /I	0.23 J	< 0.4	< 0.37	<
Indeno(1,2,3-cd)pyrene	193395	< 0.74	< 0.79	5.5	< 0.36	< 0.42	1	0.64 J	< 0.4	< 0.37	<
Dibenzo(a,h)anthracene	53703	< 0.74	< 0.79	1 /I	< 0.36	< 0.42	0.13 J	0.12 J	< 0.4	< 0.37	<
Pesticide Compounds (mg/Kg)											
Aldrin	309002	< 0.0021	< 0.0021	< 0.0023	< 0.0019	< 0.0023	< 0.0018	< 0.0019	< 0.0021	< 0.002	<
Heptachlor Epoxide	1024573	< 0.0021	0.009	0.11	< 0.0019	< 0.0023	0.036	< 0.0019	< 0.0021	< 0.002	<
Dieldrin	60571	< 0.004	< 0.0041	0.18	< 0.0038	< 0.0044	< 0.0036	0.019	< 0.0041	< 0.0039	<
4,4'-DDT	50293	0.033	< 0.0041	0.16	< 0.0038	< 0.0044	0.064	0.4	< 0.0041	< 0.0039	<
PCBs (mg/Kg)											
Aroclor - 1248	1336363	< 0.04	< 0.041	3.2	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Aroclor - 1254	1336363	< 0.04	< 0.041	1.9	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Aroclor - 1260	1336363	< 0.04	< 0.041	< 0.045	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Total PCBs		ND	ND	5.1 /P	ND	ND	ND	ND	ND	ND	
Inorganic Compounds (mg/Kg)											
Antimony	7440360	< 3.2	< 3.3	< 2.9	< 3	< 3.5	< 2.9	< 2.9	< 3.2	< 3.1	<
Arsenic	7440382	1.4	8.7	5.9	0.4	40.6 /I	1.8	2.6	0.63	0.84	
Barium	7440393	1.8	41.9	229	3.4	61.1	21.9	41.8	2.6	4.6	
Beryllium	7440417	< 0.24	0.6	< 0.22	< 0.23	1.7	< 0.22	0.36	< 0.25	< 0.24	
Cadmium	7440439	< 0.71	< 0.72	1.4	< 0.66	1.5	< 0.63	2	< 0.71	< 0.68	<
Chromium	16065831	5.3	22.7	704	3.2	19.1	303	291	4.3	46.7	
Hexavalent Chromium	18540299										
Lead	7439921	3.1	17.4	133	1.7	28	24.2	22	2.5	8.1	
Mercury	7439976	< 0.06	0.07	0.39	< 0.06	0.12	0.33	0.24	< 0.06	< 0.06	
Nickel	7440020	11.3	7.8	9.9	< 1.5	15.5	4.6	9.1	< 1.6	24	
Selenium	7782492	< 0.83	0.71	< 0.76	< 0.32	0.54	< 0.3	< 0.31	< 0.34	0.61	<
Silver	7440224	< 0.51	< 0.52	< 0.47	< 0.48	< 0.56	< 0.46	< 0.47	< 0.52	< 0.49	<
				/I/C		/I	/I				

Table 4 ubsurface Soil Data in Area 1B to Tier 1 Screening Values for Direct Contact
Yeger Tannery
Edison Company
s

Sample ID Number		MW-4B		SB-62B
IEA Sample ID Number				950162010
Depth		4-8		1-3
Phase I/Phase II		Phase I		Phase II
Sample Type		vestigation		Investigation
In-Place/Removed		In-Place		In-Place
Soil Type		Subsurface		Subsurface
Area		Area 1B		Area 1B
CAS No.				
CPAHs (mg/Kg)				
Benzo(a)anthracene	56553	0.94	<	0.33
Chrysene	218019	0.74 J	<	0.33
Benzo(b)fluoranthene	205992	0.74 J	<	0.33
Benzo(k)fluoranthene	207089	0.93	<	0.33
Benzo(a)pyrene	50328	0.93	<	0.33
Indeno(1,2,3-cd)pyrene	193395	0.93	<	0.33
Dibenzo(a,h)anthracene	53703	0.93	<	0.33
Pesticide Compounds (mg/Kg)				
Aldrin	309002	0.0024	<	0.0017
Heptachlor Epoxide	1024573	0.0024	<	0.0017
Dieldrin	60571	0.0047	<	0.0017
4,4'-DDT	50293	0.0047	<	0.0033
PCBs (mg/Kg)				
Aroclor - 1248	1336363	0.047	<	0.033
Aroclor - 1254	1336363	0.047	<	0.033
Aroclor - 1260	1336363	0.047	<	0.033
Total PCBs		ND		ND
Inorganic Compounds (mg/Kg)				
Antimony	7440360	3.8		NA
Arsenic	7440382	5.4		1.9
Barium	7440393	61.6	<	4
Beryllium	7440417	1.7		NA
Cadmium	7440439	0.82	<	0.4
Chromium	16065831	65.2		5.8
Hexavalent Chromium	18540299			NA
Lead	7439921	15.5		1.8
Mercury	7439976	0.14	<	0.094
Nickel	7440020	17.8		NA
Selenium	7782492	0.4		1.2
Silver	7440224	0.6	<	0.08

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-02A		SB-03B		SB-04B		SB-05B		SB-06A		SB-08A	
IEA Sample ID Number													
Depth		0-1		0-1		0-1		0-8		0-8		0-8	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553	< 0.64		< 0.89		1.3	J	< 1.6		< 0.69		< 0.99	
Chrysene	218019	< 0.64		< 0.89		0.87	J	< 1.6		< 0.69		0.38	J
Benzo(b)fluoranthene	205992	0.47	J	< 0.89		2.1		< 1.6		< 0.69		0.42	J
Benzo(k)fluoranthene	207089	< 0.64		< 0.89		1		< 1.6		< 0.69		0.19	J
Benzo(a)pyrene	50328	0.16	J	< 0.89		0.68	J	< 1.6		< 0.69		0.21	J
Indeno(1,2,3-cd)pyrene	193395	< 0.64		< 0.89		0.22	J	< 1.6		< 0.69		< 0.99	
Dibenzo(a,h)anthracene	53703	< 0.64		< 0.89		< 1.7		< 1.6		< 0.69		< 0.99	
Pesticide Compounds (mg/Kg)													
Aldrin	309002	< 0.0034		< 0.0049		< 0.0046		< 0.0044		< 0.0037		< 0.0026	
Heptachlor Epoxide	1024573	0.013		< 0.0049		< 0.0046		< 0.0044		0.015		< 0.0026	
Dieldrin	60571	0.056		< 0.0094		< 0.0089		< 0.0085		< 0.0072		0.091	
4,4'-DDT	50293	0.022		< 0.0094		0.036		< 0.0085		< 0.0072		0.086	
PCBs (mg/Kg)													
Aroclor - 1248	1336363	< 0.067		< 0.094		< 0.089		< 0.085		< 0.072		< 0.051	
Aroclor - 1254	1336363	< 0.067		< 0.094		< 0.089		< 0.085		< 0.072		< 0.051	
Aroclor - 1260	1336363	< 0.067		< 0.094		< 0.089		< 0.085		< 0.072		< 0.051	
Total PCBs		ND		ND		ND		ND		ND		ND	
Inorganic Compounds (mg/Kg)													
Antimony	7440360	< 5.3		< 7.5		< 7.1		< 6.8		< 5.7		< 4.1	
Arsenic	7440382	14.8	/I	5.6		17.1	/I	9.3		16.9	/I	12.1	
Barium	7440393	54.4		863		327		307		123		95.5	
Beryllium	7440417	0.53		< 0.57		< 0.54		< 0.51		< 0.43		0.34	
Cadmium	7440439	2.2		< 1.7		21		1.5		22.6		1.9	
Chromium	16065831	51600		65100		45100		57700		69300		17300	
Hexavalent Chromium	18540299												
Lead	7439921	1150	/I/C	902	/I/C	2250	/I/C	1620	/I/C	1960	/I/C	576	/I/C
Mercury	7439976	3.8		6.1		18.1		< 0.13		30		4.6	
Nickel	7440020	9.9		8.9		10.5		9.7		13		9.4	
Selenium	7782492	0.89		1		< 0.75		< 1.7		< 0.61		< 1.1	
Silver	7440224	< 0.85		< 1.2		6		< 1.1		< 0.91		< 0.65	
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SS-01		SS-02		SS-03		SS-04		SS-05		SS-06	
IEA Sample ID Number													
Depth		0-1		0-1		0-1		0-1		0-1		0-1	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Chrysene	218019	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Benzo(b)fluoranthene	205992	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Benzo(k)fluoranthene	207089	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Benzo(a)pyrene	50328	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Indeno(1,2,3-cd)pyrene	193395	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Dibenzo(a,h)anthracene	53703	< 2.3		< 2		< 1.9		< 5.8		< 3		< 2.7	
Pesticide Compounds (mg/Kg)													
Aldrin	309002	< 0.0065		< 0.0043		< 0.0025		< 0.0066		< 0.0038		< 0.0062	
Heptachlor Epoxide	1024573	< 0.0065		< 0.0043		< 0.0025		0.013		< 0.0038		< 0.0062	
Dieldrin	60571	< 0.013		< 0.0083		< 0.0049		< 0.013		< 0.012		< 0.012	
4,4'-DDT	50293	< 0.013		< 0.0083		< 0.0049		< 0.013		< 0.012		< 0.012	
PCBs (mg/Kg)													
Aroclor - 1248	1336363	< 0.13		< 0.083		< 0.049		< 0.13		< 0.12		< 0.12	
Aroclor - 1254	1336363	< 0.13		< 0.083		< 0.049		< 0.13		< 0.12		< 0.12	
Aroclor - 1260	1336363	< 0.13		< 0.083		< 0.049		< 0.13		< 0.12		< 0.12	
Total PCBs		ND		ND		ND		ND		ND		ND	
Inorganic Compounds (mg/Kg)													
Antimony	7440360	< 10		< 6.6		< 8.2		< 10.3		< 10		< 9.6	
Arsenic	7440382	7.3		15.3	/I	7.8		9.3		8.1		4.2	
Barium	7440393	413		386		372		151		339		598	
Beryllium	7440417	< 0.76		< 0.5		< 0.62		< 0.78		< 0.76		< 0.73	
Cadmium	7440439	< 2.2		< 1.5		< 1.8		< 2.3		< 2.2		< 2.1	
Chromium	16065831	40300		30400		47800		48400		43600		48400	
Hexavalent Chromium	18540299												
Lead	7439921	1050	/I/C	1460	/I/C	868	/I/C	1410	/I/C	1760	/I/C	1310	/I/C
Mercury	7439976	5.9		8.8		4.5		24.9		18.1		4.6	
Nickel	7440020	10		5.9		8.9		15.5		9.6		7.7	
Selenium	7782492	< 1.1		< 0.7		< 0.88		< 1.1		< 1.1		< 1	
Silver	7440224	< 1.6		< 1.1		< 1.3		< 1.6		< 1.6		< 1.5	
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Comparison of Su
Former Griess-Pf
Commonwealth E
Waukegan, Illinoi

Sample ID Number		SS-07	SS-08	SS-09	SS-10	SB-44A	SB-45A	SB-46A	SB-47A	
IEA Sample ID Number						950153001	950153003	950153005	950153006	
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	
Sample Type		Investigation	Combined	Combined	Investigation	Investigation	Investigation	Investigation	Investigation	
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	
CAS No.										
CPAHs (mg/Kg)										
Benzo(a)anthracene	56553	< 1.1	< 2.2	2.85	6.4					
Chrysene	218019	< 1.1	< 2.2	2.55	4.8					
Benzo(b)fluoranthene	205992	< 1.1	< 2.2	3.65	4.4					
Benzo(k)fluoranthene	207089	< 1.1	< 2.2	1.095	1.6					
Benzo(a)pyrene	50328	< 1.1	< 2.2	1.65 /I	3 /I					
Indeno(1,2,3-cd)pyrene	193395	< 1.1	< 2.2	< 1	1.4					
Dibenzo(a,h)anthracene	53703	< 1.1	< 2.2	< 1	< 1.6					
Pesticide Compounds (mg/Kg)										
Aldrin	309002	< 0.0062	< 0.006	< 0.0021	< 0.0035					
Heptachlor Epoxide	1024573	< 0.0062	< 0.006	0.007	0.015					
Dieldrin	60571	< 0.012	< 0.012	< 0.0042	< 0.0068					
4,4'-DDT	50293	< 0.012	< 0.012	< 0.0042	< 0.0068					
PCBs (mg/Kg)										
Aroclor - 1248	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Aroclor - 1254	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Aroclor - 1260	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Total PCBs		ND	< ND	< ND	ND					
Inorganic Compounds (mg/Kg)										
Antimony	7440360	< 9.7	< 9.3	< 3.3	< 5.4					
Arsenic	7440382	6.7	8.85	10.5	72.7 /I/C	4600 /I/N/C	24 /I	17 /I	46 /I	
Barium	7440393	218	388	216.5	88.5					
Beryllium	7440417	< 0.73	< 0.7	< 0.25	< 0.41					
Cadmium	7440439	< 2.1	< 2	1.95	1.7					
Chromium	16065831	21500	44900	20350	60000					
Hexavalent Chromium	18540299									
Lead	7439921	556 /I/C	1445 /I/C	1135 /I/C	1900 /I/C					
Mercury	7439976	5.1	6.1	4.45	31.8					
Nickel	7440020	5	8.35	21.3	16.7					
Selenium	7782492	< 1	< 0.99	0.38	< 0.58					
Silver	7440224	< 1.5	< 1.5	< 0.53	< 0.87					
		/I/C	/I/C	/I/C	/I/C	/I/N/C	/I	/I	/I	

Table 5 urface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
leger Tannery
:dison Company
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Sample ID Number		SB-48A	SB-49A	SB-50A	SB-51A	SB-64A/CA	SB-65A
IEA Sample ID Number		950153008	950153010	950153012	950153015	950182012	950182014
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553					< 0.33	0.34
Chrysene	218019					< 0.33	< 0.33
Benzo(b)fluoranthene	205992					< 0.33	< 0.33
Benzo(k)fluoranthene	207089					< 0.33	< 0.33
Benzo(a)pyrene	50328					< 0.33	< 0.33
Indeno(1,2,3-cd)pyrene	193395					< 0.33	< 0.33
Dibenzo(a,h)anthracene	53703					< 0.33	< 0.33
Pesticide Compounds (mg/Kg)							
Aldrin	309002					< 0.0017	< 0.0017
Heptachlor Epoxide	1024573					< 0.0017	< 0.0017
Dieldrin	60571					< 0.0033	< 0.0033
4,4'-DDT	50293					0.0093	0.013
PCBs (mg/Kg)							
Aroclor - 1248	1336363					< 0.033	< 0.033
Aroclor - 1254	1336363					< 0.033	< 0.033
Aroclor - 1260	1336363					< 0.033	0.16
Total PCBs						ND	0.16
Inorganic Compounds (mg/Kg)							
Antimony	7440360					NA	NA
Arsenic	7440382	25 /I	18 /I	3.5	16 /I	9.4	63 **/I/C
Barium	7440393					180	120
Beryllium	7440417					NA	NA
Cadmium	7440439					81	2.9
Chromium	16065831					49000	32000
Hexavalent Chromium	18540299					16	NA
Lead	7439921					930 /I/C	720 /I/C
Mercury	7439976					4.5	5.5
Nickel	7440020					NA	NA
Selenium	7782492					< 3.4	< 3.5
Silver	7440224					< 2.2	< 2
		/I	/I		/I	/I/C	/I/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-66A/CA		SB-67A/CA		SB-66A		SB-73A		SB-74A		SB-75A	
IEA Sample ID Number		950182015		950182016		950182018		950188006		9501888008			
Depth		0-1		0-1		0-1		0-1		0-1		0-1	
Phase I/Phase II		Phase II		Phase II		Phase II		Phase II		Phase II		Phase II	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553	0.37		< 0.33		< 0.33							
Chrysene	218019	0.51		< 0.33		< 0.33							
Benzo(b)fluoranthene	205992	< 0.33		< 0.33		< 0.33							
Benzo(k)fluoranthene	207089	< 0.33		< 0.33		< 0.33							
Benzo(a)pyrene	50328	< 0.33		< 0.33		< 0.33							
Indeno(1,2,3-cd)pyrene	193395	< 0.33		< 0.33		< 0.33							
Dibenzo(a,h)anthracene	53703	< 0.33		< 0.33		< 0.33							
Pesticide Compounds (mg/Kg)													
Aldrin	309002	< 0.0017		< 0.0017		< 0.0017							
Heptachlor Epoxide	1024573	< 0.0017		< 0.0017		< 0.0017							
Dieldrin	60571	< 0.0033		< 0.0033		< 0.0033							
4,4'-DDT	50293	0.013		0.036		< 0.0033							
PCBs (mg/Kg)													
Aroclor - 1248	1336363	< 0.033		< 0.033		< 0.033							
Aroclor - 1254	1336363	< 0.033		< 0.033		< 0.033							
Aroclor - 1260	1336363	0.17		0.22		< 0.033							
Total PCBs		0.17		0.22		ND							
Inorganic Compounds (mg/Kg)													
Antimony	7440360	NA		NA		NA		NA		NA		NA	
Arsenic	7440382	380	**/I/C	78	**/I/C	16	/I	11		16	/I	18	/I
Barium	7440393	250		320		140		68		390		220	
Beryllium	7440417	NA		NA		NA		NA		NA		NA	
Cadmium	7440439	4.9		2.5		3.7		< 1.2		< 1.6		42	
Chromium	16065831	31000		36000		44000		42000		40000		41000	
Hexavalent Chromium	18540299	< 2.7		2.5		NA		< 2.4		< 5		3.5	
Lead	7439921	560	/I/C	410	/I/C	970	/I/C	1000	/I/C	490	/I/C	1400	/I/C
Mercury	7439976	0.39		0.25		9.5		11		1.4		0.75	
Nickel	7440020	NA		NA		NA		NA		NA		NA	
Selenium	7782492	< 2.7		< 2.8		< 3.7		< 6.1		< 11		< 7.7	
Silver	7440224	< 2.4		2.3		< 2		< 2.3		< 3.2		< 2.2	
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-76A	SB-77A	SB-78A	SB-79A	SB-80A	SB-81A	SB-82A
IEA Sample ID Number			950248015	950248017	950248013	950248019	950153001	950153003
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360	NA						
Arsenic	7440382	12	8.5	13	23 /I	1600 /I/N/C	49 /I	180 /I/C
Barium	7440393	460						
Beryllium	7440417	NA						
Cadmium	7440439	3.6						
Chromium	18065831	37000						
Hexavalent Chromium	18540299	< 3.03						
Lead	7439921	191						
Mercury	7439976	0.24						
Nickel	7440020	NA						
Selenium	7782492	< 7.8						
Silver	7440224	< 2.9						
					/I	/I/N/C	/I	/I/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-83A	SB-84A	SB-85A	SB-86A	A1	B1	C1
IEA Sample ID Number		950153005	950153007	950153009	950153011			
Depth		0-1	0-1	0-1	0-1			
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II			
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	12	7.1	210 /I/C	21 /I	848 /I/C	1590 /I/N/C	1190 /I/C
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921					263	476 /I/C	336
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
				/I/C	/I	/I/C	/I/N/C	/I/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		D1	E1	F1	G1	H1	A,B,1,2
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	1280 /I/N/C	1370 /I/N/C	90 /I/C	382 /I/C	1100 /I/C	1420 /I/N/C
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	425 /I/C	385	400	477 /I/C	358	547 /I/C
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						
		/I/N/C	/I/N/C	/I/C	/I/C	/I/C	/I/N/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		B,C,1,2		C,D,1,2		D,E,1,2		E,F,1,2		F,G,1,2		G,H,1,2	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	1340	/I/N/C	663	/I/C	310	/I/C	341	/I/C	759	/I/C	536	/I/C
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	414	/I/C	467	/I/C	794	/I/C	577	/I/C	532	/I/C	483	/I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
			/I/N/C		/I/C		/I/C		/I/C		/I/C		/I/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		H,I,1,2		A2		B2		C2		D2		E2	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	909	/I/C	160	/I/C	85	/I/C	< 11		67	/I/C	47	/I
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	614	/I/C	658	/I/C	911	/I/C	786	/I/C	747	/I/C	990	/I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		F2		G2		H2		A,B,2,3		B,C,2,3		C,D,2,3	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	871	I/C	74	I/C	779	I/C	322	I/C	47	I	57	I
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	784	I/C	789	I/C	701	I/C	494	I/C	536	I/C	813	I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
		I/C		I/C		I/C		I/C		I/C		I/C	

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number	D,E,2,3	E,F,2,3	F,G,2,3	G,H,2,3	H,I,2,3	A3
IEA Sample ID Number						
Depth						
Phase I/Phase II						
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type	Surface	Surface	Surface	Surface	Surface	Surface
Area	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene 56553						
Chrysene 218019						
Benzo(b)fluoranthene 205992						
Benzo(k)fluoranthene 207089						
Benzo(a)pyrene 50328						
Indeno(1,2,3-cd)pyrene 193395						
Dibenzo(a,h)anthracene 53703						
Pesticide Compounds (mg/Kg)						
Aldrin 309002						
Heptachlor Epoxide 1024573						
Dieldrin 60571						
4,4'-DDT 50293						
PCBs (mg/Kg)						
Aroclor - 1248 1336363						
Aroclor - 1254 1336363						
Aroclor - 1260 1336363						
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony 7440360						
Arsenic 7440382	99 I/C	634 I/C	180 I/C	286 I/C	764 I/C	302 I/C
Barium 7440393						
Beryllium 7440417						
Cadmium 7440439						
Chromium 16065831						
Hexavalent Chromium 18540299						
Lead 7439921	878 I/C	853 I/C	1330 I/C	1120 I/C	640 I/C	713 I/C
Mercury 7439976						
Nickel 7440020						
Selenium 7782492						
Silver 7440224						
	I/C	I/C	I/C	I/C	I/C	I/C

Table 5

Comparison of Surface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		B3		C3		D3		E3		F3		G3	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 2		Area 2		Area 2		Area 2		Area 2		Area 2	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	422	I/C	< 12		46	I	180	I/C	447	I/C	678	I/C
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	304		909	I/C	777	I/C	964	I/C	1100	I/C	748	I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
		I/C		I/C		I/C		I/C		I/C		I/C	

Table 6

Comparison of Subsurface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-01B	SB-02B	SB-06B	SB-07B	SB-08B	SB-09B
IEA Sample ID Number							
Depth		1-2	4-5	3.5-4.5	3-4	4-5	4-5
Phase I/Phase II		Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation
Sample Type		In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface
In-Place/Removed							
Soil Type							
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 1.8	< 1.5	< 1.5	< 15	0.56	< 1.6
Chrysene	218019	0.37 J	0.14 J	< 1.5	< 15	0.45 J	0.37 J
Benzo(b)fluoranthene	205992	0.26 J	0.41 J	< 1.5	< 15	< 0.46	< 1.6
Benzo(k)fluoranthene	207089	0.62 J	< 1.5	< 1.5	< 15	0.43 J	< 1.6
Benzo(a)pyrene	50328	0.22 J	0.2 J	< 1.5	< 15	0.34 J	< 1.6
Indeno(1,2,3-cd)pyrene	193395	< 1.8	< 1.5	< 1.5	< 15	0.14 J	< 1.6
Dibenzo(a,h)anthracene	53703	< 1.8	< 1.5	< 1.5	< 15	< 0.46	< 1.6
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0048	< 0.004	< 0.0041	< 0.026	< 0.0025	< 0.0043
Heptachlor Epoxide	1024573	< 0.0048	< 0.004	< 0.0041	< 0.026	< 0.0025	< 0.0043
Dieldrin	60571	< 0.0092	< 0.0077	< 0.008	< 0.051	< 0.0049	< 0.0084
4,4'-DDT	50293	< 0.0092	< 0.0077	< 0.008	< 0.051	< 0.0049	< 0.0084
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Aroclor - 1254	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Aroclor - 1260	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 7.4	< 6.2	< 6.4	< 6.5	< 3.9	< 6.7
Arsenic	7440382	32.8 /I	6.9	5550 /I/N/C	14.3 /I	12.4	21.7 /I
Barium	7440393	413	360	402	95.9	68.1	82.8
Beryllium	7440417	< 0.56	< 0.47	< 0.48	< 0.49	< 0.3	< 0.51
Cadmium	7440439	< 1.6	< 1.4	< 1.4	< 1.4	1.9	< 1.5
Chromium	16065831	47400	33100	37400	49200	15300	81900
Hexavalent Chromium	18540299						
Lead	7439921	1520 /I/C	481 /I/C	253	22.4	281	1260 /I/C
Mercury	7439976	7.4	0.63	0.84	29.8	0.27	23.4
Nickel	7440020	11.3	4.2	< 3.2	11	10.4	11.5
Selenium	7782492	< 0.78	< 0.65	2.4	< 0.69	< 1	< 1.7
Silver	7440224	< 1.2	< 0.98	< 1	< 1	< 0.62	< 1.1
		/I/C	/I/C	/I/N/C	/I		/I/C

Table 6

Comparison of Subsurface Soil Data In Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		MW-2B	MW-2C	SB-44B	SB-45B	SB-46B	SB-47B	SB-48B
IEA Sample ID Number				950153002	950153004	950153005	950153007	950153009
Depth		4-6	6-8	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	5.8	< 12					
Chrysene	218019	< 5.8	< 12					
Benzo(b)fluoranthene	205992	5.8	< 12					
Benzo(k)fluoranthene	207089	< 5.8	< 12					
Benzo(a)pyrene	50328	6 /I	< 12					
Indeno(1,2,3-cd)pyrene	193395	< 5.8	< 12					
Dibenzo(a,h)anthracene	53703	< 5.8	< 12					
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.0032	< 0.0039					
Heptachlor Epoxide	1024573	< 0.0032	< 0.0039					
Dieldrin	60571	< 0.0062	< 0.0076					
4,4'-DDT	50293	< 0.0062	< 0.0076					
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.062	< 0.076					
Aroclor - 1254	1336363	< 0.062	< 0.076					
Aroclor - 1260	1336363	< 0.062	< 0.076					
Total PCBs		ND	ND					
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 5	< 6.1					
Arsenic	7440382	1210 /I/N/C	604 /I/C	5	1.2	13	15 /I	23 /I
Barium	7440393	557	155					
Beryllium	7440417	< 0.38	< 0.46					
Cadmium	7440439	2.9	< 1.3					
Chromium	16065831	20400	20800					
Hexavalent Chromium	18540299							
Lead	7439921	595 /I/C	197					
Mercury	7439976	3.6	111 /C					
Nickel	7440020	5.5	4.8					
Selenium	7782492	< 0.53	< 0.65					
Silver	7440224	< 0.79	< 0.97					
		/I/N/C	/I/C				/I	/I

Table 6

Comparison of Subsurface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-49B	SB-50B	SB-51B	SB-64CB	SB-67B/CB	SB-73B
IEA Sample ID Number		950153011	950153014	950153016	950152013	950152017	950188007
Depth		1-3	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553					< 0.33	
Chrysene	218019					< 0.33	
Benzo(b)fluoranthene	205992					< 0.33	
Benzo(k)fluoranthene	207089					< 0.33	
Benzo(a)pyrene	50328					< 0.33	
Indeno(1,2,3-cd)pyrene	193395					< 0.33	
Dibenzo(a,h)anthracene	53703					< 0.33	
Pesticide Compounds (mg/Kg)							
Aldrin	309002					< 0.0017	
Heptachlor Epoxide	1024573					< 0.0017	
Dieldrin	60571					< 0.0033	
4,4'-DDT	50293					< 0.0033	
PCBs (mg/Kg)							
Aroclor - 1248	1336363					< 0.033	
Aroclor - 1254	1336363					< 0.033	
Aroclor - 1260	1336363					< 0.033	
Total PCBs						ND	
Inorganic Compounds (mg/Kg)							
Antimony	7440360				NA	NA	NA
Arsenic	7440382	9.5	10000 /I/N/C	25 /I	140 **/I/C	370 **/I/C	98 **/I/C
Barium	7440393				300	130	330
Beryllium	7440417				NA	NA	NA
Cadmium	7440439				4.4	3.2	6.2
Chromium	16065831				27000	3600	54000
Hexavalent Chromium	18540299				12	< 1.6	< 3.1
Lead	7439921				470 /I/C	100	530 /I/C
Mercury	7439976				0.54	0.55	4.3
Nickel	7440020				NA	NA	NA
Selenium	7782492				< 3.7	< 1.9	< 9.1
Silver	7440224				< 2.8	< 1.3	< 3
			/I/N/C	/I	/I/C	/I/C	/I/C

Table 6

Comparison of Subsurface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-77B	SB-78B	SB-79B	SB-80B	SB-81B	SB-82B	SB-83B
IEA Sample ID Number		950248016	950248018	950248014	950248020	950153002	950153004	950153006
Depth		1-3	1-3	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	8.5	7.8	780 /I/C	710 /I/C	55 /I	240 /I/C	22 /I
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921							
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
				/I/C	/I/C	/I	/I/C	/I

Table 6

Comparison of Subsurface Soil Data in Area 2 to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-84B	SB-85B	SB-86B	MW-1A
IEA Sample ID Number		950153008	950153010	950153012	950211802
Depth		1-3	1-3	1-3	1-3
Phase I/Phase II		Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation
Sample Type		In-Place	In-Place	In-Place	In-Place
In-Place/Removed		Subsurface	Subsurface	Subsurface	Subsurface
Soil Type		Area 2	Area 2	Area 2	Area 2
Area					
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553				< 0.4
Chrysene	218019				< 0.4
Benzo(b)fluoranthene	205992				< 0.4
Benzo(k)fluoranthene	207089				< 0.4
Benzo(a)pyrene	50328				< 0.4
Indeno(1,2,3-cd)pyrene	193395				< 0.4
Dibenzo(a,h)anthracene	53703				< 0.4
Pesticide Compounds (mg/Kg)					
Aldrin	309002				< 0.002
Heptachlor Epoxide	1024573				< 0.002
Dieldrin	60571				< 0.004
4,4'-DDT	50293				< 0.004
PCBs (mg/Kg)					
Aroclor - 1248	1336363				< 0.04
Aroclor - 1254	1336363				< 0.04
Aroclor - 1260	1336363				< 0.04
Total PCBs					ND
Inorganic Compounds (mg/Kg)					
Antimony	7440360				< 0.47
Arsenic	7440382	19 /I	70 /I/C	4800 /I/N/C	3.4
Barium	7440393				3.1 B
Beryllium	7440417				< 0.24
Cadmium	7440439				< 0.24
Chromium	16065831				11.8
Hexavalent Chromium	18540299				NA
Lead	7439921				2.2
Mercury	7439976				< 0.12
Nickel	7440020				2.5 B
Selenium	7782492				< 0.71
Silver	7440224				< 0.24
		/I	/I/C	/I/N/C	

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-21A		SB-24A		SB-27A	PW-6	PW-7	PW-8	SB-71A
IEA Sample ID Number										950188002
Depth		0-1		0-8		0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase I		Phase I		Phase I	Phase I	Phase I	Phase I	Phase II
Sample Type		Investigation		Investigation		Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place		In-Place		In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface		Surface		Surface	Surface	Surface	Surface	Surface
Area		Area 3A		Area 3A		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.										
CPAHs (mg/Kg)										
Benzo(a)anthracene	56553	< 1		< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Chrysene	218019	< 1		< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Benzo(b)fluoranthene	205992	0.55	J	< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Benzo(k)fluoranthene	207089	0.57	J	< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Benzo(a)pyrene	50328	0.19	J	< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Indeno(1,2,3-cd)pyrene	193395	< 1		< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Dibenzo(a,h)anthracene	53703	< 1		< 0.8		< 0.8	< 2.9	< 0.4	< 0.36	
Pesticide Compounds (mg/Kg)										
Aldrin	309002	< 0.0028		< 0.0022		< 0.0021	< 0.016	< 0.0021	< 0.0019	
Heptachlor Epoxide	1024573	0.021		0.011		0.0046	< 0.016	< 0.0021	0.0061	
Dieldrin	60571	0.047		0.03		0.0083	< 0.03	< 0.0042	< 0.0038	
4,4'-DDT	50293	0.026		0.027		0.0088	< 0.03	0.012	0.02	
PCBs (mg/Kg)										
Aroclor - 1248	1336363	0.5		< 0.042		< 0.041	< 0.3	< 0.042	< 0.038	
Aroclor - 1254	1336363	< 0.053		0.38		< 0.041	< 0.3	< 0.042	< 0.038	
Aroclor - 1260	1336363	< 0.053		< 0.042		< 0.041	< 0.3	< 0.042	< 0.038	
Total PCBs		0.5		0.38		ND	ND	ND	ND	
Inorganic Compounds (mg/Kg)										
Antimony	7440360	< 4.3		< 3.4		< 3.3	< 3.8	< 3.3	< 3	NA
Arsenic	7440382	29.3	/I	152	/I/C	3.4	1.7	1.3	23.7 /I	38 **/I
Barium	7440393	203		198		990	4840	14.2	64.4	150
Beryllium	7440417	0.71		0.9		0.37	< 0.29	< 0.25	< 0.23	NA
Cadmium	7440439	54.8		21.7		< 0.72	< 0.85	< 0.73	6	5.5
Chromium	16065831	6900		6570		121	49.5	29.1	94.6	27000
Hexavalent Chromium	18540299									< 1.75
Lead	7439921	566	/I/C	538	/I/C	14.5	27.9	6.5	646 /I/C	680 /I/C
Mercury	7439976	5.1		1.1		< 0.06	0.09	< 0.06	0.09	6.8
Nickel	7440020	52.1		18.6		10.8	2	505	103	NA
Selenium	7782492	4.8		1.6		< 0.85	0.44	0.35	< 0.32	< 4.1
Silver	7440224	< 0.68		< 0.54		< 0.52	< 0.61	< 0.53	< 0.48	< 1.4
		/I/C		/I/C					/I/C	/I/C

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		N1	O1	P1	Q1	R1	S1	N,O,1,2
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,b)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	12	13	17 /I	15 /I	8.8	12	< 7
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	543 /I/C	170	42	455 /I/C	30	93	578 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C		/I	/I/C			/I/C

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		O,P,1,2	P,Q,1,2	Q,R,1,2	R,S,1,2	N2	O2	P2
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	< 7	21 /I	20 /I	< 6.5	< 7	10	29 /I
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	416 /I/C	268	644 /I/C	168	710 /I/C	402 /I/C	426 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C	/I	/I/C		/I/C	/I/C	/I/C

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		Q2	R2	S2	N,O,2,3	O,P,2,3	P,Q,2,3	Q,R,2,3
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	45 /I	< 7	< 9	9.9	16 /I	23 /I	17 /I
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	330	541 /I/C	284	795 /I/C	449 /I/C	534 /I/C	431 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I	/I/C		/I/C	/I/C	/I/C	/I/C

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

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Waukegan, Illinois

Sample ID Number		R,S,2,3	N3	O3	P3	Q3	R3	S3	N,O,3,4
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	20 /I	< 7	17 /I	20 /I	19 /I	14 /I	16 /I	46 /I
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	579 /I/C	1810 /I/C	850 /I/C	307	467 /I/C	561 /I/C	531 /I/C	614 /I/C
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								
		/I/C	/I/C	/I/C	/I	/I/C	/I/C	/I/C	/I/C

Table 7

ace Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
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Sample ID Number		O,P,3,4		P,Q,3,4		Q,R,3,4	R,S,3,4		N4		O4	
IEA Sample ID Number												
Depth												
Phase I/Phase II												
Sample Type		Investigation		Investigation		Investigation	Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place	In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface	Surface		Surface		Surface	
Area		Area 3A		Area 3A		Area 3A	Area 3A		Area 3A		Area 3A	
CAS No.												
CPAHs (mg/Kg)												
Benzo(a)anthracene	56553											
Chrysene	218019											
Benzo(b)fluoranthene	205992											
Benzo(k)fluoranthene	207089											
Benzo(a)pyrene	50328											
Indeno(1,2,3-cd)pyrene	193395											
Dibenzo(a,h)anthracene	53703											
Pesticide Compounds (mg/Kg)												
Aldrin	309002											
Heptachlor Epoxide	1024573											
Dieldrin	60571											
4,4'-DDT	50293											
PCBs (mg/Kg)												
Aroclor - 1248	1336363											
Aroclor - 1254	1336363											
Aroclor - 1260	1336363											
Total PCBs												
Inorganic Compounds (mg/Kg)												
Antimony	7440360											
Arsenic	7440382	53	/I	100	/I/C	9	17	/I	26	/I	24	/I
Barium	7440393											
Beryllium	7440417											
Cadmium	7440439											
Chromium	16065831											
Hexavalent Chromium	18540299											
Lead	7439921	603	/I/C	431	/I/C	249	248		447	/I/C	564	/I/C
Mercury	7439976											
Nickel	7440020											
Selenium	7782492											
Silver	7440224											
		/I/C		/I/C			/I		/I/C		/I/C	

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		P4		Q4		R4		S4		N,O,4,5		O,P,4,5	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	15	/I	28	/I	22	/I	15	/I	< 8		20	/I
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	573	/I/C	585	/I/C	949	/I/C	1280	/I/C	719	/I/C	815	/I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		P,Q,4,5		Q,R,4,5		R,S,4,5		N5		O5		P5	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	14	/I/C	71	/I/C	10		77	/I/C	31	/I	< 9	
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	785	/I/C	569	/I/C	811	/I/C	1280	/I/C	609	/I/C	757	/I/C
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												
		/I/C		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Comparison of Surf
Former Griess-Pfleg
Commonwealth Edi
Waukegan, Illinois

Sample ID Number		Q5	R5	S5	N,O,5,6	O,P,5,6	P,Q,5,6	Q,R,5,6	R,S,5,6
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	30 /I	16 /I	< 10	20 /I	29 /I	24 /I	31 /I	< 10
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	481 /I/C	695 /I/C	830 /I/C	231	414 /I/C	1160 /I/C	552 /I/C	730 /I/C
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								
		/I/C	/I/C	/I/C	/I	/I/C	/I/C	/I/C	/I/C

Table 7

ace Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
ier Tannery
lson Company

Sample ID Number		N6		O6		P6		Q6		R6	
IEA Sample ID Number											
Depth											
Phase I/Phase II											
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface	
Area		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.											
CPAHs (mg/Kg)											
Benzo(a)anthracene	56553										
Chrysene	218019										
Benzo(b)fluoranthene	205992										
Benzo(k)fluoranthene	207089										
Benzo(a)pyrene	50328										
Indeno(1,2,3-cd)pyrene	193395										
Dibenzo(a,h)anthracene	53703										
Pesticide Compounds (mg/Kg)											
Aldrin	309002										
Heptachlor Epoxide	1024573										
Dieldrin	60571										
4,4'-DDT	50293										
PCBs (mg/Kg)											
Aroclor - 1248	1336363										
Aroclor - 1254	1336363										
Aroclor - 1260	1336363										
Total PCBs											
Inorganic Compounds (mg/Kg)											
Antimony	7440360										
Arsenic	7440382	34	/I	67	/I/C	26	/I	< 8		< 10	
Barium	7440393										
Beryllium	7440417										
Cadmium	7440439										
Chromium	16065831										
Hexavalent Chromium	18540299										
Lead	7439921	2680	/I/C	571	/I/C	640	/I/C	508	/I/C	900	/I/C
Mercury	7439976										
Nickel	7440020										
Selenium	7782492										
Silver	7440224										
		/I/C		/I/C		/I/C		/I/C		/I/C	

Table 7

Comparison of Surface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Comparison of Surf
Former Griess-Pfleg
Commonwealth Edi
Waukegan, Illinois

Sample ID Number		S6	N,O,6,7	O,P,6,7	P,Q,6,7	Q,R,6,7	R,S,6,7	N7	O7
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	10	24 /1	12	30 /1	< 8	10	< 10	< 7
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	785 /1/C	1370 /1/C	352	498 /1/C	643 /1/C	460 /1/C	549 /1/C	871 /1/C
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								
		/1/C	/1/C		/1/C	/1/C	/1/C	/1/C	/1/C

Table 7

ace Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
er Tannery
ison Company

Comparison of Surface Soil Data in A
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number	P7	Q7	R7	S7	N,O,7,8	O,P,7,8	P,Q,7,8	Q,R,7,8	
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	
Soil Type	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	
Area	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene 56553									
Chrysene 218019									
Benzo(b)fluoranthene 205992									
Benzo(k)fluoranthene 207089									
Benzo(a)pyrene 50328									
Indeno(1,2,3-cd)pyrene 193395									
Dibenzo(a,h)anthracene 53703									
Pesticide Compounds (mg/Kg)									
Aldrin 309002									
Heptachlor Epoxide 1024573									
Dieldrin 60571									
4,4'-DDT 50293									
PCBs (mg/Kg)									
Aroclor - 1248 1336363									
Aroclor - 1254 1336363									
Aroclor - 1260 1336363									
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony 7440360									
Arsenic 7440382	35 /I	12	< 9	18 /I	< 7.4	< 7.8	8.9	8	<
Barium 7440393									
Beryllium 7440417									
Cadmium 7440439									
Chromium 16065831									
Hexavalent Chromium 18540299									
Lead 7439921	525 /I/C	290	766 /I/C	424 /I/C	1780 /I/C	843 /I/C	1190 /I/C	423 /I/C	
Mercury 7439976									
Nickel 7440020									
Selenium 7782492									
Silver 7440224									
	/I/C		/I/C	/I/C	/I/C	/I/C	/I/C	/I/C	

Table 7 Area 3A to Tier 1 Screening Values for Direct Contact

Sample ID Number		R,S,7,8
IEA Sample ID Number		
Depth		
Phase I/Phase II		
Sample Type		vestigation
In-Place/Removed		In-Place
Soil Type		Surface
Area		Area 3A
	CAS No.	
CPAHs (mg/Kg)		
Benzo(a)anthracene	56553	
Chrysene	218019	
Benzo(b)fluoranthene	205992	
Benzo(k)fluoranthene	207089	
Benzo(a)pyrene	50328	
Indeno(1,2,3-cd)pyrene	193395	
Dibenzo(a,h)anthracene	53703	
Pesticide Compounds (mg/Kg)		
Aldrin	309002	
Heptachlor Epoxide	1024573	
Dieldrin	60571	
4,4'-DDT	50293	
PCBs (mg/Kg)		
Aroclor - 1248	1336363	
Aroclor - 1254	1336363	
Aroclor - 1260	1336363	
Total PCBs		
Inorganic Compounds (mg/Kg)		
Antimony	7440360	
Arsenic	7440382	7
Barium	7440393	
Beryllium	7440417	
Cadmium	7440439	
Chromium	16065831	
Hexavalent Chromium	18540299	
Lead	7439921	217
Mercury	7439976	
Nickel	7440020	
Selenium	7782492	
Silver	7440224	

Table 8

Comparison of Subsurface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-20B	SB-21B	SB-22B	SB-23B	SB-24B	SB-25B	SB-26B
IEA Sample ID Number								
Depth		2-4	2-4	2-4	9-10	3-4	3.5-4.5	3-4
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	Removed
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	0.67 J	0.16 J	< 0.4	< 1.2	1.2	< 0.96	8.2 /I
Chrysene	218019	< 0.94	0.17 J	0.082 J	< 1.2	1.2	< 0.96	6.4
Benzo(b)fluoranthene	205992	< 0.94	0.16 J	0.12 J	< 1.2	1.7	< 0.96	8.8 /I
Benzo(k)fluoranthene	207089	< 0.94	0.083 J	0.072 J	< 1.2	0.49 J	< 0.96	5.2
Benzo(a)pyrene	50328	< 0.94	0.078 J	0.071 J	< 1.2	0.77 J	< 0.96	4.5 /I
Indeno(1,2,3-cd)pyrene	193395	< 0.94	< 0.37	0.068 J	< 1.2	< 0.89	< 0.96	5
Dibenzo(a,h)anthracene	53703	< 0.94	< 0.37	< 0.4	< 1.2	< 0.89	< 0.96	< 3.6
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.0025	< 0.002	< 0.0058	< 0.0032	< 0.0023	0.036	< 0.0049
Heptachlor Epoxide	1024573	< 0.0025	0.0034	< 0.0058	< 0.0032	0.048	0.084	< 0.0049
Dieldrin	60571	< 0.0049	0.0094	< 0.011	0.023	0.1	< 0.0049	< 0.0095
4,4'-DDT	50293	< 0.0049	< 0.0039	0.0065 J	0.0062	0.028	< 0.0049	< 0.0095
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.049	0.24	< 0.11	< 0.062	1.8	2.8	< 0.095
Aroclor - 1254	1336363	< 0.049	< 0.039	< 0.11	< 0.062	1.2	< 0.049	< 0.095
Aroclor - 1260	1336363	< 0.049	< 0.039	< 0.11	< 0.062	< 0.045	< 0.049	< 0.095
Total PCBs		ND	0.24	ND	ND	3 /P	2.8 /P	ND
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 3.9	< 3.1	< 3.6	< 5	< 3.6	< 4	< 3
Arsenic	7440382	32.7 /I	< 0.28	20.6 /I	12.6	164 /I/C	7.1	2.7
Barium	7440393	189	2.9	167	392	323	114	19.4
Beryllium	7440417	0.65	< 0.24	< 0.27	< 0.38	1.2	6.6	< 0.23
Cadmium	7440439	9	< 0.68	12.8	8.4	11	1.9	< 0.67
Chromium	16065831	11900	30.2	12400	25500	3830	919	21.8
Hexavalent Chromium	18540299							
Lead	7439921	399	3.7	425 /I/C	400	333	50.2	13.2
Mercury	7439976	2	0.61	6.6	2.2	1.3	0.5	0.07
Nickel	7440020	30.1	2.2	15.3	8.1	33.9	24.3	2.9
Selenium	7782492	1.4	< 0.8	0.96	0.54	1.4	0.79	< 0.78
Silver	7440224	< 0.62	< 0.49	< 0.57	< 0.79	< 0.58	< 0.63	< 0.48
		/I		/I/C		/I/C	/I/C	/I

Table 8

Comparison of Subsurface Soil Data in Area 3A to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-27B	SB-28B	MW-6A	MW-6B	SB-71B
IEA Sample ID Number						950188003
Depth		2-3	1-2	2-4	4-6	1-3
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase II
Sample Type		Investigation	Combined	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene	56553	< 0.43	2.75	< 1.1	< 0.94	
Chrysene	218019	< 0.43	1.675	< 1.1	< 0.94	
Benzo(b)fluoranthene	205992	< 0.43	2.75	< 1.1	< 0.94	
Benzo(k)fluoranthene	207089	< 0.43	1.7	< 1.1	< 0.94	
Benzo(a)pyrene	50328	< 0.43	0.805 /I	< 1.1	< 0.94	
Indeno(1,2,3-cd)pyrene	193395	< 0.43	1.1 J	< 1.1	< 0.94	
Dibenzo(a,h)anthracene	53703	< 0.43	0.3	< 1.1	< 0.94	
Pesticide Compounds (mg/Kg)						
Aldrin	309002	< 0.0025	< 0.0034	0.12	0.025	
Heptachlor Epoxide	1024573	< 0.0025	0.0089	0.084	0.018	
Dieldrin	60571	< 0.0048	0.0205	< 0.0059	< 0.0051	
4,4'-DDT	50293	< 0.0048	0.022	< 0.0059	< 0.0051	
PCBs (mg/Kg)						
Aroclor - 1248	1336363	< 0.048	< 0.065	4.9	0.77	
Aroclor - 1254	1336363	< 0.048	< 0.065	< 0.059	< 0.051	
Aroclor - 1260	1336363	< 0.048	< 0.065	< 0.059	< 0.051	
Total PCBs		ND	< ND	4.9 /P	0.77	
Inorganic Compounds (mg/Kg)						
Antimony	7440360	< 3.8	< 5.2	< 4.7	< 4.1	NA
Arsenic	7440382	12	16.45 /I	6.9	6.1	20 /I
Barium	7440393	88.3	124	182	13.8	120
Beryllium	7440417	1.1	0.935	0.71	< 0.31	NA
Cadmium	7440439	0.9	1.6	8.3	< 0.89	3.3
Chromium	16065831	19.7	823	11500	76.6	37000
Hexavalent Chromium	18540299					< 2.1
Lead	7439921	11.7	199.5	792 /I/C	23.7	920 /I/C
Mercury	7439976	6.5	0.3	2.6	0.91	11
Nickel	7440020	9	12.95	45.3	4.3	NA
Selenium	7782492	1.6	3.95	1.9	< 0.43	< 6.3
Silver	7440224	< 0.61	< 0.83	< 0.75	< 0.65	< 2
			/I	/I/C		/I/C

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-20B	SB-10A	SB-11A	SB-12A	SB-15A	SB-19A	PW-1
IEA Sample ID Number								
Depth		0-1	0-1	0-1	0-2	0-1	0-1	0-1
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
Sample Type		Combined	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	9 /I	< 0.63	0.89 J	4.9	28 /I	< 0.58	< 0.92
Chrysene	218019	8.65	< 0.63	0.97	2.9	30	< 0.58	< 0.92
Benzo(b)fluoranthene	205992	11 /I	< 0.63	1.3	6.9	37 /I	< 0.58	< 0.92
Benzo(k)fluoranthene	207089	< 11	< 0.63	0.3 J	2.2	10	< 0.58	< 0.92
Benzo(a)pyrene	50328	0.35 J	< 0.63	< 0.9	1.3 /I	9.3 /I	< 0.58	< 0.92
Indeno(1,2,3-cd)pyrene	193395	0.26 J	< 0.63	< 0.9	< 0.7	< 8.9	< 0.58	< 0.92
Dibenzo(a,h)anthracene	53703	< 11	< 0.63	< 0.9	0.11 J	< 8.9	< 0.58	< 0.92
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.003	< 0.018	< 0.0024	< 0.0025	0.35 /I	< 0.0031	< 0.024
Heptachlor Epoxide	1024573	0.041	< 0.018	< 0.0024	0.065	0.68 /I	0.0098	< 0.024
Dieldrin	60571	0.0545	1.9 /I	0.062	0.26	< 0.025	< 0.006	< 0.047
4,4'-DDT	50293	0.415	< 0.035	2.8	0.028	0.26	0.016	< 0.047
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.058	56	< 0.047	< 0.049	30	< 0.06	< 0.47
Aroclor - 1254	1336363	< 0.058	< 0.35	< 0.047	< 0.049	< 0.25	1.3	< 0.47
Aroclor - 1260	1336363	< 0.058	< 0.35	< 0.047	< 0.049	< 0.25	< 0.06	< 0.47
Total PCBs		< ND	56 /P	ND	ND	30 /P	1.3 /P	ND
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 4.6	< 2.8	< 3.8	< 3.9	14.2	9.1	< 3.8
Arsenic	7440382	2.8	3.6	4.6	6.4	13.4 /I	5.8	1.2
Barium	7440393	141.5	7.5	431	1570	371	897	101
Beryllium	7440417	< 0.35	< 0.21	0.6	0.33	< 0.29	0.51	< 0.29
Cadmium	7440439	1.7	< 0.61	8	29.9	17.1	42.9	1.8
Chromium	16065831	1090.5	38.6	936	7190	4010	1490	187
Hexavalent Chromium	18540299							
Lead	7439921	136.5	4.1	277	4250 /I/C	4120 /I/C	684 /I/C	86.5
Mercury	7439976	0.275	< 0.05	1.9	8.4	2	4.3	0.74
Nickel	7440020	12.5	4.9	29.5	43.7	34.3	113	3.1
Selenium	7782492	0.5	< 0.3	< 0.4	0.72	3.9	< 0.51	0.58
Silver	7440224	< 0.74	< 0.44	47.3	126	62.3	95.8	6.8
		/I	/I/C		/I/C	/I/C	/I/C	

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		PW-2	PW-3	SB-55A	SB-56A	SB-57A	SB-58A	SB-59A
IEA Sample ID Number				950182001	950182002	950182003	950182004	950182006
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	< 0.46	< 0.83		0.2		0.02	
Chrysene	218019	< 0.46	< 0.83		0.26		< 0.1	
Benzo(b)fluoranthene	205992	< 0.46	< 0.83		0.45		0.036	
Benzo(k)fluoranthene	207089	< 0.46	< 0.83		0.17		< 0.011	
Benzo(a)pyrene	50328	< 0.46	< 0.83		0.39		0.037	
Indeno(1,2,3-cd)pyrene	193395	< 0.46	< 0.83		0.27		0.041	
Dibenzo(a,h)anthracene	53703	< 0.46	< 0.83		0.035		< 0.02	
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.0025	< 0.0044	NA	NA	NA	NA	NA
Heptachlor Epoxide	1024573	< 0.0025	< 0.0044	NA	NA	NA	NA	NA
Dieldrin	60571	< 0.0048	< 0.0085	NA	NA	NA	NA	NA
4,4'-DDT	50293	< 0.0048	< 0.0085	NA	NA	NA	NA	NA
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.048	< 0.085	< 0.08	91	46	1.1	26
Aroclor - 1254	1336363	< 0.048	< 0.085	0.58	20	9.1	0.68	9.5
Aroclor - 1260	1336363	< 0.048	< 0.085	< 0.16	5.8	3.1	0.21	2.1
Total PCBs		ND	ND	0.58	116.8 /P	58.2 /P	1.99 /P	37.6 /P
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 3.8	< 6.8					
Arsenic	7440382	1.9	< 0.72					
Barium	7440393	361	11.1					
Beryllium	7440417	< 0.29	< 0.51					
Cadmium	7440439	11.7	< 1.5					
Chromium	16065831	1010	15.2					
Hexavalent Chromium	18540299							
Lead	7439921	235	787 /I/C					
Mercury	7439976	1.6	< 0.13					
Nickel	7440020	17.6	5.8					
Selenium	7782492	5.2	< 0.72					
Silver	7440224	40.7	1.7					
			/I/C		/I/C	/I/C	/I/C	/I/C

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-60A		SB-69A/CA	SB-70A	SB-72A	SB-100A	SB-101A	SB-102A
IEA Sample ID Number		950182007		950182019	950188001	950188004	950424005	950424001	950424004
Depth		0-1		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	0.51		< 0.33					
Chrysene	218019	0.76		< 0.33					
Benzo(b)fluoranthene	205992	1.4		< 0.33					
Benzo(k)fluoranthene	207089	0.73		< 0.33					
Benzo(a)pyrene	50328	1.2	/I	< 0.33					
Indeno(1,2,3-cd)pyrene	193395	1.2		< 0.33					
Dibenzo(a,h)anthracene	53703	0.19		< 0.33					
Pesticide Compounds (mg/Kg)									
Aldrin	309002	NA		< 0.0017			NA	NA	NA
Heptachlor Epoxide	1024573	NA		< 0.0017			NA	NA	NA
Dieldrin	60571	NA		< 0.0033			NA	NA	NA
4,4'-DDT	50293	NA		< 0.0033			NA	NA	NA
PCBs (mg/Kg)									
Aroclor - 1248	1336363	< 0.08		< 0.033			< 0.08	0.24	< 0.08
Aroclor - 1254	1336363	1.2		0.41			0.22	0.46	0.29
Aroclor - 1260	1336363	0.25		0.18			< 0.16	0.26	0.17
Total PCBs		1.45	/P	0.59			0.22	0.96	0.46
Inorganic Compounds (mg/Kg)									
Antimony	7440360			NA	NA	NA			
Arsenic	7440382			4	< 3.6	14 /I			
Barium	7440393			250	120	150			
Beryllium	7440417			NA	NA	NA			
Cadmium	7440439			9.5	40	14			
Chromium	16065831			230	820	49000			
Hexavalent Chromium	18540299			< 1.6	< 1.5	< 2.3			
Lead	7439921			180	360	1200 /I/C			
Mercury	7439976			16	3.9	16			
Nickel	7440020			NA	NA	NA			
Selenium	7782492			< 1.8	< 3	< 6.3			
Silver	7440224			92	89	2.7			
		/I/C				/I/C			

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-103A	SB-104A	SB-105A	SB-108A	SB-107A	A,B,24,25	B,C,24,25
IEA Sample ID Number		950424003	950424006	950424002	950424008	950182007		
Depth		0-1	0-1	0-1	0-1	0-1		
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II		
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002	NA	NA	NA	NA	NA		
Heptachlor Epoxide	1024573	NA	NA	NA	NA	NA		
Dieldrin	60571	NA	NA	NA	NA	NA		
4,4'-DDT	50293	NA	NA	NA	NA	NA		
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.08	0.21	36	< 0.08	0.87		
Aroclor - 1254	1336363	2.5	0.25	19	0.24	< 0.16		
Aroclor - 1260	1336363	0.44	< 0.16	27	< 0.16	< 0.16		
Total PCBs		2.94 /I*	0.46	82 /I*	0.24	0.87		
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382						< 11	16 /I
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921						504 /I/C	678 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C		/I/C			/I/C	/I/C

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		C,D,24,25	D,E,24,25	E,F,24,25	F,G,24,25	G,H,24,25	H,I,24,25	A25
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	< 8.3	< 11	< 9.5	14 /I	< 9.2	< 7.7	16 /I
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	694 /I/C	614 /I/C	668 /I/C	398	572 /I/C	100	598 /I/C
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							
		/I/C	/I/C	/I/C	/I	/I/C		/I/C

Table 9

Comparison of Surface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		B25	C25	D25	E25	F25	G25	H25	I25
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	51 /1	55 /1	< 8.5	< 8.1	< 8.8	< 9.7	10	< 7.1
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	229	471 /1/C	239	120	160	290	217	44
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								

/1 /1/C

Table 10

Comparison of Subsurface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-31B	MW-3B	MW-3C	SB-10B	SB-11B	SB-13B	SB-14B
IEA Sample ID Number								
Depth		2-3	2-4	4-6	2-4	2-4	2-4	2-4
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
Sample Type		Investigation	Investigation	Combined	Investigation	Combined	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	< 1.7	< 0.77	< 0.95	1.1	0.54 J	1	0.11 J
Chrysene	218019	< 1.7	< 0.77	< 0.95	0.92	0.67 J	0.92	0.087 J
Benzo(b)fluoranthene	205992	< 1.7	< 0.77	< 0.95	1.2	0.84 J	1.6	0.21 J
Benzo(k)fluoranthene	207089	< 1.7	< 0.77	< 0.95	0.51 J	0.38 J	< 0.07 J	< 0.45
Benzo(a)pyrene	50328	< 1.7	< 0.77	< 0.95	0.42 J	< 0.88	0.61	0.059 J
Indeno(1,2,3-cd)pyrene	193395	< 1.7	< 0.77	< 0.95	< 0.72	< 0.88	< 0.42	< 0.45
Dibenzo(a,h)anthracene	53703	< 1.7	< 0.77	< 0.95	< 0.72	< 0.88	< 0.42	< 0.45
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.0047	0.005	0.011	< 0.002	< 0.0025	< 0.0024	0.0094
Heptachlor Epoxide	1024573	< 0.0047	0.0077	0.015	0.042	< 0.0025	0.014	0.014
Dieldrin	60571	0.048	< 0.0047	< 0.0041	0.11	0.038	0.067	< 0.0047
4,4'-DDT	50293	< 0.0091	< 0.0047	< 0.0055	< 0.0036	1.4	0.031	< 0.0047
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.091	0.18	0.37	2.1	< 0.048	< 0.046	0.37
Aroclor - 1254	1336363	< 0.091	< 0.047	0.19	< 0.036	< 0.048	1	0.94
Aroclor - 1260	1336363	< 0.091	< 0.047	< 0.055	< 0.036	< 0.048	< 0.046	< 0.047
Total PCBs		ND	0.18	0.56	2.1 /P	< ND	1	1.31 /P
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 7.3	< 3.3	< 4.4	< 3.1	< 3.8	< 3.7	15.8
Arsenic	7440382	31 /I	5.7	3.085	5.9	1.6	5.3	7.9
Barium	7440393	185	13.6	8.25	40.5	16.65	45.5	161
Beryllium	7440417	1	< 0.25	< 0.33	< 0.24	0.28	0.47	0.34
Cadmium	7440439	2.7	< 0.72	< 0.97	< 0.69	< 0.84	1.9	37.3
Chromium	16065831	59600	263	309.3	58.9	36.8	293	1060
Hexavalent Chromium	18540299							
Lead	7439921	678 /I/C	16.8	10.8	23.8	32.85	24.8	220
Mercury	7439976	3.7	0.13	0.16	< 0.06	4.5	1.2	28.8
Nickel	7440020	18.6	3.2	2.4	6.6	5.65	15.4	63
Selenium	7782492	< 1.9	< 0.35	< 0.47	< 0.33	< 0.96	< 0.39	5.5
Silver	7440224	2.4	< 0.52	< 0.7	< 0.5	< 0.61	< 0.58	129
		/I/C			/I/C			

Table 10

Comparison of Subsurface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-15B		SB-16B		SB-17B		SB-18B		SB-19B		SB-58B		SB-60B	
IEA Sample ID Number												950182005		950186014	
Depth		2-4		2-4		2-4		1.5-3.5		2-3		1-3		1-3	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase II		Phase II	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface	
Area		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.															
CPAHs (mg/Kg)															
Benzo(a)anthracene	56553	0.43		0.28 J		0.37 J		< 0.93		< 0.48		3			
Chrysene	218019	0.39		0.33 J		0.39 J		< 0.93		< 0.48	<	0.1			
Benzo(b)fluoranthene	205992	0.5		0.29 J		0.45 J		< 0.93		< 0.48		0.042			
Benzo(k)fluoranthene	207089	< 0.39		0.11 J		0.24 J		< 0.93		< 0.48		0.025			
Benzo(a)pyrene	50328	< 0.39		0.13 J		0.14 J		< 0.93		< 0.48		0.023			
Indeno(1,2,3-cd)pyrene	193395	< 0.39		< 0.53		< 1		< 0.93		< 0.48	<	0.029			
Dibenzo(a,h)anthracene	53703	< 0.39		< 0.53		< 1		< 0.93		< 0.48	<	0.02			
Pesticide Compounds (mg/Kg)															
Aldrin	309002	< 0.0021		0.073		< 0.0027		< 0.0026		< 0.0026		NA			
Heptachlor Epoxide	1024573	0.16		< 0.0073		0.032		0.0025 J		< 0.0026		NA			
Dieldrin	60571	0.12		0.088		0.14		0.021		< 0.0051		NA			
4,4'-DDT	50293	< 0.0041		< 0.014		< 0.0052		< 0.005		< 0.0051		NA			
PCBs (mg/Kg)															
Aroclor - 1248	1336363	7.4		2.2		< 0.052		< 0.05		< 0.051	<	0.08			
Aroclor - 1254	1336363	< 0.0041		1.2		2.4		< 0.05		< 0.051		1.9			
Aroclor - 1260	1336363	< 0.0041		< 0.14		< 0.052		< 0.05		< 0.051		0.2			
Total PCBs		7.4	/P	3.4	/P	2.4	/P	ND		ND		2.1	/P		
Inorganic Compounds (mg/Kg)															
Antimony	7440360	< 3.2		< 4.5		< 4.2		< 4.1		< 4.1				NA	
Arsenic	7440382	3.6		9.7		13.6	/I	20.5	/I	3.5				7.1	
Barium	7440393	46.1		179		2140		104		14				740	
Beryllium	7440417	0.34		0.34		0.98		3		< 0.31				NA	
Cadmium	7440439	< 0.71		2.6		2.1		3.1		< 0.9				45	
Chromium	16065831	80.6		1330		1950		161		158				5000	
Hexavalent Chromium	18540299													< 1.4	
Lead	7439921	1610	/I/C	86.4		394		30.9		4.5				1000	/I/C
Mercury	7439976	0.1		4		3.3		0.35		< 0.08				3.2	
Nickel	7440020	5.9		11		47		32.4		< 2				NA	
Selenium	7782492	< 0.34		< 0.48		1.7		0.53		< 0.43				< 3.7	
Silver	7440224	< 0.52		< 0.72		4.5		< 0.65		< 0.65				260	
		/I/C		/I/C		/I/C		/I				/I/C		/I/C	

Table 10

Comparison of Subsurface Soil Data in Area 3B to Tier 1 Screening Values for Direct Contact
Former Griess-Pfleger Tannery
Commonwealth Edison Company
Waukegan, Illinois

Sample ID Number		SB-69B/CB		MW-5A	
IEA Sample ID Number		950162020		950211803	
Depth		1-3		1-3	
Phase I/Phase II		Phase II		Phase II	
Sample Type		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place	
Soil Type		Subsurface		Subsurface	
Area		Area 3B		Area 3B	
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553	< 0.33		< 0.39	
Chrysene	218019	< 0.33		< 0.39	
Benzo(b)fluoranthene	205992	< 0.33		< 0.39	
Benzo(k)fluoranthene	207089	< 0.33		< 0.39	
Benzo(a)pyrene	50328	< 0.33		< 0.39	
Indeno(1,2,3-cd)pyrene	193395	< 0.33		< 0.39	
Dibenzo(a,h)anthracene	53703	< 0.33		< 0.39	
Pesticide Compounds (mg/Kg)					
Aldrin	309002	< 0.0017		< 0.002	
Heptachlor Epoxide	1024573	< 0.0017		< 0.002	
Dieldrin	60571	< 0.0033		< 0.004	
4,4'-DDT	50293	< 0.0033		< 0.004	
PCBs (mg/Kg)					
Aroclor - 1248	1336363	< 0.033		< 0.04	
Aroclor - 1254	1336363	0.82		< 0.04	
Aroclor - 1260	1336363	0.26		< 0.04	
Total PCBs		1.08	/P	ND	
Inorganic Compounds (mg/Kg)					
Antimony	7440360	NA		< 0.36	
Arsenic	7440382	5.4		1.2	B
Barium	7440393	280		4.3	B
Beryllium	7440417	NA		< 0.18	
Cadmium	7440439	21		0.19	B
Chromium	16065831	1600		20	
Hexavalent Chromium	18540299	< 1.9		NA	
Lead	7439921	700	/I/C	3	
Mercury	7439976	35		< 0.11	
Nickel	7440020	NA		2.9	B
Selenium	7782492	< 2.4		< 0.53	
Silver	7440224	230		< 0.18	
		/I/C			

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-39A		SB-62A	SB-53A	SB-54A	SB-63A	J2	K2
IEA Sample ID Number				950153017	950153018	950153020	950182011		
Depth		0-1		0-1	0-1	0-1	0-1		
Phase I/Phase II		Phase I		Phase II	Phase II	Phase II	Phase II		
Sample Type		Investigation		Investigation	Investigation	Investigation	Combined	Investigation	Investigation
In-Place/Removed		In-Place		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	1					1.5		
Chrysene	218019	5.1					1.7		
Benzo(b)fluoranthene	205992	14					1.8		
Benzo(k)fluoranthene	207089	2					1.235		
Benzo(a)pyrene	50328	0.1	J				1.55		
Indeno(1,2,3-cd)pyrene	193395	1					1.3		
Dibenzo(a,h)anthracene	53703	0.85					< 0.33		
Pesticide Compounds (mg/Kg)									
Aldrin	309002	< 0.12		< 0.008	< 0.008	< 0.008	< 0.0017		
Heptachlor Epoxide	1024573	< 0.12		< 0.008	< 0.008	< 0.008	< 0.0017		
Dieldrin	60571	0.68	/GW	< 0.016	< 0.016	U	< 0.0017		
4,4'-DDT	50293	34	/GW	0.59	0.04	0.15	0.89		
PCBs (mg/Kg)									
Aroclor - 1248	1336363	< 2.2		NA	NA	NA	< 0.033		
Aroclor - 1254	1336363	< 2.2		NA	NA	NA	< 0.033		
Aroclor - 1260	1336363	< 2.2		NA	NA	NA	< 0.033		
Total PCBs		ND		NA	NA	NA	< ND		
Inorganic Compounds (mg/Kg)									
Antimony	7440360	< 3.6							
Arsenic	7440382	15.9					111 /GW	832 /GW	537 /GW
Barium	7440393	85.1					140		
Beryllium	7440417	0.57							
Cadmium	7440439	1.2					22		
Chromium	16065831	832					36000		
Hexavalent Chromium	18540299								
Lead	7439921	212	/GW				480 /GW	475 /GW	341 /GW
Mercury	7439976	1.6					5		
Nickel	7440020	12.5							
Selenium	7782492	< 0.38					< 2.5		
Silver	7440224	< 0.57					< 20		

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Compon of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number / IEA Sample ID Number / Depth / Phase I/Phase II / Sample Type / In-Place/Removed / Soil Type / Area / CAS No.	L2	M2	I,J,2,3	J,K,2,3	K,L,2,3	L,M,2,3
	Investigation In-Place Surface Area 1A	Investigation In-Place Surface Area 1A	Investigation In-Place Surface Area 1A	Investigation In-Place Surface Area 1A	Investigation In-Place Surface Area 1A	Investigation In-Place Surface Area 1A
CPAHs (mg/Kg)						
Benzo(a)anthracene 56553						
Chrysene 218019						
Benzo(b)fluoranthene 205992						
Benzo(k)fluoranthene 207089						
Benzo(a)pyrene 50328						
Indeno(1,2,3-cd)pyrene 193395						
Dibenzo(a,h)anthracene 53703						
Pesticide Compounds (mg/Kg)						
Aldrin 309002						
Heptachlor Epoxide 1024573						
Dieldrin 60571						
4,4'-DDT 50293						
PCBs (mg/Kg)						
Aroclor - 1248 1336363						
Aroclor - 1254 1336363						
Aroclor - 1260 1336363						
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony 7440360						
Arsenic 7440382	< 7	< 6.5	200 /GW	110 /GW	110 /GW	< 6.2
Barium 7440393						
Beryllium 7440417						
Cadmium 7440439						
Chromium 16065831						
Hexavalent Chromium 18540299						
Lead 7439921	59 /GW	36	882 /GW	1200 /GW	69 /GW	39 /GW
Mercury 7439978						
Nickel 7440020						
Selenium 7782492						
Silver 7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Compone of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		J3	K3	L3	M3	I,J,3,4	J,K,3,4
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	170 /GW	373 /GW	< 6.5	< 5.8	295 /GW	298 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	694 /GW	573 /GW	245 /GW	34	565 /GW	540 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Compone of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		K,L,3,4	L,M,3,4	J4	K4	L4	M4
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	130 /GW	19	374 /GW	150 /GW	28	< 5.7
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	18065831						
Hexavalent Chromium	18540299						
Lead	7439921	110 /GW	81 /GW	397 /GW	459 /GW	227 /GW	4.6
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		I,J,4,5	J,K,4,5	K,L,4,5	L,M,4,5	J5	K5
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	883 /GW	623 /GW	160 /GW	48 /GW	1800 /GW	203 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	859 /GW	294 /GW	454 /GW	233 /GW	393 /GW	517 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Compon of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		L5		M5		I,J,5,6		J,K,5,6		K,L,5,6		L,M,5,6	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 1A		Area 1A		Area 1A		Area 1A		Area 1A		Area 1A	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	83	/GW	< 5.8		100	/GW	681	/GW	2870	/GW	437	/GW
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	574	/GW	16		539	/GW	527	/GW	503	/GW	398	/GW
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		J8	K8	L8	M8	I,J,6,7	J,K,6,7
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360				8.4	19	120 /GW
Arsenic	7440382	262 /GW	69 /GW	120 /GW			
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	411 /GW	381 /GW	171 /GW	185 /GW	451 /GW	470 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Compon of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number	K,L,6,7	L,M,6,7	J7	K7	L7	M7
IEA Sample ID Number						
Depth						
Phase I/Phase II						
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type	Surface	Surface	Surface	Surface	Surface	Surface
Area	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene 56553						
Chrysene 218019						
Benzo(b)fluoranthene 205992						
Benzo(k)fluoranthene 207089						
Benzo(a)pyrene 50328						
Indeno(1,2,3-cd)pyrene 193395						
Dibenzo(a,h)anthracene 53703						
Pesticide Compounds (mg/Kg)						
Aldrin 309002						
Heptachlor Epoxide 1024573						
Dieldrin 60571						
4,4'-DDT 50293						
PCBs (mg/Kg)						
Aroclor - 1248 1336363						
Aroclor - 1254 1336363						
Aroclor - 1260 1336363						
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony 7440360						
Arsenic 7440382	46 /GW	25	< 11	61 /GW	110 /GW	15
Barium 7440393						
Beryllium 7440417						
Cadmium 7440439						
Chromium 16065831						
Hexavalent Chromium 18540299						
Lead 7439921	56 /GW	31	433 /GW	250 /GW	98 /GW	148 /GW
Mercury 7439976						
Nickel 7440020						
Selenium 7782492						
Silver 7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		I,J,7,8	J,K,7,8	K,L,7,8	L,M,7,8	J8	K8
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	< 11	130 /GW	96 /GW	35 /GW	< 11	13
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	463 /GW	449 /GW	208 /GW	131 /GW	752 /GW	417 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		L8	M8	I,J,8,9	J,K,8,9	K,L,8,9	L,M,8,9
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	11	409 /GW	< 12	14	140 /GW	< 5.9
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	91 /GW	70 /GW	829 /GW	533 /GW	85 /GW	43 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		J9	K9	L9	M9	I,J,9,10	J,K,9,10
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	< 11	7.7	14	12	22	8.7
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalcat Chromium	18540299						
Lead	7439921	601 /GW	315 /GW	50 /GW	142 /GW	538 /GW	110 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		K,L,9,10	L,M,9,10	J10	K10	L10	M10
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.							
CPAHs (mg/Kg)							
Benzo(e)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	< 6.2	140 /GW	< 11	< 6	32 /GW	364 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	85 /GW	229 /GW	872 /GW	98 /GW	32	189 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 11

Comparison of Surface Soil Data In Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		I,J,10,11	J,K,10,11	K,L,10,11	L,M,10,11	J11	K11	L11
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	9.8	8.1	6	9.7	< 5.5	< 5.6	< 5.9
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	82 /GW	148 /GW	110 /GW	64 /GW	53 /GW	7	31
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		M11	I,J,11,12	J,K,11,12	K,L,11,12	L,M,11,12	J12	K12
IEA Sample ID Number								
Depth								
Phase I/Phase II								
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A	Area 1A
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	< 5.8	14	< 5.5	24	< 5.9	< 5.5	< 5.6
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921	11	110 /GW	7.3	59 /GW	72 /GW	< 4.4	5.5
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							

Table 11

Comparison of Surface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery, Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		L12		M12	
IEA Sample ID Number					
Depth					
Phase I/Phase II					
Sample Type		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place	
Soil Type		Surface		Surface	
Area		Area 1A		Area 1A	
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553				
Chrysene	218019				
Benzo(b)fluoranthene	205992				
Benzo(k)fluoranthene	207089				
Benzo(a)pyrene	50328				
Indeno(1,2,3-cd)pyrene	193395				
Dibenzo(a,h)anthracene	53703				
Pesticide Compounds (mg/Kg)					
Aldrin	309002				
Heptachlor Epoxide	1024573				
Dieldrin	60571				
4,4'-DDT	50293				
PCBs (mg/Kg)					
Aroclor - 1248	1336363				
Aroclor - 1254	1336363				
Aroclor - 1260	1336363				
Total PCBs					
Inorganic Compounds (mg/Kg)					
Antimony	7440360				
Arsenic	7440382	<	6	<	5.7
Barium	7440393				
Beryllium	7440417				
Cadmium	7440439				
Chromium	16065831				
Hexavalent Chromium	18540299				
Lead	7439921		11	<	4.6
Mercury	7439976				
Nickel	7440020				
Selenium	7782492				
Silver	7440224				

Table 12

Comparison of Subsurface Soil Data in Area 1A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-39B			SB-40B			SB-53B	
IEA Sample ID Number								950153019	
Depth		2-4			2-3			1-3	
Phase I/Phase II		Phase I			Phase I			Phase II	
Sample Type		Investigation			Investigation			Investigation	
In-Place/Removed		In-Place			In-Place			In-Place	
Soil Type		Subsurface			Subsurface			Subsurface	
Area		Area 1A			Area 1A			Area 1A	
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553		4.7			0.62	J		
Chrysene	218019		4.1			0.46	J		
Benzo(b)fluoranthene	205992		7			1.1			
Benzo(k)fluoranthene	207089		2.3			0.39	J		
Benzo(a)pyrene	50328		2.1		<	1.1			
Indeno(1,2,3-cd)pyrene	193395		0.91		<	1.1			
Dibenzo(a,h)anthracene	53703		0.22	J	<	1.1			
Pesticide Compounds (mg/Kg)									
Aldrin	309002	<	0.0024		<	0.0029		<	0.008
Heptachlor Epoxide	1024573	<	0.0024		<	0.0029		<	0.008
Dieldrin	60571	<	0.0047		<	0.0056		<	0.016
4,4'-DDT	50293		0.084		<	0.0056			0.033
PCBs (mg/Kg)									
Aroclor - 1248	1336363	<	0.047		<	0.056			NA
Aroclor - 1254	1336363	<	0.047		<	0.056			NA
Aroclor - 1260	1336363	<	0.047		<	0.056			NA
Total PCBs			ND			ND			NA
Inorganic Compounds (mg/Kg)									
Antimony	7440360	<	3.8			7.5	/GW		
Arsenic	7440382		37.9	/GW		65.8	/GW		
Barium	7440393		39			229			
Beryllium	7440417		0.28		<	0.34			
Cadmium	7440439	<	0.83			15.8			
Chromium	16065831		278			816			
Hexavalent Chromium	18540299								
Lead	7439921		47.6	/GW		290	/GW		
Mercury	7439976		2.7			25.6	/GW		
Nickel	7440020		6.9			29.1			
Selenium	7782492		0.63		<	0.48			
Silver	7440224	<	0.6		<	0.71			

Table 13

Comparison of Surface Soil Data in Area 1B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-30A	SB-33A	SB-36A	SS-12	SB-61A	SB-62A
IEA Sample ID Number						950182008	950182009
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 0.82	1.2	2.6	3.4	9.2	2.9
Chrysene	218019	< 0.82	1.8	2.5	2.8	8.9	3
Benzo(b)fluoranthene	205992	< 0.82	2.4	2.4	3.6	8	2.7
Benzo(k)fluoranthene	207089	< 0.82	0.76	0.92	1.3	3.3	1.6
Benzo(a)pyrene	50328	< 0.82	1.2	1.3	2.1	4.8	1.9
Indeno(1,2,3-cd)pyrene	193395	< 0.82	0.73	0.11 J	< 1.3	6.8	2.6
Dibenzo(a,h)anthracene	53703	< 0.82	0.13 J	0.2 J	< 1.3	1.9	1
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0023	< 0.0019	< 0.0018	< 0.0029	< 0.0017	< 0.0017
Heptachlor Epoxide	1024573	0.023	0.015	0.0079	< 0.0029	< 0.0017	< 0.0017
Dieldrin	60571	< 0.0045	0.016	< 0.0035	< 0.0055	< 0.0017	< 0.0017
4,4'-DDT	50293	< 0.0045	0.066	0.023	< 0.0055	0.21	0.03
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Aroclor - 1254	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Aroclor - 1260	1336363	< 0.045	< 0.037	< 0.035	< 0.055	< 0.033	< 0.033
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 3.6	< 2.9	< 2.8	< 4.4	NA	NA
Arsenic	7440382	12.1	4.4	0.77	6.4	6	5
Barium	7440393	18.3	86.9	10.4	30.9	520	180
Beryllium	7440417	1.2	0.27	< 0.21	< 0.34	NA	NA
Cadmium	7440439	< 0.78	1.3	< 0.61	< 0.97	4.7	1.4
Chromium	16065831	14.2	104	75.1	2600	1100	180
Hexavalent Chromium	18540299					NA	NA
Lead	7439921	27	45.7 /GW	16.2	99.6 /GW	220 /GW	170 /GW
Mercury	7439976	< 0.07	0.08	0.14	1.7	0.96	0.092
Nickel	7440020	3.8	16.7	3.5	8.1	NA	NA
Selenium	7782492	2	< 0.31	< 0.29	0.62	< 1.5	< 1.7
Silver	7440224	< 0.57	< 0.47	< 0.44	< 0.7	< 0.91	< 1.1

Table 14

Comparison of Subsurface Soil Data in Area 1B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-30B	SB-32B	SB-33B	SB-34B	SB-35B	SB-36B	SB-37B	SB-38B	MW-4A	
IEA Sample ID Number											
Depth		2-4	2-3	2-3	2-3	2-3	2-3	2-3	2-3	2-4	
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	Phase I	
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	
Area		Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	Area 1B	
CAS No.											
CPAHs (mg/Kg)											
Benzo(a)anthracene	56553	< 0.74	< 0.79	< 0.85	< 0.36	< 0.42	3.6	3	< 0.4	< 0.37	
Chrysene	218019	< 0.74	< 0.79	< 0.85	< 0.36	< 0.42	3.4	3	< 0.4	< 0.37	
Benzo(b)fluoranthene	205992	< 0.74	< 0.79	27	< 0.36	< 0.42	5.3	4.5	< 0.4	< 0.37	
Benzo(k)fluoranthene	207089	< 0.74	< 0.79	9.4	< 0.36	< 0.42	1.4	1.3	< 0.4	< 0.37	<
Benzo(a)pyrene	50328	< 0.74	< 0.79	9.9	< 0.36	< 0.42	1.7	0.23 J	< 0.4	< 0.37	<
Indeno(1,2,3-cd)pyrene	193395	< 0.74	< 0.79	5.5	< 0.36	< 0.42	1	0.64 J	< 0.4	< 0.37	<
Dibenzo(a,h)anthracene	53703	< 0.74	< 0.79	1	< 0.36	< 0.42	0.13 J	0.12 J	< 0.4	< 0.37	<
Pesticide Compounds (mg/Kg)											
Aldrin	309002	< 0.0021	< 0.0021	< 0.0023	< 0.0019	< 0.0023	< 0.0018	< 0.0019	< 0.0021	< 0.002	<
Heptachlor Epoxide	1024573	< 0.0021	0.009	0.11	< 0.0019	< 0.0023	0.036	< 0.0019	< 0.0021	< 0.002	<
Dieldrin	60571	< 0.004	< 0.0041	0.18 /GW	< 0.0038	< 0.0044	< 0.0036	0.019	< 0.0041	< 0.0039	<
4,4'-DDT	50293	0.033	< 0.0041	0.16	< 0.0038	< 0.0044	0.064	0.4	< 0.0041	< 0.0039	<
PCBs (mg/Kg)											
Aroclor - 1248	1336363	< 0.04	< 0.041	3.2	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Aroclor - 1254	1336363	< 0.04	< 0.041	1.9	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Aroclor - 1260	1336163	< 0.04	< 0.041	< 0.045	< 0.038	< 0.044	< 0.036	< 0.037	< 0.041	< 0.039	<
Total PCBs		ND	ND	5.1	ND	ND	ND	ND	ND	ND	
Inorganic Compounds (mg/Kg)											
Antimony	7440360	< 3.2	< 3.3	< 2.9	< 3	< 3.5	< 2.9	< 2.9	< 3.2	< 3.1	<
Arsenic	7440382	1.4	8.7	5.9	0.4	40.6 /GW	1.8	2.6	0.63	0.84	
Barium	7440393	1.8	41.9	229	3.4	61.1	21.9	41.8	2.6	4.6	
Beryllium	7440417	< 0.24	0.6	< 0.22	< 0.23	1.7	< 0.22	0.36	< 0.25	< 0.24	
Cadmium	7440439	< 0.71	< 0.72	1.4	< 0.66	1.5	< 0.63	2	< 0.71	< 0.68	<
Chromium	16065831	5.3	22.7	704	3.2	19.1	303	291	4.3	46.7	
Hexavalent Chromium	18540299										
Lead	7439921	3.1	17.4	133 /GW	1.7	28	24.2	22	2.5	8.1	
Mercury	7439976	< 0.06	0.07	0.39	< 0.06	0.12	0.33	0.24	< 0.06	< 0.06	
Nickel	7440020	11.3	7.8	9.9	< 1.5	15.5	4.6	9.1	< 1.6	24	
Selenium	7782492	< 0.83	0.71	< 0.76	< 0.32	0.54	< 0.3	< 0.31	< 0.34	0.61	<
Silver	7440224	< 0.51	< 0.52	< 0.47	< 0.48	< 0.56	< 0.46	< 0.47	< 0.52	< 0.49	<

Table 14

ubsurface Soil Data in Area 1B to Tier 1 and Tier 2 Screening Values for the
of the Groundwater Ingestion Route
leger Tannery - Waukegan, Illinois
:dison Company

Sample ID Number		MW-4B		SB-62B	
IEA Sample ID Number				950182010	
Depth		4-6		1-3	
Phase I/Phase II		Phase I		Phase II	
Sample Type		vestigation		Investigation	
In-Place/Removed		In-Place		In-Place	
Soil Type		Subsurface		Subsurface	
Area		Area 1B		Area 1B	
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553	0.94		< 0.33	
Chrysene	218019	0.74	J	< 0.33	
Benzo(b)fluoranthene	205992	0.74	J	< 0.33	
Benzo(k)fluoranthene	207089	0.93		< 0.33	
Benzo(a)pyrene	50328	0.93		< 0.33	
Indeno(1,2,3-cd)pyrene	193395	0.93		< 0.33	
Dibenzo(a,h)anthracene	53703	0.93		< 0.33	
Pesticide Compounds (mg/Kg)					
Aldrin	309002	0.0024		< 0.0017	
Heptachlor Epoxide	1024573	0.0024		< 0.0017	
Dieldrin	60571	0.0047		< 0.0017	
4,4'-DDT	50293	0.0047		< 0.0033	
PCBs (mg/Kg)					
Aroclor - 1248	1336363	0.047		< 0.033	
Aroclor - 1254	1336363	0.047		< 0.033	
Aroclor - 1260	1336363	0.047		< 0.033	
Total PCBs		ND		ND	
Inorganic Compounds (mg/Kg)					
Antimony	7440360	3.8		NA	
Arsenic	7440382	5.4		1.9	
Barium	7440393	61.6		< 4	
Beryllium	7440417	1.7		NA	
Cadmium	7440439	0.82		< 0.4	
Chromium	16065831	65.2		5.8	
Hexavalent Chromium	18540299			NA	
Lead	7439921	15.5		1.8	
Mercury	7439976	0.14		< 0.094	
Nickel	7440020	17.8		NA	
Selenium	7782492	0.4		1.2	
Silver	7440224	0.6		< 0.08	

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-02A	SB-03B	SB-04B	SB-05B	SB-06A	SB-08A
IEA Sample ID Number							
Depth		0-1	0-1	0-1	0-8	0-8	0-8
Phase I/Phase II		Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation	Phase I Investigation
Sample Type		In-Place Surface	In-Place Surface	In-Place Surface	In-Place Surface	In-Place Surface	In-Place Surface
In-Place/Removed							
Soil Type							
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 0.64	< 0.89	1.3 J	< 1.6	< 0.69	< 0.99
Chrysene	218019	< 0.64	< 0.89	0.87 J	< 1.6	< 0.69	0.38 J
Benzo(b)fluoranthene	205992	0.47 J	< 0.89	2.1	< 1.6	< 0.69	0.42 J
Benzo(k)fluoranthene	207089	< 0.64	< 0.89	1	< 1.6	< 0.69	0.19 J
Benzo(a)pyrene	50328	0.16 J	< 0.89	0.68 J	< 1.6	< 0.69	0.21 J
Indeno(1,2,3-cd)pyrene	193395	< 0.64	< 0.89	0.22 J	< 1.6	< 0.69	< 0.99
Dibenzo(a,h)anthracene	53703	< 0.64	< 0.89	< 1.7	< 1.6	< 0.69	< 0.99
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0034	< 0.0049	< 0.0046	< 0.0044	< 0.0037	< 0.0026
Heptachlor Epoxide	1024573	0.013	< 0.0049	< 0.0046	< 0.0044	0.015	< 0.0026
Dieldrin	60571	0.056	< 0.0094	< 0.0089	< 0.0085	< 0.0072	0.091
4,4'-DDT	50293	0.022	< 0.0094	0.036	< 0.0085	< 0.0072	0.086
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.067	< 0.094	< 0.089	< 0.085	< 0.072	< 0.051
Aroclor - 1254	1336363	< 0.067	< 0.094	< 0.089	< 0.085	< 0.072	< 0.051
Aroclor - 1260	1336363	< 0.067	< 0.094	< 0.089	< 0.085	< 0.072	< 0.051
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 5.3	< 7.5	< 7.1	< 6.8	< 5.7	< 4.1
Arsenic	7440382	14.8	5.6	17.1	9.3	16.9	12.1
Barium	7440393	54.4	863	327	307	123	95.5
Beryllium	7440417	0.53	< 0.57	< 0.54	< 0.51	< 0.43	0.34
Cadmium	7440439	2.2	< 1.7	21	1.5	22.6	1.9
Chromium	16065831	51600	65100	45100	57700	69300	17300
Hexavalent Chromium	18540299						
Lead	7439921	1150 /GW	902 /GW	2250 /GW	1620 /GW	1960 /GW	576 /GW
Mercury	7439976	3.8	6.1	18.1 /GW	< 0.13	30 /GW	4.6
Nickel	7440020	9.9	8.9	10.5	9.7	13	9.4
Selenium	7782492	0.89	1	< 0.75	< 1.7	< 0.61	< 1.1
Silver	7440224	< 0.85	< 1.2	6	< 1.1	< 0.91	< 0.65

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SS-01	SS-02	SS-03	SS-04	SS-05	SS-06
IEA Sample ID Number							
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Chrysene	218019	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Benzo(b)fluoranthene	205992	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Benzo(k)fluoranthene	207089	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Benzo(a)pyrene	50328	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Indeno(1,2,3-cd)pyrene	193395	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Dibenzo(a,h)anthracene	53703	< 2.3	< 2	< 1.9	< 5.8	< 3	< 2.7
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0065	< 0.0043	< 0.0025	< 0.0066	< 0.0038	< 0.0062
Heptachlor Epoxide	1024573	< 0.0065	< 0.0043	< 0.0025	0.013	< 0.0038	< 0.0062
Dieldrin	60571	< 0.013	< 0.0083	< 0.0049	< 0.013	< 0.012	< 0.012
4,4'-DDT	50293	< 0.013	< 0.0083	< 0.0049	< 0.013	< 0.012	< 0.012
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.13	< 0.083	< 0.049	< 0.13	< 0.12	< 0.12
Aroclor - 1254	1336363	< 0.13	< 0.083	< 0.049	< 0.13	< 0.12	< 0.12
Aroclor - 1260	1336363	< 0.13	< 0.083	< 0.049	< 0.13	< 0.12	< 0.12
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 10	< 6.6	< 8.2	< 10.3	< 10	< 9.6
Arsenic	7440382	7.3	15.3	7.8	9.3	8.1	4.2
Barium	7440393	413	386	372	151	339	598
Beryllium	7440417	< 0.76	< 0.5	< 0.62	< 0.78	< 0.76	< 0.73
Cadmium	7440439	< 2.2	< 1.5	< 1.8	< 2.3	< 2.2	< 2.1
Chromium	16065831	40300	30400	47800	48400	43600	48400
Hexavalent Chromium	18540299						
Lead	7439921	1050 /GW	1460 /GW	868 /GW	1410 /GW	1760 /GW	1320 /GW
Mercury	7439976	5.9	8.8 /GW	4.5	24.9 /GW	18.1 /GW	4.6
Nickel	7440020	10	5.9	8.9	15.5	9.6	7.7
Selenium	7782492	< 1.1	< 0.7	< 0.88	< 1.1	< 1.1	< 1
Silver	7440224	< 1.6	< 1.1	< 1.3	< 1.6	< 1.6	< 1.5

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

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Sample ID Number		SS-07	SS-08	SS-09	SS-10	SB-44A	SB-45A	SB-46A	SB-47A	
IEA Sample ID Number						950153001	950153003	950153005	950153006	
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	
Sample Type		Investigation	Combined	Combined	Investigation	Investigation	Investigation	Investigation	Investigation	
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	
CAS No.										
CPAHs (mg/Kg)										
Benzo(a)anthracene	56553	< 1.1	< 2.2	2.85	6.4					
Chrysene	218019	< 1.1	< 2.2	2.55	4.8					
Benzo(b)fluoranthene	205992	< 1.1	< 2.2	3.65	4.4					
Benzo(k)fluoranthene	207089	< 1.1	< 2.2	1.095	1.6					
Benzo(a)pyrene	50328	< 1.1	< 2.2	1.65	3					
Indeno(1,2,3-cd)pyrene	193395	< 1.1	< 2.2	< 1	1.4					
Dibenzo(a,h)anthracene	53703	< 1.1	< 2.2	< 1	< 1.6					
Pesticide Compounds (mg/Kg)										
Aldrin	309002	< 0.0062	< 0.006	< 0.0021	< 0.0035					
Heptachlor Epoxide	1024573	< 0.0062	< 0.006	0.007	0.015					
Dieldrin	60571	< 0.012	< 0.012	< 0.0042	< 0.0068					
4,4' DDT	50293	< 0.012	< 0.012	< 0.0042	< 0.0068					
PCBs (mg/Kg)										
Aroclor - 1248	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Aroclor - 1254	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Aroclor - 1260	1336363	< 0.12	< 0.12	< 0.042	< 0.068					
Total PCBs		ND	< ND	< ND	ND					
Inorganic Compounds (mg/Kg)										
Antimony	7440360	< 9.7	< 9.3	< 3.3	< 5.4					
Arsenic	7440382	6.7	8.85	10.5	72.7 /GW	4600 /GW	24	17	46 /GW	
Barium	7440393	218	388	216.5	88.5					
Beryllium	7440417	< 0.73	< 0.7	< 0.25	< 0.41					
Cadmium	7440439	< 2.1	< 2	1.95	1.7					
Chromium	16065831	21500	44900	20350	60000					
Hexavalent Chromium	18540299									
Lead	7439921	556 /GW	1445 /GW	1135 /GW	1900 /GW					
Mercury	7439976	5.1	6.1	4.45	31.8 /GW					
Nickel	7440020	5	8.35	21.3	16.7					
Selenium	7782492	< 1	< 0.99	0.38	< 0.58					
Silver	7440224	< 1.5	< 1.5	< 0.53	< 0.87					

Table 15

ice Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values
ent of the Groundwater Ingestion Route
er Tannery - Waukegan, Illinois
ion Company

Sample ID Number		SB-48A	SB-49A	SB-50A	SB-51A	SB-84A/CA	SB-85A
IEA Sample ID Number		950153008	950153010	950153012	950153015	950182012	950182014
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553					< 0.33	0.34
Chrysene	218019					< 0.33	< 0.33
Benzo(b)fluoranthene	205992					< 0.33	< 0.33
Benzo(k)fluoranthene	207089					< 0.33	< 0.33
Benzo(a)pyrene	50328					< 0.33	< 0.33
Indeno(1,2,3-cd)pyrene	193395					< 0.33	< 0.33
Dibenzo(a,h)anthracene	53703					< 0.33	< 0.33
Pesticide Compounds (mg/Kg)							
Aldrin	309002					< 0.0017	< 0.0017
Heptachlor Epoxide	1024573					< 0.0017	< 0.0017
Dieldrin	60571					< 0.0033	< 0.0033
4,4'-DDT	50293					0.0093	0.013
PCBs (mg/Kg)							
Aroclor - 1248	1336363					< 0.033	< 0.033
Aroclor - 1254	1336363					< 0.033	< 0.033
Aroclor - 1260	1336363					< 0.033	0.16
Total PCBs						ND	0.16
Inorganic Compounds (mg/Kg)							
Antimony	7440360					NA	NA
Arsenic	7440382	25	18	3.5	16	9.4	63 **/GW
Barium	7440393					180	120
Beryllium	7440417					NA	NA
Cadmium	7440439					81	2.9
Chromium	16065831					49000	32000
Hexavalent Chromium	18540299					16	NA
Lead	7439921					930 /GW	720 /GW
Mercury	7439976					4.5	5.5
Nickel	7440020					NA	NA
Selenium	7782492					< 3.4	< 3.5
Silver	7440224					< 2.2	< 2

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-66A/CA	SB-67A/CA	SB-68A	SB-73A	SB-74A	SB-75A
IEA Sample ID Number		950182015	950182016	950182018	950188008	9501888008	
Depth		0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.37	< 0.33	< 0.33			
Chrysene	218019	0.51	< 0.33	< 0.33			
Benzo(b)fluoranthene	205992	< 0.33	< 0.33	< 0.33			
Benzo(k)fluoranthene	207089	< 0.33	< 0.33	< 0.33			
Benzo(a)pyrene	50328	< 0.33	< 0.33	< 0.33			
Indeno(1,2,3-cd)pyrene	193395	< 0.33	< 0.33	< 0.33			
Dibenzo(a,h)anthracene	53703	< 0.33	< 0.33	< 0.33			
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0017	< 0.0017	< 0.0017			
Heptachlor Epoxide	1024573	< 0.0017	< 0.0017	< 0.0017			
Dieldrin	60571	< 0.0033	< 0.0033	< 0.0033			
4,4'-DDT	50293	0.013	0.036	< 0.0033			
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.033	< 0.033	< 0.033			
Aroclor - 1254	1336363	< 0.033	< 0.033	< 0.033			
Aroclor - 1260	1336363	0.17	0.22	< 0.033			
Total PCBs		0.17	0.22	ND			
Inorganic Compounds (mg/Kg)							
Antimony	7440360	NA	NA	NA	NA	NA	NA
Arsenic	7440382	380 **/GW	78 **/GW	16	11	16	18
Barium	7440393	250	320	140	68	390	220
Beryllium	7440417	NA	NA	NA	NA	NA	NA
Cadmium	7440439	4.9	2.5	3.7	< 1.2	< 1.6	42
Chromium	16065831	31000	36000	44000	42000	40000	41000
Hexavalent Chromium	18540299	< 2.7	2.5	NA	< 2.4	< 5	3.5
Lead	7439921	560 /GW	410 /GW	970 /GW	1000 /GW	490 /GW	1400 /GW
Mercury	7439976	0.39	0.25	9.5 /GW	11 /GW	1.4	0.75
Nickel	7440020	NA	NA	NA	NA	NA	NA
Selenium	7782492	< 2.7	< 2.8	< 3.7	< 6.1	< 11	< 7.7
Silver	7440224	< 2.4	2.3	< 2	< 2.3	< 3.2	< 2.2

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-78A	SB-77A	SB-78A	SB-79A	SB-80A	SB-81A	SB-82A
IEA Sample ID Number			950248015	950248017	950248013	950248019	950153001	950153003
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360	NA						
Arsenic	7440382	12	8.5	13	23	1600 /GW	49 /GW	180 /GW
Barium	7440393	460						
Beryllium	7440417	NA						
Cadmium	7440439	3.6						
Chromium	16065831	37000						
Hexavalent Chromium	18540299	< 3.03						
Lead	7439921	191 /GW						
Mercury	7439976	0.24						
Nickel	7440020	NA						
Selenium	7782492	< 7.8						
Silver	7440224	< 2.9						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-83A	SB-84A	SB-85A	SB-86A	A1	B1	C1
IEA Sample ID Number		950153005	950153007	950153009	950153011			
Depth		0-1	0-1	0-1	0-1			
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II			
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553							
Chrysene	218019							
Benzo(b)fluoranthene	205992							
Benzo(k)fluoranthene	207089							
Benzo(a)pyrene	50328							
Indeno(1,2,3-cd)pyrene	193395							
Dibenzo(a,h)anthracene	53703							
Pesticide Compounds (mg/Kg)								
Aldrin	309002							
Heptachlor Epoxide	1024573							
Dieldrin	60571							
4,4'-DDT	50293							
PCBs (mg/Kg)								
Aroclor - 1248	1336363							
Aroclor - 1254	1336363							
Aroclor - 1260	1336363							
Total PCBs								
Inorganic Compounds (mg/Kg)								
Antimony	7440360							
Arsenic	7440382	12	7.1	210 /GW	21	848 /GW	1590 /GW	1190 /GW
Barium	7440393							
Beryllium	7440417							
Cadmium	7440439							
Chromium	16065831							
Hexavalent Chromium	18540299							
Lead	7439921					263 /GW	476 /GW	336 /GW
Mercury	7439976							
Nickel	7440020							
Selenium	7782492							
Silver	7440224							

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		D1	E1	F1	G1	H1	A,B,1,2
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	1280 /GW	1370 /GW	90 /GW	382 /GW	1100 /GW	1420 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	425 /GW	385 /GW	400 /GW	477 /GW	358 /GW	547 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		B,C,1,2	C,D,1,2	D,E,1,2	E,F,1,2	F,G,1,2	G,H,1,2
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	1340 /GW	663 /GW	210 /GW	341 /GW	759 /GW	536 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	414 /GW	467 /GW	794 /GW	577 /GW	532 /GW	483 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		H,I,1,2	A2	B2	C2	D2	E2
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	909 /GW	160 /GW	85 /GW	< 11	67 /GW	47 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	614 /GW	658 /GW	921 /GW	786 /GW	747 /GW	990 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number IEA Sample ID Number Depth Phase I/Phase II Sample Type In-Place/Removed Soil Type Area CAS No.	F2 Investigation In-Place Surface Area 2	G2 Investigation In-Place Surface Area 2	H2 Investigation In-Place Surface Area 2	A,B,2,3 Investigation In-Place Surface Area 2	B,C,2,3 Investigation In-Place Surface Area 2	C,D,2,3 Investigation In-Place Surface Area 2
CPAHs (mg/Kg)						
Benzo(a)anthracene 56553						
Chrysene 218019						
Benzo(b)fluoranthene 205992						
Benzo(k)fluoranthene 207089						
Benzo(a)pyrene 50328						
Indeno(1,2,3-cd)pyrene 193395						
Dibenzo(a,h)anthracene 53703						
Pesticide Compounds (mg/Kg)						
Aldrin 309002						
Heptachlor Epoxide 1024573						
Dieldrin 60571						
4,4'-DDT 50293						
PCBs (mg/Kg)						
Aroclor - 1248 1336363						
Aroclor - 1254 1336363						
Aroclor - 1260 1336363						
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony 7440360						
Arsenic 7440382	871 /GW	74 /GW	779 /GW	322 /GW	47 /GW	57 /GW
Barium 7440393						
Beryllium 7440417						
Cadmium 7440439						
Chromium 16065831						
Hexavalent Chromium 18540299						
Lead 7439921	784 /GW	789 /GW	701 /GW	494 /GW	536 /GW	813 /GW
Mercury 7439978						
Nickel 7440020						
Selenium 7782492						
Silver 7440224						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		D,E,2,3	E,F,2,3	F,G,2,3	G,H,2,3	H,I,2,3	A3
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	99 /GW	634 /GW	180 /GW	286 /GW	764 /GW	302 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	878 /GW	853 /GW	1330 /GW	1120 /GW	640 /GW	713 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 15

Comparison of Surface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		B3	C3	D3	E3	F3	G3
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	422 /GW	< 12	46 /GW	180 /GW	447 /GW	678 /GW
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	384 /GW	909 /GW	777 /GW	964 /GW	1100 /GW	748 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 16

Comparison of Subsurface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-01B	SB-02B	SB-06B	SB-07B	SB-08B	SB-09B
IEA Sample ID Number							
Depth		1-2	4-5	3.5-4.5	3-4	4-5	4-5
Phase I/Phase II		Phase I	Phase I	Phase I	Phase I	Phase I	Phase I
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	< 1.8	< 1.5	< 1.5	< 15	0.56	< 1.6
Chrysene	218019	0.37 J	0.14 J	< 1.5	< 15	0.45 J	0.37 J
Benzo(b)fluoranthene	205992	0.26 J	0.41 J	< 1.5	< 15	< 0.46	< 1.6
Benzo(k)fluoranthene	207089	0.62 J	< 1.5	< 1.5	< 15	0.43 J	< 1.6
Benzo(a)pyrene	50328	0.22 J	0.2 J	< 1.5	< 15	0.34 J	< 1.6
Indeno(1,2,3-cd)pyrene	193395	< 1.8	< 1.5	< 1.5	< 15	0.14 J	< 1.6
Dibenzo(a,h)anthracene	53703	< 1.8	< 1.5	< 1.5	< 15	< 0.46	< 1.6
Pesticide Compounds (mg/Kg)							
Aldrin	309002	< 0.0048	< 0.004	< 0.0041	< 0.026	< 0.0025	< 0.0043
Heptachlor Epoxide	1024573	< 0.0048	< 0.004	< 0.0041	< 0.026	< 0.0025	< 0.0043
Dieldrin	60571	< 0.0092	< 0.0077	< 0.008	< 0.051	< 0.0049	< 0.0084
4,4'-DDT	50293	< 0.0092	< 0.0077	< 0.008	< 0.051	< 0.0049	< 0.0084
PCBs (mg/Kg)							
Aroclor - 1248	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Aroclor - 1254	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Aroclor - 1260	1336363	< 0.092	< 0.077	< 0.08	< 0.51	< 0.049	< 0.084
Total PCBs		ND	ND	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)							
Antimony	7440360	< 7.4	< 6.2	< 6.4	< 6.5	< 3.9	< 6.7
Arsenic	7440382	32.8 /GW	6.9	5550 /GW	14.3	12.4	21.7
Barium	7440393	413	360	402	95.9	68.1	82.8
Beryllium	7440417	< 0.56	< 0.47	< 0.48	< 0.49	< 0.3	< 0.51
Cadmium	7440439	< 1.6	< 1.4	< 1.4	< 1.4	1.9	< 1.5
Chromium	16065831	47400	33100	37400	49200	15300	81900
Hexavalent Chromium	18540299						
Lead	7439921	1520 /GW	481 /GW	253 /GW	22.4	281 /GW	1260 /GW
Mercury	7439976	7.4	0.63	0.84	29.8 /GW	0.27	23.4 /GW
Nickel	7440020	11.3	4.2	< 3.2	11	10.4	11.5
Selenium	7782492	< 0.78	< 0.65	2.4	< 0.69	< 1	< 1.7
Silver	7440224	< 1.2	< 0.98	< 1	< 1	< 0.62	< 1.1

Table 16

Comparison of Subsurface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		MW-2B	MW-2C	SB-44B	SB-45B	SB-46B	SB-47B	SB-48B
IEA Sample ID Number				950153002	950153004	950153005	950153007	950153009
Depth		4-6	6-8	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase I	Phase I	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface	Subsurface
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	5.8	< 12					
Chrysene	218019	< 5.8	< 12					
Benzo(b)fluoranthene	205992	5.8	< 12					
Benzo(k)fluoranthene	207089	< 5.8	< 12					
Benzo(a)pyrene	50328	6	< 12					
Indeno(1,2,3-cd)pyrene	193395	< 5.8	< 12					
Dibenzo(a,h)anthracene	53703	< 5.8	< 12					
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.0032	< 0.0039					
Heptachlor Epoxide	1024573	< 0.0032	< 0.0039					
Dieldrin	60571	< 0.0062	< 0.0076					
4,4'-DDT	50293	< 0.0062	< 0.0076					
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.062	< 0.076					
Aroclor - 1254	1336363	< 0.062	< 0.076					
Aroclor - 1260	1336363	< 0.062	< 0.076					
Total PCBs		ND	ND					
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 5	< 6.1					
Arsenic	7440382	1210 /GW	604 /GW	5	1.2	13	15	23
Barium	7440393	557	155					
Beryllium	7440417	< 0.38	< 0.46					
Cadmium	7440439	2.9	< 1.3					
Chromium	16065831	20400	20800					
Hexavalent Chromium	18540299							
Lead	7439921	595 /GW	197 /GW					
Mercury	7439976	3.6	111 /GW					
Nickel	7440020	5.5	4.8					
Selenium	7782492	< 0.53	< 0.65					
Silver	7440224	< 0.79	< 0.97					

Table 16

Comparison of Subsurface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-49B	SB-50B	SB-51B	SB-64CB	SB-67B/CB	SB-73B	SB-77B	SB-78B
IEA Sample ID Number		950153011	950153014	950153016	950182013	950182017	950188007	950248016	950248018
Depth		1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation
Sample Type		In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface
In-Place/Removed		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
Soil Type									
Area									
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553					< 0.33			
Chrysene	218019					< 0.33			
Benzo(b)fluoranthene	205992					< 0.33			
Benzo(k)fluoranthene	207089					< 0.33			
Benzo(a)pyrene	50328					< 0.33			
Indeno(1,2,3-cd)pyrene	193395					< 0.33			
Dibenzo(a,h)anthracene	53703					< 0.33			
Pesticide Compounds (mg/Kg)									
Aldrin	309002					< 0.0017			
Heptachlor Epoxide	1024573					< 0.0017			
Dieldrin	60571					< 0.0033			
4,4'-DDT	50293					< 0.0033			
PCBs (mg/Kg)									
Aroclor - 1248	1336363					< 0.033			
Aroclor - 1254	1336363					< 0.033			
Aroclor - 1260	1336363					< 0.033			
Total PCBs						ND			
Inorganic Compounds (mg/Kg)									
Antimony	7440360				NA	NA	NA		
Arsenic	7440382	9.5	10000 /GW	25	140 **/GW	370 **/GW	98 **/GW	8.5	7.8
Barium	7440393				300	130	330		
Beryllium	7440417				NA	NA	NA		
Cadmium	7440439				4.4	3.2	6.2		
Chromium	16065831				27000	3600	54000		
Hexavalent Chromium	18540299				12	< 1.6	< 3.1		
Lead	7439921				470 /GW	100 /GW	530 /GW		
Mercury	7439976				0.54	0.55	4.3		
Nickel	7440020				NA	NA	NA		
Selenium	7782492				< 3.7	< 1.9	< 9.1		
Silver	7440224				< 2.4	< 1.3	< 3		

Table 16

ubsurface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values
ponent of the Groundwater Ingestion Route
leger Tannery - Waukegan, Illinois
Edison Company

Sample ID Number		SB-79B	SB-80B	SB-81B	SB-82B	SB-83B	SB-84B
IEA Sample ID Number		950248014	950248020	950153002	950153004	950153006	950153008
Depth		1-3	1-3	1-3	1-3	1-3	1-3
Phase I/Phase II		Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation	Phase II Investigation
Sample Type		In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface	In-Place Subsurface
In-Place/Removed							
Soil Type							
Area		Area 2	Area 2	Area 2	Area 2	Area 2	Area 2
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	780 /GW	710 /GW	55 /GW	240 /GW	22	19
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921						
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 16

Comparison of Subsurface Soil Data in Area 2 to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-85B		SB-88B		MW-1A	
IEA Sample ID Number		950153010		950153012		950211602	
Depth		1-3		1-3		1-3	
Phase I/Phase II		Phase II		Phase II		Phase II	
Sample Type		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface	
Area		Area 2		Area 2		Area 2	
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553					< 0.4	
Chrysene	218019					< 0.4	
Benzo(b)fluoranthene	205992					< 0.4	
Benzo(k)fluoranthene	207089					< 0.4	
Benzo(a)pyrene	50328					< 0.4	
Indeno(1,2,3-cd)pyrene	193395					< 0.4	
Dibenzo(a,h)anthracene	53703					< 0.4	
Pesticide Compounds (mg/Kg)							
Aldrin	309002					< 0.002	
Heptachlor Epoxide	1024573					< 0.002	
Dieldrin	60571					< 0.004	
4,4'-DDT	50293					< 0.004	
PCBs (mg/Kg)							
Aroclor - 1248	1336363					< 0.04	
Aroclor - 1254	1336363					< 0.04	
Aroclor - 1260	1336363					< 0.04	
Total PCBs						ND	
Inorganic Compounds (mg/Kg)							
Antimony	7440360					< 0.47	
Arsenic	7440382	70	/GW	4800	/GW	3.4	
Barium	7440393					3.1	B
Beryllium	7440417					< 0.24	
Cadmium	7440439					< 0.24	
Chromium	16065831					11.8	
Hexavalent Chromium	18540299					NA	
Lead	7439921					2.2	
Mercury	7439976					< 0.12	
Nickel	7440020					2.5	B
Selenium	7782492					< 0.71	
Silver	7440224					< 0.24	

Table 17

Comparison of Surface Soil Data in Area 3A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number	N8	O8	P8	Q8	R8	S8
IEA Sample ID Number						
Depth						
Phase I/Phase II						
Sample Type	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type	Surface	Surface	Surface	Surface	Surface	Surface
Area	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene 56553						
Chrysene 218019						
Benzo(b)fluoranthene 205992						
Benzo(k)fluoranthene 207089						
Benzo(a)pyrene 50328						
Indeno(1,2,3-cd)pyrene 193395						
Dibenzo(a,h)anthracene 53703						
Pesticide Compounds (mg/Kg)						
Aldrin 309002						
Heptachlor Epoxide 1024573						
Dieldrin 60571						
4,4'-DDT 50293						
PCBs (mg/Kg)						
Aroclor - 1248 1336363						
Aroclor - 1254 1336363						
Aroclor - 1260 1336363						
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony 7440360						
Arsenic 7440382	8.9	254 /GW	< 7.9	26	< 8.2	20
Barium 7440393						
Beryllium 7440417						
Cadmium 7440439						
Chromium 16065831						
Hexavalent Chromium 18540299						
Lead 7439921	1780 /GW	904 /GW	174 /GW	6430 /GW	593 /GW	617 /GW
Mercury 7439976						
Nickel 7440020						
Selenium 7782492						
Silver 7440224						

Table 17

Comparison of Surface Soil Data in Area 3A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		N,O,8,9		O,P,8,9		P,Q,8,9		Q,R,8,9		R,S,8,9		N9	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	402	/GW	< 7.1		< 7.9		< 8.3		< 7.4		16	
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921	180	/GW	257	/GW	157	/GW	514	/GW	297	/GW	96	/GW
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												

Table 17

Comparison of Surface Soil Data in Area 3A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		O9	P9	Q9	R9	S9
IEA Sample ID Number						
Depth						
Phase I/Phase II						
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface
Area		Area 3A	Area 3A	Area 3A	Area 3A	Area 3A
CAS No.						
CPAHs (mg/Kg)						
Benzo(a)anthracene	56553					
Chrysene	218019					
Benzo(b)fluoranthene	205992					
Benzo(k)fluoranthene	207089					
Benzo(a)pyrene	50328					
Indeno(1,2,3-cd)pyrene	193395					
Dibenzo(a,h)anthracene	53703					
Pesticide Compounds (mg/Kg)						
Aldrin	309002					
Heptachlor Epoxide	1024573					
Dieldrin	60571					
4,4'-DDT	50293					
PCBs (mg/Kg)						
Aroclor - 1248	1336363					
Aroclor - 1254	1336363					
Aroclor - 1260	1336363					
Total PCBs						
Inorganic Compounds (mg/Kg)						
Antimony	7440360					
Arsenic	7440382	16	< 9.9	< 8.2	< 8.4	< 11
Barium	7440393					
Beryllium	7440417					
Cadmium	7440439					
Chromium	16065831					
Hexavalent Chromium	18540299					
Lead	7439921	806 /GW	218 /GW	461 /GW	385 /GW	170 /GW
Mercury	7439976					
Nickel	7440020					
Selenium	7782492					
Silver	7440224					

Table 18

Comparison of Subsurface Soil Data in Area 3A to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Comparison of Su
for the Soil Comp
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Commonwealth E

Sample ID Number		SB-20B		SB-21B		SB-22B		SB-23B		SB-24B		SB-25B		SB-26B		SB-27B	
IEA Sample ID Number																	
Depth		2-4		2-4		2-4		9-10		3-4		3.5-4.5		3-4		2-3	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place		Removed		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface	
Area		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.																	
CPAHs (mg/Kg)																	
Benzo(a)anthracene	56553	0.67	J	0.16	J	< 0.4		< 1.2		1.2		< 0.96		8.2		< 0.43	
Chrysene	218019	< 0.94		0.17	J	0.082	J	< 1.2		1.2		< 0.96		6.4		< 0.43	
Benzo(b)fluoranthene	205992	< 0.94		0.16	J	0.12	J	< 1.2		1.7		< 0.96		8.8		< 0.43	
Benzo(k)fluoranthene	207089	< 0.94		0.083	J	0.072	J	< 1.2		0.49	J	< 0.96		5.2		< 0.43	
Benzo(a)pyrene	50328	< 0.94		0.078	J	0.071	J	< 1.2		0.77	J	< 0.96		4.5		< 0.43	
Indeno(1,2,3-cd)pyrene	193395	< 0.94		< 0.37		0.068	J	< 1.2		< 0.89		< 0.96		5		< 0.43	
Dibenzo(a,h)anthracene	53703	< 0.94		< 0.37		< 0.4		< 1.2		< 0.89		< 0.96		< 3.6		< 0.43	
Pesticide Compounds (mg/Kg)																	
Aldrin	309002	< 0.0025		< 0.002		< 0.0058		< 0.0032		< 0.0023		0.036		< 0.0049		< 0.0025	<
Heptachlor Epoxide	1024573	< 0.0025		0.0034		< 0.0058		< 0.0032		0.048		0.084		< 0.0049		< 0.0025	
Dieldrin	60571	< 0.0049		0.0094		< 0.011		0.023		0.1		< 0.0049		< 0.0095		< 0.0048	
4,4'-DDT	50293	< 0.0049		< 0.0039		0.0065	J	0.0062		0.028		< 0.0049		< 0.0095		< 0.0048	
PCBs (mg/Kg)																	
Aroclor - 1248	1336363	< 0.049		0.24		< 0.11		< 0.062		1.8		2.8		< 0.095		< 0.048	<
Aroclor - 1254	1336363	< 0.049		< 0.039		< 0.11		< 0.062		1.2		< 0.049		< 0.095		< 0.048	<
Aroclor - 1260	1336363	< 0.049		< 0.039		< 0.11		< 0.062		< 0.045		< 0.049		< 0.095		< 0.048	<
Total PCBs		ND		0.24		ND		ND		3		2.8		ND		ND	<
Inorganic Compounds (mg/Kg)																	
Antimony	7440360	< 3.9		< 3.1		< 3.6		< 5		< 3.6		< 4		< 3		< 3.8	<
Arsenic	7440382	32.7	/GW	< 0.28		20.6		12.6		164	/GW	7.1		2.7		12	
Barium	7440393	189		2.9		167		392		323		114		19.4		88.3	
Beryllium	7440417	0.65		< 0.24		< 0.27		< 0.38		1.2		6.6		< 0.23		1.1	
Cadmium	7440439	9		< 0.68		12.8		8.4		11		1.9		< 0.67		0.9	
Chromium	16065831	11900		30.2		12400		25500		3830		919		21.8		19.7	
Hexavalent Chromium	18540299																
Lead	7439921	399	/GW	3.7		425	/GW	400	/GW	333	/GW	50.2	/GW	13.2		11.7	
Mercury	7439976	2		0.61		6.6		2.2		1.3		0.5		0.07		6.5	
Nickel	7440020	30.1		2.2		15.3		8.1		33.9		24.3		2.9		9	
Selenium	7782492	1.4		< 0.8		0.96		0.54		1.4		0.79		< 0.78		1.6	
Silver	7440224	< 0.62		< 0.49		< 0.57		< 0.79		< 0.58		< 0.63		< 0.48		< 0.61	<

Table 18

ubsurface Soil Data in Area 3A to Tier 1 and Tier 2 Screening Val
ionent of the Groundwater Ingestion Route
leger Tannery - Waukegan, Illinois
Edison Company

Sample ID Number		SB-28B		MW-6A		MW-6B		SB-71B	
IEA Sample ID Number								950188003	
Depth		1-2		2-4		4-6		1-3	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase II	
Sample Type		Combined		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface		Subsurface	
Area		Area 3A		Area 3A		Area 3A		Area 3A	
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	2.75		< 1.1		< 0.94			
Chrysene	218019	1.675		< 1.1		< 0.94			
Benzo(b)fluoranthene	205992	2.75		< 1.1		< 0.94			
Benzo(k)fluoranthene	207089	1.7		< 1.1		< 0.94			
Benzo(a)pyrene	50328	0.805		< 1.1		< 0.94			
Indeno(1,2,3-cd)pyrene	193395	1.1	J	< 1.1		< 0.94			
Dibenzo(a,h)anthracene	53703	0.3		< 1.1		< 0.94			
Pesticide Compounds (mg/Kg)									
Aldrin	309002	0.0034		0.12		0.025			
Heptachlor Epoxide	1024573	0.0089		0.084		0.018			
Dieldrin	60571	0.0205		< 0.0059		< 0.0051			
4,4'-DDT	50293	0.022		< 0.0059		< 0.0051			
PCBs (mg/Kg)									
Aroclor - 1248	1336363	0.065		4.9		0.77			
Aroclor - 1254	1336363	0.065		< 0.059		< 0.051			
Aroclor - 1260	1336363	0.065		< 0.059		< 0.051			
Total PCBs		ND		4.9		0.77			
Inorganic Compounds (mg/Kg)									
Antimony	7440360	5.2		< 4.7		< 4.1		NA	
Arsenic	7440382	16.45		6.9		6.1		20	
Barium	7440393	124		182		13.8		120	
Beryllium	7440417	0.935		0.71		< 0.31		NA	
Cadmium	7440439	1.6		8.3		< 0.89		3.3	
Chromium	16065831	823		11500		76.6		37000	
Hexavalent Chromium	18540299							< 2.1	
Lead	7439921	199.5	/GW	792	/GW	23.7		920	/GW
Mercury	7439976	0.3		2.6		0.91		11	/GW
Nickel	7440020	12.95		45.3		4.3		NA	
Selenium	7782492	3.95	/GW	1.9		< 0.43		< 6.3	
Silver	7440224	0.83		< 0.75		< 0.65		< 2	

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-20B		SB-10A		SB-11A		SB-12A		SB-15A		SB-19A	
IEA Sample ID Number													
Depth		0-1		0-1		0-1		0-2		0-1		0-1	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I	
Sample Type		Combined		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553	9		< 0.63		0.89 J		4.9		28		< 0.58	
Chrysene	218019	8.65		< 0.63		0.97		2.9		30		< 0.58	
Benzo(b)fluoranthene	205992	11		< 0.63		1.3		6.9		37		< 0.58	
Benzo(k)fluoranthene	207089	< 11		< 0.63		0.3 J		2.2		10		< 0.58	
Benzo(a)pyrene	50328	0.35 J		< 0.63		< 0.9		1.3		9.3		< 0.58	
Indeno(1,2,3-cd)pyrene	193395	0.26 J		< 0.63		< 0.9		< 0.7		< 8.9		< 0.58	
Dibenzo(a,h)anthracene	53703	< 11		< 0.63		< 0.9		0.11 J		< 8.9		< 0.58	
Pesticide Compounds (mg/Kg)													
Aldrin	309002	< 0.003		< 0.018		< 0.0024		< 0.0025		0.35		< 0.0031	
Heptachlor Epoxide	1024573	0.041		< 0.018		< 0.0024		0.065		0.68		0.0098	
Dieldrin	60571	0.0545		1.9	/GW	0.062		0.26	/GW	< 0.025		< 0.006	
4,4'-DDT	50293	0.415		< 0.035		2.8		0.028		0.26		0.016	
PCBs (mg/Kg)													
Aroclor - 1248	1336363	< 0.058		56		< 0.047		< 0.049		30		< 0.06	
Aroclor - 1254	1336363	< 0.058		< 0.35		< 0.047		< 0.049		< 0.25		1.3	
Aroclor - 1260	1336363	< 0.058		< 0.35		< 0.047		< 0.049		< 0.25		< 0.06	
Total PCBs		< ND		56		ND		ND		30		1.3	
Inorganic Compounds (mg/Kg)													
Antimony	7440360	< 4.6		< 2.8		< 3.8		< 3.9		14.2	/GW	9.1	/GW
Arsenic	7440382	2.8		3.6		4.6		6.4		13.4		5.8	
Barium	7440393	141.5		7.5		431		1570		371		897	
Beryllium	7440417	< 0.35		< 0.21		0.6		0.33		< 0.29		0.51	
Cadmium	7440439	1.7		< 0.61		8		29.9		17.1		42.9	
Chromium	18065831	1090.5		38.6		936		7190		4010		1490	
Hexavalent Chromium	18540299												
Lead	7439921	136.5	/GW	4.1		277	/GW	4250	/GW	4120	/GW	684	/GW
Mercury	7439976	0.275		< 0.05		1.9		8.4	/GW	2		4.3	
Nickel	7440020	12.5		4.9		29.5		43.7		34.3		113	
Selenium	7782492	0.5		< 0.3		< 0.4		0.72		3.9	/GW	< 0.51	
Silver	7440224	< 0.74		< 0.44		47.3		126	/GW	62.3		95.8	

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number IEA Sample ID Number Depth Phase I/Phase II Sample Type In-Place/Removed Soil Type Area CAS No.		PW-1 0-1 Phase I Investigation In-Place Surface Area 3B	PW-2 0-1 Phase I Investigation In-Place Surface Area 3B	PW-3 0-1 Phase I Investigation In-Place Surface Area 3B	SB-55A 950182001 0-1 Phase II Investigation In-Place Surface Area 3B	SB-56A 950182002 0-1 Phase II Investigation In-Place Surface Area 3B	SB-57A 950182003 0-1 Phase II Investigation In-Place Surface Area 3B	SB-58A 950182004 0-1 Phase II Investigation In-Place Surface Area 3B
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	< 0.92	< 0.46	< 0.83		0.2		0.02
Chrysene	218019	< 0.92	< 0.46	< 0.83		0.26		< 0.1
Benzo(b)fluoranthene	205992	< 0.92	< 0.46	< 0.83		0.45		0.038
Benzo(k)fluoranthene	207089	< 0.92	< 0.46	< 0.83		0.17		< 0.011
Benzo(a)pyrene	50328	< 0.92	< 0.46	< 0.83		0.39		0.037
Indeno(1,2,3-cd)pyrene	193395	< 0.92	< 0.46	< 0.83		0.27		0.041
Dibenzo(a,h)anthracene	53703	< 0.92	< 0.46	< 0.83		0.035		< 0.02
Pesticide Compounds (mg/Kg)								
Aldrin	309002	< 0.024	< 0.0025	< 0.0044	NA	NA	NA	NA
Heptachlor Epoxide	1024573	< 0.024	< 0.0025	< 0.0044	NA	NA	NA	NA
Dieldrin	60571	< 0.047	< 0.0048	< 0.0085	NA	NA	NA	NA
4,4'-DDT	50293	< 0.047	< 0.0048	< 0.0085	NA	NA	NA	NA
PCBs (mg/Kg)								
Aroclor - 1248	1336363	< 0.47	< 0.048	< 0.085	< 0.08	91	46	1.1
Aroclor - 1254	1336363	< 0.47	< 0.048	< 0.085	0.58	20	9.1	0.68
Aroclor - 1260	1336363	< 0.47	< 0.048	< 0.085	< 0.16	5.8	3.1	0.21
Total PCBs		ND	ND	ND	0.58	116.8	58.2	1.99
Inorganic Compounds (mg/Kg)								
Antimony	7440360	< 3.8	< 3.8	< 6.8				
Arsenic	7440382	1.2	1.9	< 0.72				
Barium	7440393	101	361	11.1				
Beryllium	7440417	< 0.29	< 0.29	< 0.51				
Cadmium	7440439	1.8	11.7	< 1.5				
Chromium	16065831	187	1010	15.2				
Hexavalent Chromium	18540299							
Lead	7439921	86.5 /GW	235 /GW	787 /GW				
Mercury	7439976	0.74	1.6	< 0.13				
Nickel	7440020	3.1	17.6	5.8				
Selenium	7782492	0.58	5.2 /GW	< 0.72				
Silver	7440224	6.8	40.7	1.7				

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-59A	SB-60A	SB-69A/CA	SB-70A	SB-72A	SB-100A	SB-101A
IEA Sample ID Number		950182006	950182007	950182019	950188001	950188004	950424005	950424001
Depth		0-1	0-1	0-1	0-1	0-1	0-1	0-1
Phase I/Phase II		Phase II	Phase II	Phase II	Phase II	Phase II	Phase II	Phase II
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.								
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553		0.51	< 0.33				
Chrysene	218019		0.76	< 0.33				
Benzo(b)fluoranthene	205992		1.4	< 0.33				
Benzo(k)fluoranthene	207089		0.73	< 0.33				
Benzo(a)pyrene	50328		1.2	< 0.33				
Indeno(1,2,3-cd)pyrene	193395		1.2	< 0.33				
Dibenzo(a,h)anthracene	53703		0.19	< 0.33				
Pesticide Compounds (mg/Kg)								
Aldrin	309002	NA	NA	< 0.0017			NA	NA
Heptachlor Epoxide	1024573	NA	NA	< 0.0017			NA	NA
Dieldrin	60571	NA	NA	< 0.0033			NA	NA
4,4'-DDT	50293	NA	NA	< 0.0033			NA	NA
PCBs (mg/Kg)								
Aroclor - 1248	1336363	26	< 0.08	< 0.033			< 0.08	0.24
Aroclor - 1254	1336363	9.5	1.2	0.41			0.22	0.46
Aroclor - 1260	1336363	2.1	0.25	0.18			< 0.16	0.26
Total PCBs		37.6	1.45	0.59			0.22	0.96
Inorganic Compounds (mg/Kg)								
Antimony	7440360			NA	NA	NA		
Arsenic	7440382			4	< 3.6	14		
Barium	7440393			250	120	150		
Beryllium	7440417			NA	NA	NA		
Cadmium	7440439			9.5	40	14		
Chromium	16065831			230	820	49000		
Hexavalent Chromium	18540299			< 1.6	< 1.5	< 2.3		
Lead	7439921			180 /GW	360 /GW	1200 /GW		
Mercury	7439976			16 /GW	3.9	16 /GW		
Nickel	7440020			NA	NA	NA		
Selenium	7782492			< 1.8	< 3	< 6.3		
Silver	7440224			92	89	2.7		

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number IEA Sample ID Number Depth Phase I/Phase II Sample Type In-Place/Removed Soil Type Area CAS No.	SB-102A 950424004 0-1 Phase II Investigation In-Place Surface Area 3B	SB-103A 950424003 0-1 Phase II Investigation In-Place Surface Area 3B	SB-104A 950424006 0-1 Phase II Investigation In-Place Surface Area 3B	SB-105A 950424002 0-1 Phase II Investigation In-Place Surface Area 3B	SB-106A 950424005 0-1 Phase II Investigation In-Place Surface Area 3B	SB-107A 950182007 0-1 Phase II Investigation In-Place Surface Area 3B	A,B,24,25 Investigation In-Place Surface Area 3B
CPAHs (mg/Kg)							
Benzo(a)anthracene 56553							
Chrysene 218019							
Benzo(b)fluoranthene 205992							
Benzo(k)fluoranthene 207089							
Benzo(a)pyrene 50328							
Indeno(1,2,3-cd)pyrene 193395							
Dibenzo(a,h)anthracene 53703							
Pesticide Compounds (mg/Kg)							
Aldrin 309002	NA	NA	NA	NA	NA	NA	
HeptaChlor Epoxide 1024573	NA	NA	NA	NA	NA	NA	
Dieldrin 60571	NA	NA	NA	NA	NA	NA	
4,4'-DDT 50293	NA	NA	NA	NA	NA	NA	
PCBs (mg/Kg)							
Aroclor - 1248 1336363	< 0.08	< 0.08	0.21	36	< 0.08	0.87	
Aroclor - 1254 1336363	0.29	2.5	0.25	19	0.24	< 0.16	
Aroclor - 1260 1336363	0.17	0.44	< 0.16	27	< 0.16	< 0.16	
Total PCBs	0.46	2.94	0.46	82	0.24	0.87	
Inorganic Compounds (mg/Kg)							
Antimony 7440360							
Arsenic 7440382							< 11
Barium 7440393							
Beryllium 7440417							
Cadmium 7440439							
Chromium 16065831							
Hexavalent Chromium 18540299							
Lead 7439921							504 /GW
Mercury 7439976							
Nickel 7440020							
Selenium 7782492							
Silver 7440224							

Table 19

Comparison of Surface Soil Data In Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		B,C,24,25	C,D,24,25	D,E,24,25	E,F,24,25	F,G,24,25	G,H,24,25
IEA Sample ID Number							
Depth							
Phase I/Phase II							
Sample Type		Investigation	Investigation	Investigation	Investigation	Investigation	Investigation
In-Place/Removed		In-Place	In-Place	In-Place	In-Place	In-Place	In-Place
Soil Type		Surface	Surface	Surface	Surface	Surface	Surface
Area		Area 3B	Area 3B	Area 3B	Area 3B	Area 3B	Area 3B
CAS No.							
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553						
Chrysene	218019						
Benzo(b)fluoranthene	205992						
Benzo(k)fluoranthene	207089						
Benzo(a)pyrene	50328						
Indeno(1,2,3-cd)pyrene	193395						
Dibenzo(a,h)anthracene	53703						
Pesticide Compounds (mg/Kg)							
Aldrin	309002						
Heptachlor Epoxide	1024573						
Dieldrin	60571						
4,4'-DDT	50293						
PCBs (mg/Kg)							
Aroclor - 1248	1336363						
Aroclor - 1254	1336363						
Aroclor - 1260	1336363						
Total PCBs							
Inorganic Compounds (mg/Kg)							
Antimony	7440360						
Arsenic	7440382	16	< 8.3	< 11	< 9.5	14	< 9.2
Barium	7440393						
Beryllium	7440417						
Cadmium	7440439						
Chromium	16065831						
Hexavalent Chromium	18540299						
Lead	7439921	678 /GW	694 /GW	614 /GW	668 /GW	398 /GW	572 /GW
Mercury	7439976						
Nickel	7440020						
Selenium	7782492						
Silver	7440224						

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		H,I,24,25		A25		B25		C25		D25		E25	
IEA Sample ID Number													
Depth													
Phase I/Phase II													
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface		Surface		Surface	
Area		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.													
CPAHs (mg/Kg)													
Benzo(a)anthracene	56553												
Chrysene	218019												
Benzo(b)fluoranthene	205992												
Benzo(k)fluoranthene	207089												
Benzo(a)pyrene	50328												
Indeno(1,2,3-cd)pyrene	193395												
Dibenzo(a,h)anthracene	53703												
Pesticide Compounds (mg/Kg)													
Aldrin	309002												
Heptachlor Epoxide	1024573												
Dieldrin	60571												
4,4'-DDT	50293												
PCBs (mg/Kg)													
Aroclor - 1248	1336363												
Aroclor - 1254	1336363												
Aroclor - 1260	1336363												
Total PCBs													
Inorganic Compounds (mg/Kg)													
Antimony	7440360												
Arsenic	7440382	<	7.7		16		51 /GW		55 /GW	<	8.5	<	8.1
Barium	7440393												
Beryllium	7440417												
Cadmium	7440439												
Chromium	16065831												
Hexavalent Chromium	18540299												
Lead	7439921		100 /GW		598 /GW		229 /GW		471 /GW		239 /GW		120 /GW
Mercury	7439976												
Nickel	7440020												
Selenium	7782492												
Silver	7440224												

Table 19

Comparison of Surface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		F25		G25		H25		I25	
IEA Sample ID Number									
Depth									
Phase I/Phase II									
Sample Type		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place	
Soil Type		Surface		Surface		Surface		Surface	
Area		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.									
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553								
Chrysene	218019								
Benzo(b)fluoranthene	205992								
Benzo(k)fluoranthene	207089								
Benzo(a)pyrene	50328								
Indeno(1,2,3-cd)pyrene	193395								
Dibenzo(a,h)anthracene	53703								
Pesticide Compounds (mg/Kg)									
Aldrin	309002								
Heptachlor Epoxide	1024573								
Dieldrin	60571								
4,4'-DDT	50293								
PCBs (mg/Kg)									
Aroclor - 1248	1336363								
Aroclor - 1254	1336363								
Aroclor - 1260	1336363								
Total PCBs									
Inorganic Compounds (mg/Kg)									
Antimony	7440360								
Arsenic	7440382	< 8.8		< 9.7		10		< 7.1	
Barium	7440393								
Beryllium	7440417								
Cadmium	7440439								
Chromium	16065831								
Hexavalent Chromium	18540299								
Lead	7439921	160	/GW	290	/GW	217	/GW	44	/GW
Mercury	7439976								
Nickel	7440020								
Selenium	7782492								
Silver	7440224								

Table 20

Comparison of Subsurface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-31B		MW-3B		MW-3C		SB-10B		SB-11B		SB-13B		SB-14B	
IEA Sample ID Number															
Depth		2-3		2-4		4-8		2-4		2-4		2-4		2-4	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I		Phase I	
Sample Type		Investigation		Investigation		Combined		Investigation		Combined		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface	
Area		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.															
CPAHs (mg/Kg)															
Benzo(a)anthracene	56553	< 1.7		< 0.77		< 0.95		1.1		0.54 J		1		0.11 J	
Chrysene	218019	< 1.7		< 0.77		< 0.95		0.92		0.67 J		0.92		0.087 J	
Benzo(b)fluoranthene	205992	< 1.7		< 0.77		< 0.95		1.2		0.84 J		1.6		0.21 J	
Benzo(k)fluoranthene	207089	< 1.7		< 0.77		< 0.95		0.51 J		0.38 J		< 0.07 J		< 0.45	
Benzo(a)pyrene	50328	< 1.7		< 0.77		< 0.95		0.42 J		< 0.88		0.61		0.059 J	
Indeno(1,2,3-cd)pyrene	193395	< 1.7		< 0.77		< 0.95		< 0.72		< 0.88		< 0.42		< 0.45	
Dibenzo(a,h)anthracene	53703	< 1.7		< 0.77		< 0.95		< 0.72		< 0.88		< 0.42		< 0.45	
Pesticide Compounds (mg/Kg)															
Aldrin	309002	< 0.0047		0.005		0.011		< 0.002		< 0.0025		< 0.0024		0.0094	
Heptachlor Epoxide	1024573	< 0.0047		0.0077		0.015		0.042		< 0.0025		0.014		0.014	
Dieldrin	60571	0.048		< 0.0047		< 0.0041		0.11		0.038		0.067		< 0.0047	
4,4'-DDT	50293	< 0.0091		< 0.0047		< 0.0055		< 0.0036		1.4		0.031		< 0.0047	
PCBs (mg/Kg)															
Aroclor - 1248	1336363	< 0.091		0.18		0.37		2.1		< 0.048		< 0.046		0.37	
Aroclor - 1254	1336363	< 0.091		< 0.047		0.19		< 0.036		< 0.048		1		0.94	
Aroclor - 1260	1336363	< 0.091		< 0.047		< 0.055		< 0.036		< 0.048		< 0.046		< 0.047	
Total PCBs		ND		0.18		0.56		2.1		ND		1		1.31	
Inorganic Compounds (mg/Kg)															
Antimony	7440360	< 7.3		< 3.3		< 4.4		< 3.1		< 3.8		< 3.7		15.8 /GW	
Arsenic	7440382	31		5.7		3.085		5.9		1.6		5.3		7.9	
Barium	7440393	185		13.6		8.25		40.5		16.65		45.5		161	
Beryllium	7440417	1		< 0.25		< 0.33		< 0.24		0.28		0.47		0.34	
Cadmium	7440439	2.7		< 0.72		< 0.97		< 0.69		< 0.84		1.9		37.3	
Chromium	16065831	59600		263		309.3		58.9		36.8		293		1060	
Hexavalent Chromium	18540299														
Lead	7439921	678 /GW		16.8		10.8		23.8		32.85		24.8		220 /GW	
Mercury	7439976	3.7		0.13		0.16		< 0.06		4.5		1.2		28.8 /GW	
Nickel	7440020	18.6		3.2		2.4		6.6		5.65		15.4		63	
Selenium	7782492	< 1.9		< 0.35		< 0.47		< 0.33		< 0.96		< 0.39		5.5 /GW	
Silver	7440224	2.4		< 0.52		< 0.7		< 0.5		< 0.61		< 0.58		129 /GW	

Table 20

Comparison of Subsurface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-15B		SB-16B		SB-17B		SB-18B		SB-19B		SB-58B		SB-60B	
IEA Sample ID Number												950182005		950188014	
Depth		2-4		2-4		2-4		1.5-3.5		2-3		1-3		1-3	
Phase I/Phase II		Phase I		Phase I		Phase I		Phase I		Phase I		Phase II		Phase II	
Sample Type		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place		In-Place	
Soil Type		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface		Subsurface	
Area		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B		Area 3B	
CAS No.															
CPAHs (mg/Kg)															
Benzo(a)anthracene	56553	0.43		0.28 J		0.37 J		< 0.93		< 0.48		3			
Chrysene	218019	0.39		0.33 J		0.39 J		< 0.93		< 0.48		< 0.1			
Benzo(b)fluoranthene	205992	0.5		0.29 J		0.45 J		< 0.93		< 0.48		0.042			
Benzo(k)fluoranthene	207089	< 0.39		0.11 J		0.24 J		< 0.93		< 0.48		0.025			
Benzo(a)pyrene	50328	< 0.39		0.13 J		0.14 J		< 0.93		< 0.48		0.023			
Indeno(1,2,3-cd)pyrene	193395	< 0.39		< 0.53		< 1		< 0.93		< 0.48		< 0.029			
Dibenzo(a,h)anthracene	53703	< 0.39		< 0.53		< 1		< 0.93		< 0.48		< 0.02			
Pesticide Compounds (mg/Kg)															
Aldrin	309002	< 0.0021		0.073		< 0.0027		< 0.0026		< 0.0026		NA			
Heptachlor Epoxide	1024573	0.16		< 0.0073		0.032		0.0025 J		< 0.0026		NA			
Dieldrin	60571	0.12	/GW	0.088		0.14	/GW	0.021		< 0.0051		NA			
4,4'-DDT	50293	< 0.0041		< 0.014		< 0.0052		< 0.005		< 0.0051		NA			
PCBs (mg/Kg)															
Aroclor - 1248	1336363	7.4		2.2		< 0.052		< 0.05		< 0.051		< 0.08			
Aroclor - 1254	1336363	< 0.0041		1.2		2.4		< 0.05		< 0.051		1.9			
Aroclor - 1260	1336163	< 0.0041		< 0.14		< 0.052		< 0.05		< 0.051		0.2			
Total PCBs		7.4		3.4		2.4		ND		ND		2.1			
Inorganic Compounds (mg/Kg)															
Antimony	7440360	< 3.2		< 4.5		< 4.2		< 4.1		< 4.1				NA	
Arsenic	7440382	3.6		9.7		13.6		20.5		3.5				7.1	
Barium	7440393	46.1		179		2140	/GW	104		14				740	
Beryllium	7440417	0.34		0.34		0.98		3		< 0.31				NA	
Cadmium	7440439	< 0.71		2.6		2.1		3.1		< 0.9				45	
Chromium	16065831	80.6		1330		1950		161		158				5000	
Hexavalent Chromium	18540299													< 1.4	
Lead	7439921	1610	/GW	86.4	/GW	394	/GW	30.9		4.5				1000	/GW
Mercury	7439976	0.1		4		3.3		0.35		< 0.08				3.2	
Nickel	7440020	5.9		11		47		32.4		< 2				NA	
Selenium	7782492	< 0.34		< 0.48		1.7		0.53		< 0.43				< 3.7	
Silver	7440224	< 0.52		< 0.72		4.5		< 0.65		< 0.65				260	/GW

Table 20

Comparison of Subsurface Soil Data in Area 3B to Tier 1 and Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Route
Former Griess-Pfleger Tannery - Waukegan, Illinois
Commonwealth Edison Company

Sample ID Number		SB-69B/CB		MW-5A	
IEA Sample ID Number		950182020		950211603	
Depth		1-3		1-3	
Phase I/Phase II		Phase II		Phase II	
Sample Type		Investigation		Investigation	
In-Place/Removed		In-Place		In-Place	
Soil Type		Subsurface		Subsurface	
Area		Area 3B		Area 3B	
CAS No.					
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553	< 0.33		< 0.39	
Chrysene	218019	< 0.33		< 0.39	
Benzo(b)fluoranthene	205992	< 0.33		< 0.39	
Benzo(k)fluoranthene	207089	< 0.33		< 0.39	
Benzo(a)pyrene	50328	< 0.33		< 0.39	
Indeno(1,2,3-cd)pyrene	193395	< 0.33		< 0.39	
Dibenzo(a,h)anthracene	53703	< 0.33		< 0.39	
Pesticide Compounds (mg/Kg)					
Aldrin	309002	< 0.0017		< 0.002	
Heptachlor Epoxide	1024573	< 0.0017		< 0.002	
Dieldrin	60571	< 0.0033		< 0.004	
4,4'-DDT	50293	< 0.0033		< 0.004	
PCBs (mg/Kg)					
Aroclor - 1248	1336363	< 0.033		< 0.04	
Aroclor - 1254	1336363	0.82		< 0.04	
Aroclor - 1260	1336363	0.26		< 0.04	
Total PCBs		1.08		ND	
Inorganic Compounds (mg/Kg)					
Antimony	7440360	NA		< 0.36	
Arsenic	7440382	5.4		1.2	B
Barium	7440393	280		4.3	B
Beryllium	7440417	NA		< 0.18	
Cadmium	7440439	21		0.19	B
Chromium	16065831	1600		20	
Hexavalent Chromium	18540299	< 1.9		NA	
Lead	7439921	700	/GW	3	
Mercury	7439976	35	/GW	< 0.11	
Nickel	7440020	NA		2.9	B
Selenium	7782492	< 2.4		< 0.53	
Silver	7440224	230	/GW	< 0.18	

Table 21 Tier 1 and Tier 2 Screening Values

Constituent of Interest	CAS No. Value	Soil Screening Values				
		Industrial/Commercial		Construction Worker		Soil Component of Groundwater Ingestion Route
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	
VOCs						
Acetone	67641	200000	100000	200000	100000	16
2-Butanone	78933	1000000 *	22000 *	410000 *	140 *	17 *
Carbon disulfide	75150	200000	720	20000	9	32
Methylene Chloride	75092	760	24	12000	34	0.081
Toluene	108883	410000	650	410000	42	12
Trichloroethene	79016	520	8.9	1200	12	0.06
SVOCs						
PAHs						
Acenaphthene	83329	120000	--	120000	--	570
Acenaphthylene	208968	61000 *	--	61000 *	--	30 *
Anthracene	120127	610000	--	610000	--	12000
Benzo(a)anthracene	56553	8	--	170	--	41
Benzo(b)fluoranthene	205992	8	--	170	--	126
Benzo(k)fluoranthene	207089	78	--	1700	--	49
Benzo(a)pyrene	50328	0.8	--	17	--	209
Benzo(g,h,i)perylene	191242	61000 *	--	61000 *	--	32000 *
Carbazole	86748	290	--	6200	--	12
Chrysene	218019	780	--	17000	--	160
Dibenzo(a,h)anthracene	53703	0.8	--	17	--	2
Dibenzofuran	132649	8200 *	--	820 *	--	15 *
Fluoranthene	206440	82000	--	82000	--	4300
Fluorene	86737	82000	--	82000	--	560
Indeno(1,2,3-c,d)pyrene	193395	8	--	170	--	14
2-Methylnaphthalene	91576	61000 *	--	61000 *	--	58 *
Naphthalene	91203	41000	270	4100	1.8	12
Phenanthrene	85018	61000 *	--	61000 *	--	280 *
Pyrene	129000	61000	--	61000	--	4200
Other SVOCs						
Bis(2-ethylhexyl)phthalate	117817	410	31000	4100	31000	3600
Di-n-butyl phthalate	84742	200000	2300	200000	2300	2300
Pentachlorophenol	87865	24	--	520	--	0.43
2,4,5-Trichlorophenol	95954	200000	--	200000	--	64
Pesticides						
Aldrin	309002	0.3	6.6	6.1	9.3	0.5
beta-BHC	319857	3.2 *	12 *	69 *	16 *	0.065 *
alpha-Chlordane	57749	1.6	140	100	22	10
gamma-Chlordane	57749	1.6	140	100	22	10
DDD	72548	24	--	520	--	16
DDE	72559	17	--	370	--	54
DDT	50293	17	1500	100	2100	609.5
Dieldrin	60571	0.4	2.2	7.8	3.1	0.11
Endrin	72208	610	--	61	--	1
Endosulfan	115297	12000	--	1200	--	18
Heptachlor	76448	1	11	28	16	23
Heptachlor epoxide	1024573	0.6	9.2	2.7	13	0.7
Methoxychlor	72435	10000	--	1000	--	160
PCBs						
Aroclor - 1248	1336363					
Aroclor - 1254	1336363					
Aroclor - 1260	1336363					
Total PCBs	1336363	1	--	1	--	--
Metals						
Aluminum	7429905	--	--	--	--	--
Antimony	7440360	820	--	82	--	5
Arsenic	7440382	13	1200	61	25000	31
Barium	7440393	140000	910000	14000	870000	2100
Beryllium	7440417	4100	2100	410	44000	8000
Cadmium	7440439	2000	2800	200	59000	430
Calcium	7440702	--	--	--	--	--
Chromium, ion, trivalent	16065831	1000000	--	310000	--	--
Chromium, ion, hexavalent	18540299	6100	420	4100	8800	28
Cobalt	7440484	120000	--	12000	--	--
Copper	7440508	82000	--	8200	--	330000
Cyanide	57125	41000	--	4100	--	40
Iron	15438310	--	--	--	--	--
Lead	7439921	400	--	400	--	36
Magnesium	7439954	--	--	--	--	--
Manganese	7439965	96000	91000	9600	8700	--
Mercury	7439976	610	540000	61	52000	8
Nickel	7440020	41000	21000	4100	440000	3800
Potassium	7440097	--	--	--	--	--
Selenium	7782492	10000	--	1000	--	2.4
Silver	7440224	10000	--	1000	--	110
Sodium	7440235	--	--	--	--	--
Thallium	7440280	160	--	160	--	3.8
Vanadium	7440622	14000	--	1400	--	980
Zinc	7440666	610000	--	61000	--	53000

Table 22 **Summary of Groundwater Data**

Sample Name / Date / Sample Type / Site / CAS No.		MW-1 05/13/02 Investigation Tan	MW-1A 05/13/02 Investigation Tan	MW-2 05/13/02 Investigation Tan	MW-3 05/13/02 Investigation Tan	MW-4 05/10/02 Investigation Tan	MW-5 05/13/02 Investigation Tan
Total Metals (mg/L)							
Antimony	7440360	0.0061	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	7440382	0.93	< 0.010	0.025	< 0.010	< 0.010	< 0.010
Barium	7440393	--	--	--	--	--	--
Calcium	7440702	310	230	310	240	140	300
Chromium	18540299	--	--	--	--	--	--
Iron	15438310	< 0.050	< 0.25	1.2	2.0	4.7	9.9
Lead	7439921	--	--	--	--	--	--
Magnesium	7439954	77	46	78	82	30	49
Manganese	7439965	0.080	0.38	0.47	0.29	0.43	0.84
Mercury	7439976	--	--	--	--	--	--
Selenium	7782492	--	--	--	--	--	--
Silver	7440224	--	--	--	--	--	--
Thallium	7440280	--	--	--	--	--	--
Zinc	7440666	--	--	--	--	--	--
Water Quality Parameter (mg/L)							
Solids, Total Dissolved (TDS)		1600	1000	1500	1500	900	1200

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-5A 05/13/02 Investigation Tan	MW-6 05/10/02 Investigation Tan	MW-7 05/14/02 Investigation Background	MW-7A 05/14/02 Investigation Background	MW-8 05/13/02 Investigation Tan	MW-9 05/10/02 Investigation Tan
Total Metals (mg/L)						
Antimony 7440360	0.0036	<0.003	<0.003	<0.003	0.0035	<0.003
Arsenic 7440382	< 0.010	< 0.010	< 0.010	< 0.010	0.95	0.014
Barium 7440393	--	--	--	--	--	--
Calcium 7440702	210	240	440	140	180	170
Chromium 18540299	--	--	--	--	--	--
Iron 15438310	1.4	< 0.050	0.51	4.7	2.4	3.4
Lead 7439921	--	--	--	--	--	--
Magnesium 7439954	100	42	29	46	70	39
Manganese 7439965	0.55	1.0	0.44	0.67	0.13	0.58
Mercury 7439976	--	--	--	--	--	--
Selenium 7782492	--	--	--	--	--	--
Silver 7440224	--	--	--	--	--	--
Thallium 7440280	--	--	--	--	--	--
Zinc 7440666	--	--	--	--	--	--
Water Quality Parameter (mg/L)						
Solids, Total Dissolved (TDS)	1700	1500	2000	1100	1100	1500

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-10 05/09/02 Investigation Tan	MW-11 05/09/02 Investigation Tan	MW-12 05/09/02 Investigation Tan	MW-13 05/09/02 Investigation Tan	MW-14 05/09/02 Investigation Tan
Total Metals (mg/L)					
Antimony 7440360	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic 7440382	0.45	0.73	0.023	< 0.010	0.39
Barium 7440393	--	--	--	--	--
Calcium 7440702	110	210	330	55	160
Chromium 18540299	--	--	--	--	--
Iron 15438310	5.3	2.4	4.6	0.083	2.1
Lead 7439921	--	--	--	--	--
Magnesium 7439954	23	63	17	3.7	58
Manganese 7439965	0.18	0.43	0.26	0.013	0.15
Mercury 7439976	--	--	--	--	--
Selenium 7782492	--	--	--	--	--
Silver 7440224	--	--	--	--	--
Thallium 7440280	--	--	--	--	--
Zinc 7440666	--	--	--	--	--
Water Quality Parameter (mg/L)					
Solids, Total Dissolved (TDS)	560	1100	1600	200	870

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-101 (MW-4 dup) 05/10/02 Investigation Tan	MW-102 (MW-6 dup) 05/10/02 Investigation Tan	MW-GB2 05/10/02 Investigation GB	MW-GB5 05/10/02 Investigation GB
Total Metals (mg/L)				
Antimony 7440360	<0.003	<0.003	<0.003	<0.003
Arsenic 7440382	< 0.010	< 0.010	< 0.010	0.0085B
Barium 7440393	--	--	--	--
Calcium 7440702	140	230	92	110
Chromium 18540299	--	--	--	--
Iron 15438310	5.3	< 0.050	2.4	2.5
Lead 7439921	--	--	--	--
Magnesium 7439954	30	40	37	32
Manganese 7439965	0.44	0.98	0.26	0.29
Mercury 7439976	--	--	--	--
Selenium 7782492	--	--	--	--
Silver 7440224	--	--	--	--
Thallium 7440280	--	--	--	--
Zinc 7440666	--	--	--	--
Water Quality Parameter (mg/L)				
Solids, Total Dissolved (TDS)	860	1100	570	640

Table 22

Summary of Groundwater Data

Sample Name Date Sample Type Site CAS No.		MW-GB1 Mar-98 Investigation GB		MW-GB2 Mar-98 Investigation GB		MW-GB3 Mar-98 Investigation GB		MW-GB4 Mar-98 Investigation GB		MW-GB5 Mar-98 Investigation GB
Total Metals (mg/L)										
Antimony	7440360	< 0.067	<	0.067	<	0.067	<	0.067	<	0.067
Arsenic	7440382	0.008	<	0.002	<	0.002		0.003	<	0.002
Barium	7440393	0.075	<	0.056		0.16		0.121		0.17
Calcium	7440702	NA		NA		NA		NA		NA
Chromium	18540299	< 0.011	<	0.011	<	0.011	<	0.011	<	0.011
Iron	15438310	1.88		14.8		8.3		2.88		4.9
Lead	7439921	< 0.003	<	0.003	<	0.003	<	0.003	<	0.003
Magnesium	7439954	NA		NA		NA		NA		NA
Manganese	7439965	0.353		0.414		0.6		0.452		0.3
Mercury	7439976	< 0.0002	<	0.0002	<	0.0002	<	0.0002	<	0.0002
Selenium	7782492	0.037	<	0.003	<	0.003	<	0.003	<	0.003
Silver	7440224	0.097	<	0.011	<	0.011	<	0.011	<	0.011
Thallium	7440280	0.004	<	0.002	<	0.002	<	0.002	<	0.002
Zinc	7440666	< 0.022	<	0.022		0.058		0.091	<	0.022
Water Quality Parameter (mg/L)										
Solids, Total Dissolved (TDS)		NA		NA		NA		NA		NA

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.		MW-GB6 Mar-98 Investigation GB		MW-GB7 Mar-98 Investigation GB		MW-1 Oct-97 Investigation Tan		MW-1A Oct-97 Investigation Tan		MW-2 Oct-97 Investigation Tan
Total Metals (mg/L)										
Antimony	7440360	< 0.067	<	0.067		0.029	<	0.028		0.038
Arsenic	7440382	< 0.002	<	0.002		1.3	<	0.002		0.069
Barium	7440393	0.073		0.11	<	0.056	<	0.056		0.066
Calcium	7440702	NA		NA		NA		NA		NA
Chromium	18540299	< 0.011	<	0.011	<	0.011		0.02	<	0.011
Iron	15438310	8.5		7.8		1.3		0.092		2
Lead	7439921	< 0.003	<	0.003	<	0.003	<	0.003	<	0.003
Magnesium	7439954	NA		NA		NA		NA		NA
Manganese	7439965	0.35		0.49		0.38		0.99		0.28
Mercury	7439976	< 0.0002	<	0.0002	<	0.0002	<	0.0002	<	0.0002
Selenium	7782492	< 0.003	<	0.003	<	0.0033	<	0.0033	<	0.0033
Silver	7440224	< 0.011	<	0.011	<	0.011	<	0.011	<	0.011
Thallium	7440280	< 0.002	<	0.002	<	0.0022	<	0.0022	<	0.0022
Zinc	7440666	< 0.022	<	0.022		0.048	<	0.022	<	0.022
Water Quality Parameter (mg/L)										
Solids, Total Dissolved (TDS)		NA		NA		NA		NA		NA

Table 22 Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.		MW-3 Oct-97 Investigation Tan		MW-4 Oct-97 Investigation Tan		MW-5 Oct-97 Investigation Tan		MW-5A Oct-97 Investigation Tan		MW-6 Oct-97 Investigation Tan
Total Metals (mg/L)										
Antimony	7440360	0.033		0.049		0.036		0.035		0.053
Arsenic	7440382	< 0.002		0.0044		0.0038		0.0032	<	0.002
Barium	7440393	< 0.056		0.097	<	0.056		0.1	<	0.056
Calcium	7440702	NA		NA		NA		NA		NA
Chromium	18540299	0.011	<	0.011	<	0.011	<	0.011		0.013
Iron	15438310	9.3		7.4		15		11		0.14
Lead	7439921	< 0.003	<	0.003	<	0.003	<	0.003	<	0.003
Magnesium	7439954	NA		NA		NA		NA		NA
Manganese	7439965	0.24		0.31		0.78		0.41		3.5
Mercury	7439976	< 0.0002	<	0.0002	<	0.0002	<	0.0002	<	0.0002
Selenium	7782492	< 0.0033	<	0.0033	<	0.0033	<	0.0033	<	0.0033
Silver	7440224	< 0.011	<	0.011	<	0.011	<	0.011	<	0.011
Thallium	7440280	< 0.0022	<	0.0022	<	0.0022	<	0.0022	<	0.0022
Zinc	7440666	0.059		0.16		0.1		0.024		0.46
Water Quality Parameter (mg/L)										
Solids, Total Dissolved (TDS)		NA		NA		NA		NA		NA

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.		MW-7 Oct-97 Investigation Background		MW-7A Oct-97 Investigation Background		MW-8 Oct-97 Investigation Tan		MW-9 Oct-97 Investigation Tan		MW-10 Oct-97 Investigation Tan
Total Metals (mg/L)										
Antimony	7440360	< 0.028	<	0.028	<	0.028		0.039	<	0.028
Arsenic	7440382	0.076		0.0033		0.67		0.032		0.17
Barium	7440393	0.072		0.16	<	0.056		0.088		0.065
Calcium	7440702	NA		NA		NA		NA		NA
Chromium	18540299	< 0.011		0.026	<	0.011		0.012	<	0.011
Iron	15438310	5.4		5.9		3.3		6		3.3
Lead	7439921	0.0041	<	0.003	<	0.003	<	0.003	<	0.003
Magnesium	7439954	NA		NA		NA		NA		NA
Manganese	7439965	0.45		1.1		0.11		0.26		0.085
Mercury	7439976	< 0.0002	<	0.0002	<	0.0002	<	0.0002	<	0.0002
Selenium	7782492	0.0068	<	0.0033	<	0.0033	<	0.0033	<	0.0033
Silver	7440224	0.056	<	0.011	<	0.011	<	0.011	<	0.011
Thallium	7440280	< 0.0022		0.0029	<	0.0022		0.0022	<	0.0022
Zinc	7440666	0.032		0.096	<	0.022		0.068	<	0.022
Water Quality Parameter (mg/L)										
Solids, Total Dissolved (TDS)		NA		NA		NA		NA		NA

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-11 Oct-97 Investigation Tan	MW-12 Oct-97 Investigation Tan	MW-13 Oct-97 Investigation Tan	MW-1T Nov-96 Investigation Tan	MW-1AT Nov-96 Investigation Tan
Total Metals (mg/L)					
Antimony 7440360	0.029	< 0.028	0.044		
Arsenic 7440382	0.22	0.0025	< 0.002	1.39	< 0.003 J
Barium 7440393	< 0.056	< 0.056	< 0.056	0.0378	0.021
Calcium 7440702	NA	NA	NA	NA	NA
Chromium 18540299	< 0.011	< 0.011	< 0.011	0.033	0.0059
Iron 15438310	0.73	1.4	0.42		
Lead 7439921	< 0.003	< 0.003	< 0.003	0.0018	0.0013
Magnesium 7439954	NA	NA	NA	NA	NA
Manganese 7439965	0.14	0.27	0.19		
Mercury 7439976	0.0002	< 0.0002	< 0.0002	< 0.00003	< 0.00003
Selenium 7782492	0.0034	< 0.0033	< 0.0033	< 0.0014	< 0.0014
Silver 7440224	< 0.011	< 0.011	< 0.011	< 0.0007	< 0.0007
Thallium 7440280	< 0.0022	0.0025	< 0.0022		
Zinc 7440666	< 0.022	0.16	0.032		
Water Quality Parameter (mg/L)					
Solids, Total Dissolved (TDS)	NA	NA	NA	NA	NA

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-2T Nov-96 Investigation Tan	MW-3T Nov-96 Investigation Tan	MW-4T Nov-96 Investigation Tan	MW-5T Nov-96 Investigation Tan	MW-5AT Nov-96 Investigation Tan
Total Metals (mg/L)					
Antimony 7440360					
Arsenic 7440382	0.0658	< 0.0025 J	< 0.0028 J	< 0.0025 J	< 0.0025 J
Barium 7440393	0.1	0.0627	0.0993	0.0303	0.112
Calcium 7440702	NA	NA	NA	NA	NA
Chromium 18540299	0.0139	0.0504	0.0024	0.02	0.0054
Iron 15438310					
Lead 7439921	< 0.001	0.0016	< 0.001	0.0011	< 0.001
Magnesium 7439954	NA	NA	NA	NA	NA
Manganese 7439965					
Mercury 7439976	< 0.00005	0.00004	< 0.00004	< 0.00003	< 0.00003
Selenium 7782492	0.0019	< 0.0014	< 0.0014	< 0.0023	< 0.0042
Silver 7440224	< 0.0007	< 0.0007	< 0.0007	0.0007	< 0.0007
Thallium 7440280					
Zinc 7440666					
Water Quality Parameter (mg/L)					
Solids, Total Dissolved (TDS)	NA	NA	NA	NA	NA

Table 22

Summary of Groundwater Data (Continued)

Sample Name Date Sample Type Site CAS No.	MW-6T Nov-96 Investigation Tan	MW-7T Nov-96 Investigation Background	MW-7AT Nov-96 Investigation Background	MW-8T Nov-96 Investigation Tan	MW-9T Nov-96 Investigation Tan
Total Metals (mg/L)					
Antimony 7440360					
Arsenic 7440382	< 0.0025 J	< 0.0025 J	< 0.0025 J	0.513	0.0487
Barium 7440393	0.0446	0.0545	0.209	0.035	0.11
Calcium 7440702	NA	NA	NA	NA	NA
Chromium 18540299	0.0044	0.0015	0.0019	0.0242	0.006
Iron 15438310					
Lead 7439921	< 0.001	< 0.001	0.0016	< 0.001	< 0.001
Magnesium 7439954	NA	NA	NA	NA	NA
Manganese 7439965					
Mercury 7439976	< 0.00005	< 0.00003	< 0.00003	< 0.00004	< 0.00004
Selenium 7782492	< 0.0014	< 0.0018	< 0.0014	< 0.0014	< 0.0014
Silver 7440224	< 0.0007	< 0.0007	< 0.0007	< 0.0007	< 0.0007
Thallium 7440280					
Zinc 7440666					
Water Quality Parameter (mg/L)					
Solids, Total Dissolved (TDS)	NA	NA	NA	NA	NA

Table 22 **Summary of Groundwater Data (Continued)**

Sample Name / Date / Sample Type / Site / CAS No.	MW-10T Nov-96 Investigation Tan	MW-11T Nov-96 Investigation Tan	MW-12T Nov-96 Investigation Tan	MW-13T Nov-96 Investigation Tan	MW-14D Investigation Tan	MW-14T Investigation Tan
Total Metals (mg/L)						
Antimony 7440360						
Arsenic 7440382	0.278	1.28	< 0.0025 J	< 0.0025 J	0.25	0.34
Barium 7440393	0.0574	0.0293	0.0261	0.0122	0.22	0.13
Calcium 7440702	NA	NA	NA	NA	NA	NA
Chromium 18540299	0.0028	0.0041	< 0.0006	0.00067		
Iron 15438310					1.4	1.4
Lead 7439921	< 0.001	< 0.001	0.0016	< 0.001		
Magnesium 7439954	NA	NA	NA	NA	NA	NA
Manganese 7439965					0.31	0.33
Mercury 7439976	< 0.00003	< 0.00003	< 0.00003	< 0.00003		
Selenium 7782492	< 0.0024	< 0.0031	< 0.0055	< 0.0017		
Silver 7440224	< 0.0007	< 0.0007	< 0.0007	< 0.0007		
Thallium 7440280						
Zinc 7440666					0.12	0.081
Water Quality Parameter (mg/L)						
Solids, Total Dissolved (TDS)	NA	NA	NA	NA	NA	NA

SEVERN
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STL Chicago
2417 Bond Street
University Park, IL 60466

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June 5, 2002

Mr. David Meiri
The RETEC Group, Inc.
8605 W. Bryn Mawr Ave., Suite 301
Chicago, IL 60631

RE: ComEd - Waukegan
Revised Metals Data
Job# 209723

Dear Mr. Meiri:

The enclosed revised metals data is for the project and job number listed above. As requested, Antimony has been added.

These analyses were performed to meet the requirements for the IEPA SRP Rev. 2 - IIIB. If you have any questions, please contact me at 708-534-5200.

Sincerely,

Severn Trent Laboratories

Eric A. Lang
Project Manager

sj

Enclosure

SEVERN TRENT SERVICES

STL Chicago

SEVERN TRENT LABORATORIES
ANALYTICAL REPORT

JOB NUMBER: 209723

Prepared For:

The RETEC Group Inc.
8605 W. Bryn Mawr Ave
Suite 301
Chicago, IL 60631

Project: ComEd - Waukegan

Attention: David Meiri

Date: 06/05/2002

Signature

Name: Eric A. Lang

Title: Project Manager

E-Mail: elang@stl-inc.com

6/5/02

Date

STL Chicago
2417 Bond Street
University Park, IL 60466

PHONE: (708) 534-5200
FAX..: (708) 534-5211

STL Chicago is part of Severn Trent Laboratories, Inc.

Severn Trent Laboratories - Chicago
METALS CASE NARRATIVE

Client: The RETEC Group Inc. Date Rec'd: 05/15/02
Project ID: COMBD - Waukegan
STL#: 209723

1. This narrative covers the metals analysis for samples received in the above Job # 209723.

   Method Refs: USEPA,SW-846

2. All analyses were performed within the required holding times.

3. All Initial and Continuing Calibration Verification (ICV/CCV's) were within control limits.

4. All Initial and Continuing Calibration Blanks (ICB/CCB's) were within control limits.

5. All Preparation/Method Blanks were below Reporting Limits (RL) except for Calcium. Calcium in the samples were greater than 10X the blank concentration. Therefore, reanalysis was not performed.

6. All ICP Interference Check Samples (ICSA and ICSAB) were within control limits.

7. Laboratory Control Sample (LCS) recoveries were within the 80-120% control limits.

8. Matrix was performed on samples 19 & 21..

   All Serial dilution analysis were within control limits..

   All Matrix spike (MS/MSD) recoveries were within the 75-125% control limits (control limits are not applicable when the sample concentration exceed the spike added concentration by a factor of 4 or more).

   All Duplicate results were within the 20% Relative Percent Difference (RPD) control limits for sample concentration greater than 5X the CRDL or +\- the CRDL for sample concentration less than 5X the RL.

Mani S.Iyer
Metals Section Manager

5/23/02
Date

SEVERN TRENT SERVICES

STL Chicago

SAMPLE INFORMATION
Date: 06/05/2002

Job Number.: 209723
Customer...: The RETEC Group Inc.
Attn.....: Jing Shen Gabriel

Project Number.....: 20002196
Customer Project ID....: COMED - WAUKEGAN
Project Description....: ComEd - Waukegan

Laboratory Sample ID	Customer Sample ID	Sample Matrix	Date Sampled	Time Sampled	Date Received	Time Received
209723-1	MW-14-050902	Water	05/09/2002	12:55	05/15/2002	11:30
209723-2	MW-10-050902	Water	05/09/2002	12:15	05/15/2002	11:30
209723-3	MW-11-050902	Water	05/09/2002	13:45	05/15/2002	11:30
209723-4	MW-12-050902	Water	05/09/2002	11:20	05/15/2002	11:30
209723-5	MW-13-050902	Water	05/09/2002	10:30	05/15/2002	11:30
209723-6	MW-4-051002	Water	05/10/2002	09:00	05/15/2002	11:30
209723-7	MW-101-051002	Water	05/10/2002	12:00	05/15/2002	11:30
209723-8	MW-GB2-051002	Water	05/10/2002	10:10	05/15/2002	11:30
209723-9	MW-GB5-051002	Water	05/10/2002	11:30	05/15/2002	11:30
209723-10	MW-6-051002	Water	05/10/2002	12:30	05/15/2002	11:30
209723-11	MW-102-051002	Water	05/10/2002	12:00	05/15/2002	11:30
209723-12	MW-9-051002	Water	05/10/2002	15:30	05/15/2002	11:30
209723-13	MW-5-051302	Water	05/13/2002	10:10	05/15/2002	11:30
209723-14	MW-5A-051302	Water	05/13/2002	09:20	05/15/2002	11:30
209723-15	MW-3-051302	Water	05/13/2002	13:40	05/15/2002	11:30
209723-16	MW-1-051302	Water	05/13/2002	16:35	05/15/2002	11:30
209723-17	MW-1A-051302	Water	05/13/2002	17:35	05/15/2002	11:30
209723-18	MW-2-051302	Water	05/13/2002	15:45	05/15/2002	11:30
209723-19	MW-7-051402	Water	05/14/2002	10:35	05/15/2002	11:30
209723-20	MW-7A-051402	Water	05/14/2002	09:30	05/15/2002	11:30
209723-21	MW-8-051302	Water	05/13/2002	14:45	05/15/2002	11:30

MWG13-15_46429

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723 Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-14-050902
Date Sampled.....: 05/09/2002
Time Sampled.....: 12:55
Sample Matrix.....: Water

Laboratory Sample ID: 209723-1
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	OT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	870			4.9	10	1	mg/L	52290		05/16/02 1223	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53699		06/05/02 1027	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.39			0.0052	0.010	1	mg/L	52302		05/17/02 1546	lmr
	Calcium	160		H	0.024	0.10	1	mg/L	52302		05/17/02 1546	lmr
	Iron	2.1			0.040	0.050	1	mg/L	52302		05/17/02 1546	lmr
	Magnesium	58			0.012	0.10	1	mg/L	52302		05/17/02 1546	lmr
	Manganese	0.15			0.00071	0.010	1	mg/L	52302		05/17/02 1546	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-10-050902
Date Sampled.....: 05/09/2002
Time Sampled.....: 12:15
Sample Matrix.....: Water

Laboratory Sample ID: 209723-2
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	560			4.9	10	1	mg/L	52290		05/16/02 1227	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2019	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.45			0.0052	0.010	1	mg/L	52302		05/17/02 1552	lmr
	Calcium	110		H	0.024	0.10	1	mg/L	52302		05/17/02 1552	lmr
	Iron	5.3			0.040	0.050	1	mg/L	52302		05/17/02 1552	lmr
	Magnesium	23			0.012	0.10	1	mg/L	52302		05/17/02 1552	lmr
	Manganese	0.18			0.00071	0.010	1	mg/L	52302		05/17/02 1552	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-11-050902
Date Sampled.....: 05/09/2002
Time Sampled.....: 13:45
Sample Matrix.....: Water

Laboratory Sample ID: 209723-3
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1100			4.9	10	1	mg/L	52290		05/16/02 1231	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53533		06/03/02 1309	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.73			0.0052	0.010	1	mg/L	52302		05/17/02 1559	lmr
	Calcium	210		H	0.024	0.10	1	mg/L	52302		05/17/02 1559	lmr
	Iron	2.4			0.040	0.050	1	mg/L	52302		05/17/02 1559	lmr
	Magnesium	63			0.012	0.10	1	mg/L	52302		05/17/02 1559	lmr
	Manganese	0.43			0.00071	0.010	1	mg/L	52302		05/17/02 1559	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-12-050902
Date Sampled.....: 05/09/2002
Time Sampled.....: 11:20
Sample Matrix.....: Water

Laboratory Sample ID: 209723-4
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1600			4.9	10	1	mg/L	52290		05/16/02 1235	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2056	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.023			0.0052	0.010	1	mg/L	52302		05/17/02 1605	lmr
	Calcium	330		H	0.024	0.10	1	mg/L	52302		05/17/02 1605	lmr
	Iron	4.6			0.040	0.050	1	mg/L	52302		05/17/02 1605	lmr
	Magnesium	17			0.012	0.10	1	mg/L	52302		05/17/02 1605	lmr
	Manganese	0.26			0.00071	0.010	1	mg/L	52302		05/17/02 1605	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

Job Number: 209723

LABORATORY TEST RESULTS

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-13-050902
Date Sampled.....: 05/09/2002
Time Sampled.....: 10:30
Sample Matrix.....: Water

Laboratory Sample ID: 209723-5
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	200			4.9	10	1	mg/L	52290		05/16/02 1239	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53533		06/03/02 1322	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1611	lmr
	Calcium	55		H	0.024	0.10	1	mg/L	52302		05/17/02 1611	lmr
	Iron	0.083			0.040	0.050	1	mg/L	52302		05/17/02 1611	lmr
	Magnesium	3.7			0.012	0.10	1	mg/L	52302		05/17/02 1611	lmr
	Manganese	0.013			0.00071	0.010	1	mg/L	52302		05/17/02 1611	lmr

* In Description = Dry Wgt.

MWG13-15_46434

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: CONCO - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-4-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 09:00
Sample Matrix.....: Water

Laboratory Sample ID: 209723-6
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	900			4.9	10	1	mg/L	52290		05/16/02 1243	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2121	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1617	lmr
	Calcium	140		H	0.024	0.10	1	mg/L	52302		05/17/02 1617	lmr
	Iron	4.7			0.040	0.050	1	mg/L	52302		05/17/02 1617	lmr
	Magnesium	30			0.012	0.10	1	mg/L	52302		05/17/02 1617	lmr
	Manganese	0.43			0.00071	0.010	1	mg/L	52302		05/17/02 1617	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-101-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 12:00
Sample Matrix.....: Water

Laboratory Sample ID: 209723-7
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	860			4.9	10	1	mg/L	52290		05/16/02 1247	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2146	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1623	lmr
	Calcium	140		K	0.024	0.10	1	mg/L	52302		05/17/02 1623	lmr
	Iron	5.3			0.040	0.050	1	mg/L	52302		05/17/02 1623	lmr
	Magnesium	30			0.012	0.10	1	mg/L	52302		05/17/02 1623	lmr
	Manganese	0.44			0.00071	0.010	1	mg/L	52302		05/17/02 1623	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-GB2-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 10:10
Sample Matrix.....: Water

Laboratory Sample ID: 209723-8
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	570			4.9	10	1	mg/L	52290		05/16/02 1251	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2158	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1630	lmr
	Calcium	92		H	0.024	0.10	1	mg/L	52302		05/17/02 1630	lmr
	Iron	2.4			0.040	0.050	1	mg/L	52302		05/17/02 1630	lmr
	Magnesium	37			0.012	0.10	1	mg/L	52302		05/17/02 1630	lmr
	Manganese	0.26			0.00071	0.010	1	mg/L	52302		05/17/02 1630	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-GB5-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 11:30
Sample Matrix.....: Water

Laboratory Sample ID: 209723-9
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	640			4.9	10	1	mg/L	52290		05/16/02 1255	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2235	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.0085	B		0.0052	0.010	1	mg/L	52302		05/17/02 1650	lmr
	Calcium	110		H	0.024	0.10	1	mg/L	52302		05/17/02 1650	lmr
	Iron	2.5			0.040	0.050	1	mg/L	52302		05/17/02 1650	lmr
	Magnesium	32			0.012	0.10	1	mg/L	52302		05/17/02 1650	lmr
	Manganese	0.29			0.00071	0.010	1	mg/L	52302		05/17/02 1650	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-6-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 12:30
Sample Matrix.....: Water

Laboratory Sample ID: 209723-10
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1500			4.9	10	1	mg/L	52290		05/16/02 1259	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2248	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1657	lmr
	Calcium	240		H	0.024	0.10	1	mg/L	52302		05/17/02 1657	lmr
	Iron	0.050	U		0.040	0.050	1	mg/L	52302		05/17/02 1657	lmr
	Magnesium	42			0.012	0.10	1	mg/L	52302		05/17/02 1657	lmr
	Manganese	1.0			0.00071	0.010	1	mg/L	52302		05/17/02 1657	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

Job Number: 209723

LABORATORY TEST RESULTS

Date:06/05/2002

CUSTOMER: The RETEC Group Inc PROJECT: COMED - WAUKEGAN ATTN: Jing-Shen Gabriel

Customer Sample ID: MW-102-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 12:00
Sample Matrix.....: Water

Laboratory Sample ID: 209723-11
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1100			4.9	10	1	mg/L	52290		05/16/02 1303	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2312	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1703	lmr
	Calcium	230		H	0.024	0.10	1	mg/L	52302		05/17/02 1703	lmr
	Iron	0.050	U		0.040	0.050	1	mg/L	52302		05/17/02 1703	lmr
	Magnesium	40			0.012	0.10	1	mg/L	52302		05/17/02 1703	lmr
	Manganese	0.98			0.00071	0.010	1	mg/L	52302		05/17/02 1703	lmr

* In Description = Dry Wgt.

MWG13-15_46440

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-9-051002
Date Sampled.....: 05/10/2002
Time Sampled.....: 15:30
Sample Matrix.....: Water

Laboratory Sample ID: 209723-12
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL *	RL *	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1500			4.9	10	1	mg/L	52290		05/16/02 1307	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2337	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.014			0.0052	0.010	1	mg/L	52302		05/17/02 1709	lmr
	Calcium	170		H	0.024	0.10	1	mg/L	52302		05/17/02 1709	lmr
	Iron	3.4			0.040	0.050	1	mg/L	52302		05/17/02 1709	lmr
	Magnesium	39			0.012	0.10	1	mg/L	52302		05/17/02 1709	lmr
	Manganese	0.58			0.00071	0.010	1	mg/L	52302		05/17/02 1709	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COKED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-5-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 10:10
Sample Matrix.....: Water

Laboratory Sample ID: 209723-13
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1200			4.9	10	1	mg/L	52290		05/16/02 1310	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/02/02 2349	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1715	lmr
	Calcium	300		H	0.024	0.10	1	mg/L	52302		05/17/02 1715	lmr
	Iron	9.9			0.040	0.050	1	mg/L	52302		05/17/02 1715	lmr
	Magnesium	49			0.012	0.10	1	mg/L	52302		05/17/02 1715	lmr
	Manganese	0.84			0.00071	0.010	1	mg/L	52302		05/17/02 1715	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-5A-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 09:20
Sample Matrix.....: Water

Laboratory Sample ID: 209723-14
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	PQL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1700			4.9	10	1	mg/L	52290		05/16/02 1314	jmk
7041	Antimony (GFAA)											
	Antimony	0.0036			0.0025	0.0030	1	mg/L	53484		06/03/02 0002	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1721	lmr
	Calcium	210		H	0.024	0.10	1	mg/L	52302		05/17/02 1721	lmr
	Iron	1.4			0.040	0.050	1	mg/L	52302		05/17/02 1721	lmr
	Magnesium	100			0.012	0.10	1	mg/L	52302		05/17/02 1721	lmr
	Manganese	0.55			0.00071	0.010	1	mg/L	52302		05/17/02 1721	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-3-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 13:40
Sample Matrix.....: Water

Laboratory Sample ID: 209723-15
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1500			4.9	10	1	mg/L	52290		05/16/02 1318	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/03/02 0026	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1728	lmr
	Calcium	240		H	0.024	0.10	1	mg/L	52302		05/17/02 1728	lmr
	Iron	2.0			0.040	0.050	1	mg/L	52302		05/17/02 1728	lmr
	Magnesium	82			0.012	0.10	1	mg/L	52302		05/17/02 1728	lmr
	Manganese	0.29			0.00071	0.010	1	mg/L	52302		05/17/02 1728	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-1-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 16:35
Sample Matrix.....: Water

Laboratory Sample ID: 209723-16
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1600			4.9	10	1	mg/L	52290		05/16/02 1322	jmk
7041	Antimony (GFAA)											
	Antimony	0.0061			0.0025	0.0030	1	mg/L	53484		06/03/02 0038	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.93			0.0052	0.010	1	mg/L	52302		05/17/02 1734	lmr
	Calcium	310		H	0.024	0.10	1	mg/L	52302		05/17/02 1734	lmr
	Iron	0.050	U		0.040	0.050	1	mg/L	52302		05/17/02 1734	lmr
	Magnesium	77			0.012	0.10	1	mg/L	52302		05/17/02 1734	lmr
	Manganese	0.080			0.00071	0.010	1	mg/L	52302		05/17/02 1734	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-1A-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 17:35
Sample Matrix.....: Water

Laboratory Sample ID: 209723-17
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1000			4.9	10	1	mg/L	52470		05/20/02 1433	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/03/02 0051	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1740	lmr
	Calcium	230		H	0.024	0.10	1	mg/L	52302		05/17/02 1740	lmr
	Iron	0.25	U		0.20	0.25	5	mg/L	52429		05/20/02 1418	lmr
	Magnesium	46			0.012	0.10	1	mg/L	52302		05/17/02 1740	lmr
	Manganese	0.38			0.00071	0.010	1	mg/L	52302		05/17/02 1740	lmr

* In Description = Dry Wgt.

MWG13-15_46446

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen-Gabriel

Customer Sample ID: MW-2-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 15:45
Sample Matrix.....: Water

Laboratory Sample ID: 209723-18
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1500			4.9	10	1	mg/L	52470		05/20/02 1436	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53484		06/03/02 0103	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.025			0.0052	0.010	1	mg/L	52302		05/17/02 1746	lmr
	Calcium	310		H	0.024	0.10	1	mg/L	52302		05/17/02 1746	lmr
	Iron	1.2			0.040	0.050	1	mg/L	52302		05/17/02 1746	lmr
	Magnesium	78			0.012	0.10	1	mg/L	52302		05/17/02 1746	lmr
	Manganese	0.47			0.00071	0.010	1	mg/L	52302		05/17/02 1746	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-7-051402
Date Sampled.....: 05/14/2002
Time Sampled.....: 10:35
Sample Matrix.....: Water

Laboratory Sample ID: 209723-19
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	2000			4.9	10	1	mg/L	52470		05/20/02 1439	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53533		06/03/02 1334	daj
6010B	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1807	lmr
	Calcium	440		H	0.024	0.10	1	mg/L	52302		05/17/02 1807	lmr
	Iron	0.51			0.040	0.050	1	mg/L	52302		05/17/02 1807	lmr
	Magnesium	29			0.012	0.10	1	mg/L	52302		05/17/02 1807	lmr
	Manganese	0.44			0.00071	0.010	1	mg/L	52302		05/17/02 1807	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-7A-051402
Date Sampled.....: 05/14/2002
Time Sampled.....: 09:30
Sample Matrix.....: Water

Laboratory Sample ID: 209723-20
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	QT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1100			4.9	10	1	mg/L	52470		05/20/02 1442	jmk
7041	Antimony (GFAA)											
	Antimony	0.0030	U		0.0025	0.0030	1	mg/L	53533		06/03/02 1442	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.010	U		0.0052	0.010	1	mg/L	52302		05/17/02 1838	lmr
	Calcium	140		H	0.024	0.10	1	mg/L	52302		05/17/02 1838	lmr
	Iron	4.7			0.040	0.050	1	mg/L	52302		05/17/02 1838	lmr
	Magnesium	46			0.012	0.10	1	mg/L	52302		05/17/02 1838	lmr
	Manganese	0.67			0.00071	0.010	1	mg/L	52302		05/17/02 1838	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

LABORATORY TEST RESULTS

Job Number: 209723

Date:06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Customer Sample ID: MW-8-051302
Date Sampled.....: 05/13/2002
Time Sampled.....: 14:45
Sample Matrix.....: Water

Laboratory Sample ID: 209723-21
Date Received.....: 05/15/2002
Time Received.....: 11:30

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
160.1	Solids, Total Dissolved (TDS)											
	Solids, Total Dissolved (TDS)	1100			4.9	10	1	mg/L	52470		05/20/02 1444	jmk
7041	Antimony (GFAA)											
	Antimony	0.0035			0.0025	0.0030	1	mg/L	53484		06/03/02 0259	daj
60108	Metals Analysis (ICAP Trace)											
	Arsenic	0.95			0.0052	0.010	1	mg/L	52302		05/17/02 1401	lmr
	Calcium	180		H	0.024	0.10	1	mg/L	52302		05/17/02 1401	lmr
	Iron	2.4			0.040	0.050	1	mg/L	52302		05/17/02 1401	lmr
	Magnesium	70			0.012	0.10	1	mg/L	52302		05/17/02 1401	lmr
	Manganese	0.13			0.00071	0.010	1	mg/L	52302		05/17/02 1401	lmr

* In Description = Dry Wgt.

SEVERN TRENT SERVICES

STL Chicago

LABORATORY CHRONICLE

Job Number: 209723

Date: 06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: CONED - VAUKEGAN ATTN: Jing Shen Gabriel

Lab ID: 209723-1 Client ID: MW-14-050902

Date Recvd: 05/15/2002 Sample Date: 05/09/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
3020A(M)	Acid Digestion with H2O2 (GFAA)	2	53634		06/04/2002 1830	
7041	Antimony (GFAA)	1	53699	53634	06/05/2002 1027	
EDD	Electronic Data Deliverable	1	52786			
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1546	
PKG MET	PKG MET (METALS)	1				
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1223	

Lab ID: 209723-2 Client ID: MW-10-050902

Date Recvd: 05/15/2002 Sample Date: 05/09/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2019	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1552	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1227	

Lab ID: 209723-3 Client ID: MW-11-050902

Date Recvd: 05/15/2002 Sample Date: 05/09/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53533	53292	06/03/2002 1309	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1559	
.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1231	

Lab ID: 209723-4 Client ID: MW-12-050902

Date Recvd: 05/15/2002 Sample Date: 05/09/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2056	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1605	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1235	

Lab ID: 209723-5 Client ID: MW-13-050902

Date Recvd: 05/15/2002 Sample Date: 05/09/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53533	53292	06/03/2002 1322	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1611	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1239	

Lab ID: 209723-6 Client ID: MW-4-051002

Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2121	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1617	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1243	

Lab ID: 209723-7 Client ID: MW-101-051002

Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2146	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1623	

SEVERN TRENT SERVICES

STL Chicago

LABORATORY CHRONICLE

Job Number: 209723 Date: 06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - VAUKEGAN ATTN: Jing Shen Gabrfel

Lab ID: 209723-7 Client ID: MW-101-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1247	

Lab ID: 209723-8 Client ID: MW-GB2-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2158	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1630	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1251	

Lab ID: 209723-9 Client ID: MW-GB5-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2235	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1650	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1255	

Lab ID: 209723-10 Client ID: MW-6-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2248	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1657	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1259	

Lab ID: 209723-11 Client ID: MW-102-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2312	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1703	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1303	

Lab ID: 209723-12 Client ID: MW-9-051002 — Date Recvd: 05/15/2002 Sample Date: 05/10/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2337	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1709	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1307	

Lab ID: 209723-13 Client ID: MW-5-051302 — Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/02/2002 2349	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1715	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1310	

Lab ID: 209723-14 Client ID: MW-5A-051302 — Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0002	

SEVERN TRENT SERVICES

STL Chicago

LABORATORY CHRONICLE

Job Number: 209723 Date: 06/05/2002

CUSTOMER: The RETEC Group Inc PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabriel

Lab ID: 209723-14 Client ID: MW-5A-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1721	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1314	

Lab ID: 209723-15 Client ID: MW-3-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0026	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1728	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1318	

Lab ID: 209723-16 Client ID: MW-1-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0038	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1734	
160.1	Solids, Total Dissolved (TDS)	1	52290	52290	05/16/2002 1322	

Lab ID: 209723-17 Client ID: MW-1A-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0051	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1740	
6010B	Metals Analysis (ICAP Trace)	1	52429	52083	05/20/2002 1418	5
160.1	Solids, Total Dissolved (TDS)	1	52470	52470	05/20/2002 1433	

Lab ID: 209723-18 Client ID: MW-2-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0103	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1746	
160.1	Solids, Total Dissolved (TDS)	1	52470	52470	05/20/2002 1436	

Lab ID: 209723-19 Client ID: MW-7-051402
Date Recvd: 05/15/2002 Sample Date: 05/14/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53533	53292	06/03/2002 1334	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1807	
160.1	Solids, Total Dissolved (TDS)	1	52470	52470	05/20/2002 1439	

Lab ID: 209723-20 Client ID: MW-7A-051402
Date Recvd: 05/15/2002 Sample Date: 05/14/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52083		05/16/2002 0930	
3020A(M)	Acid Digestion with H2O2 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53533	53292	06/03/2002 1442	
6010B	Metals Analysis (ICAP Trace)	1	52302	52083	05/17/2002 1838	
160.1	Solids, Total Dissolved (TDS)	1	52470	52470	05/20/2002 1442	

Lab ID: 209723-21 Client ID: MW-8-051302
Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3010A	Acid Digestion (ICAP)	1	52084		05/16/2002 0930	

SEVERN TRENT SERVICES

STL Chicago

LABORATORY CHRONICLE

Job Number: 209723

Date: 06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: FCNED - WAUKEGAN ATTN: Jing Shen Gabriel

Lab ID: 209723-21 Client ID: MW-8-051302 Date Recvd: 05/15/2002 Sample Date: 05/13/2002

METHOD	DESCRIPTION	RUN#	BATCH#	PREP BT #(S)	DATE/TIME ANALYZED	DILUTION
3020A(M)	Acid Digestion with H202 (GFAA)	1	53292		05/30/2002 1720	
7041	Antimony (GFAA)	1	53484	53292	06/03/2002 0259	
6010B	Metals Analysis (ICAP Trace)	1	52302	52084	05/17/2002 1401	
160.1	Solids, Total Dissolved (TDS)	1	52470	52470	05/20/2002 1444	

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723 — Report Date.: 06/05/2002

CUSTOMER: The RETEC Group Inc. — PROJECT: COMED # WAUKEGAN — ATTN: Jing Shen Gabriel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B — Equipment Code....: ICP4 — Analyst...: lmr
Method Description.: Metals Analysis (ICAP Trace) — Batch.....: 52302

LCS	Laboratory Control Sample	H02BSPK001	52084		05/17/2002	1355

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.09382		0.10000	0.00520 U	94	%	80-120	
Calcium	mg/L	9.80366		10.00000	0.12164	98	%	80-120	
Iron	mg/L	0.93480		1.00000	0.03960 U	93	%	80-120	
Magnesium	mg/L	9.76219		10.00000	0.01240 U	98	%	80-120	
Manganese	mg/L	0.49343		0.50000	0.00071 U	99	%	80-120	

LCS	Laboratory Control Sample	H02BSPK001	52083		05/17/2002	1540

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.09233		0.10000	0.00520 U	92	%	80-120	
Calcium	mg/L	9.57914		10.00000	0.10943	96	%	80-120	
Iron	mg/L	0.95683		1.00000	0.03960 U	96	%	80-120	
Magnesium	mg/L	9.53843		10.00000	0.01240 U	95	%	80-120	
Manganese	mg/L	0.48181		0.50000	0.00071 U	96	%	80-120	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723

Report Date.: 06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shen Gabrfel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B
Method Description.: Metals Analysis (ICAP Trace)

Equipment Code....: ICP4
Batch.....: 52302

Analyst...: lmr

MB	Method Blank	52084	52084		05/17/2002	1348

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.00520 U							
Calcium	mg/L	0.12164							H
Iron	mg/L	0.03960 U							
Magnesium	mg/L	0.01240 U							
Manganese	mg/L	0.00071 U							

MB	Method Blank	52083	52083		05/17/2002	1534

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.00520 U							
Calcium	mg/L	0.10943							
Iron	mg/L	0.03960 U							
Magnesium	mg/L	0.01240 U							
Manganese	mg/L	0.00071 U							

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723

Report Date.: 06/05/2002

CUSTOMER: The RETEC Group,Inc. PROJECT: COMED - WAUKEGAN ATTN: Ufoq Shen Gabriel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B
Method Description.: Metals Analysis (ICAP Trace)
Equipment Code....: ICP4
Batch.....: 52302
Analyst...: lmr

MD | Method Duplicate | 209723-21 | 05/17/2002 1422

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.93588			0.95337	1.9	R	20.0	
Calcium	mg/L	180.66220			182.50579	1.0	R	20.0	
Iron	mg/L	2.39463			2.43912	1.8	R	20.0	
Magnesium	mg/L	69.52227			70.03379	0.7	R	20.0	
Manganese	mg/L	0.12985			0.13114	1.0	R	20.0	

MD | Method Duplicate | 209723-19 | 05/17/2002 1813

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.00520 U			0.00520 U				
Calcium	mg/L	448.70983			441.28961	1.7	R	20.0	
Iron	mg/L	0.54135			0.50622	6.7	R	20.0	
[redacted]ium	mg/L	29.87940			29.31705	1.9	R	20.0	
[redacted]ese	mg/L	0.44895			0.44310	1.3	R	20.0	

 * %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723 — Report Date.: 06/05/2002

CUSTOMER: The RETEC Group Inc. — PROJECT: COMED - WAUKEGAN — ATTN: Jing Shen Gabriel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B — Equipment Code....: ICP4 — Analyst...: lmr
Method Description.: Metals Analysis (ICAP Trace) — Batch.....: 52302

MS	Matrix Spike	M02BSPK001	209723-21		05/17/2002 1428

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	1.03970		0.10000	0.95337	86	%	75-125	4
Calcium	mg/L	191.09469		10.00000	182.50579	86	%	75-125	4
Iron	mg/L	3.35241		1.00000	2.43912	91	%	75-125	
Magnesium	mg/L	79.22657		10.00000	70.03379	92	%	75-125	4
Manganese	mg/L	0.61831		0.50000	0.13114	97	%	75-125	

MS	Matrix Spike	M02BSPK001	209723-19		05/17/2002 1819

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.09717		0.10000	0.00520 U	97	%	75-125	
Calcium	mg/L	455.86425		10.00000	441.28961	146	%	75-125	4
Iron	mg/L	1.42854		1.00000	0.50622	92	%	75-125	
Magnesium	mg/L	39.31974		10.00000	29.31705	100	%	75-125	
Manganese	mg/L	0.93478		0.50000	0.44310	98	%	75-125	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723 — Report Date.: 06/05/2002

CUSTOMER: The RETEC Group, Inc. — PROJECT: COMED - WAUKEGAN — ATTN: Jing Shen Gabriel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B
Method Description.: Metals Analysis (ICAP Trace)
Equipment Code....: ICP4
Batch.....: 52302
Analyst...: lmr

MSD	Matrix Spike Duplicate	M02BSPK001	209723-21		05/17/2002	1434

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	1.03410	1.03970	0.10000	0.95337	81	%	75-125	4
						6.0	R	20	
Calcium	mg/L	188.82199	191.09469	10.00000	182.50579	63	%	75-125	4
						30.9	R	20	*
Iron	mg/L	3.32933	3.35241	1.00000	2.43912	89	%	75-125	
						2.2	R	20	
Magnesium	mg/L	78.75788	79.22657	10.00000	70.03379	87	%	75-125	4
						5.6	R	20	
Manganese	mg/L	0.61804	0.61831	0.50000	0.13114	97	%	75-125	
						0.0	R	20	

MSD	Matrix Spike Duplicate	M02BSPK001	209723-19		05/17/2002	1826

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.10019	0.09717	0.10000	0.00520 U	100	%	75-125	
						3.0	R	20	
Calcium	mg/L	456.18167	455.86425	10.00000	441.28961	149	%	75-125	4
						2.0	R	20	
Iron	mg/L	1.45919	1.42854	1.00000	0.50622	95	%	75-125	
						3.2	R	20	
Magnesium	mg/L	39.66265	39.31974	10.00000	29.31705	103	%	75-125	
						3.0	R	20	
Manganese	mg/L	0.94164	0.93478	0.50000	0.44310	100	%	75-125	
						2.0	R	20	

* %=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723 — Report Date.: 06/05/2002

CUSTOMER: the RETEC Group Inc. — PROJECT: COMED : WAUKEGAN — ATTN: Jing Shen Gabriel

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time

Test Method.....: 6010B — Equipment Code....: ICP4 — Analyst...: lmr
Method Description.: Metals Analysis (ICAP Trace) — Batch.....: 52302

SD | Serial Dilution | 209723-21 | 05/17/2002 1440

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.18648			0.95337	2.2	D	10.0	
Calcium	mg/L	35.24085			182.50579	3.5	D	10.0	
Iron	mg/L	0.46822			2.43912	4.0	D	10.0	
Magnesium	mg/L	13.80694			70.03379	1.4	D	10.0	
Manganese	mg/L	0.02573			0.13114	1.9	D	10.0	

SD | Serial Dilution | 209723-19 | 05/17/2002 1832

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	*	Limits	F
Arsenic	mg/L	0.00520 U			0.00520 U				
Calcium	mg/L	86.66983			441.28961	1.8	D	10.0	
Iron	mg/L	0.09265			0.50622				
Magnesium	mg/L	6.05761			29.31705	3.3	D	10.0	
Manganese	mg/L	0.08930			0.44310	0.8	D	10.0	

 * X=% REC, R=RPD, A=ABS Diff., D=% Diff.

SEVERN TRENT SERVICES

STL Chicago

QUALITY CONTROL RESULTS

Job Number.: 209723 Report Date.: 06/05/2002

CUSTOMER: The RETEC Group Inc. PROJECT: COMED - WAUKEGAN ATTN: Jing Shan Gabriel

Test Method.....: 160.1 Batch.....: 52290 Analyst...: jmk
Method Description.: Solids, Total Dissolved (TDS) Equipment Code....: Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS)

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
MB	52290		mg/L	4.90000 U								05/16/2002	1200
LCS	52290	I01KSTTS1B	mg/L	242.00000		250.00000	4.90000 U	97		%	80-120	05/16/2002	1204
MD	209723-16		mg/L	1636.00000			1628.00000	0.5		R	20.0	05/16/2002	1326
MS	209723-16	I01KSTTS1B	mg/L	1876.00000		250.00000	1628.00000	99	4	%	75-125	05/16/2002	1330

Test Method.....: 160.1 Batch.....: 52470 Analyst...: jmk
Method Description.: Solids, Total Dissolved (TDS) Equipment Code....: Test Code.: TDS
Parameter.....: Solids, Total Dissolved (TDS)

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
MB	52470		mg/L	4.90000 U								05/20/2002	1400
LCS	52470	I01KSTTS1B	mg/L	240.00000		250.00000		96		%	80-120	05/20/2002	1403
MD	209723-19		mg/L	1942.00000			1952.00000	0.5		R	20.0	05/20/2002	1447
MS	209723-19	I01KSTTS1B	mg/L	2246.00000		250.00000	1952.00000	118	4	%	75-125	05/20/2002	1450

Test Method.....: 7041 Batch.....: 53484 Analyst...: daj
Method Description.: Antimony (GFAA) Equipment Code....: AA8 Test Code.: SB
Parameter.....: Antimony

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
MB	53292	53292	mg/L	0.00250 U								06/02/2002	1601
LCS	53292	M02ESPK002	mg/L	0.05032		0.05000	0.00250 U	101		%	80-120	06/02/2002	1613

Test Method.....: 7041 Batch.....: 53533 Analyst...: daj
Method Description.: Antimony (GFAA) Equipment Code....: AA8 Test Code.: SB
Parameter.....: Antimony

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
MD	209723-19		mg/L	0.00250 U			0.00250 U					06/03/2002	1405
MS	209723-19	M02ESPK002	mg/L	0.05531		0.05000	0.00250 U	111		%	75-125	06/03/2002	1417
MSD	209723-19	M02ESPK002	mg/L	0.05655	0.05531	0.05000	0.00250 U	113		%	75-125	06/03/2002	1430
								1.8		R	20		

Test Method.....: 7041 Batch.....: 53699 Analyst...: daj
Method Description.: Antimony (GFAA) Equipment Code....: AA8 Test Code.: SB
Parameter.....: Antimony

QC	Lab ID	Reagent	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	F	*	Limits	Date	Time
LCS	53634	M02ESPK002	mg/L	0.05233		0.05000	0.00250 U	105		%	80-120	06/05/2002	1014
MS	209723-1	M02ESPK002	mg/L	0.05089		0.05000	0.00250 U	102		%	75-125	06/05/2002	1104
MSD	209723-1	M02ESPK002	mg/L	0.05590	0.05089	0.05000	0.00250 U	112		%	75-125	06/05/2002	1116
								9.3		R	20		
MB	53634	53634	mg/L	0.00250 U								06/05/2002	1144
MD	209723-1		mg/L	0.00250 U			0.00250 U					06/05/2002	1156

MWG13-15_46461

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 06/05/2002

REPORT COMMENTS

1) All pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.
2) Soil, sediment and sludge sample results are reported on a "dry weight" basis except when analyzed for landfill disposal or incineration parameters. All other solid matrix samples are reported on an "as received" basis unless noted differently.
3) Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.
4) The test results for the noted analytical method(s) meet the requirements of NELAC. Lab Cert. ID# 100201
5) Arizona Environmental Laboratory License number AZ0603.
6) According to 40CFR Part 136.3, pH, Chlorine Residual and Dissolved Oxygen analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. pH Field) they were not analyzed immediately, but as soon as possible on laboratory receipt.

Glossary of flags, qualifiers and abbreviations (any number of which may appear in the report)

Inorganic Qualifiers (Q-Column)

U	Analyte was not detected at or above the stated limit.
<	Not detected at or above the reporting limit.
J	Result is less than the RL, but greater than or equal to the method detection limit.
B	Result is less than the CRDL/RL, but greater than or equal to the IDL/MDL.
S	Result was determined by the Method of Standard Additions.
F	AFCEE: Result is less than the RL, but greater than or equal to the method detection limit.

Inorganic Flags (Flag Column)

'	ICV,CCV,ICB,CCB,ISA,ISB,CRI,CRA,MRL: Instrument related QC exceed the upper or lower control limits.
*	LCS, LCD, MD: Batch QC exceeds the upper or lower control limits.
+	MSA correlation coefficient is less than 0.995.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
E	SD: Serial dilution exceeds the control limits.
H	MB, EB1, EB2, EB3: Batch QC is greater than reporting limit or had a negative instrument reading lower than the absolute value of the reporting limit.
N	MS, MSD: Spike recovery exceeds the upper or lower control limits.
W	AS(GFAA) Post-digestion spike was outside 85-115% control limits.

Organic Qualifiers (Q - Column)

U	Analyte was not detected at or above the stated limit.
ND	Compound not detected.
J	Result is an estimated value below the reporting limit or a tentatively identified compound (TIC).
Q	Result was qualitatively confirmed, but not quantified.
C	Pesticide identification was confirmed by GC/MS.
Y	The chromatographic response resembles a typical fuel pattern.
Z	The chromatographic response does not resemble a typical fuel pattern.
E	Result exceeded calibration range, secondary dilution required.
F	AFCEE:Result is an estimated value below the reporting limit or a tentatively identified compound (TIC)

Organic Flags (Flags Column)

B	MB: Batch QC is greater than reporting limit.
*	LCS, LCD, ELC, ELD, CV, MS, MSD, Surrogate: Batch QC exceeds the upper or lower control limits.
'	EB1, EB2, EB3, MLE: Batch QC is greater than reporting Limit
A	Concentration exceeds the instrument calibration range
a	Concentration is below the method Reporting Limit (RL)
B	Compound was found in the blank and sample.
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution will be flagged with a D.
H	Alternate peak selection upon analytical review
I	Indicates the presence of an interfence, recovery is not calculated.
M	Manually integrated compound.

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 06/05/2002

P The lower of the two values is reported when the % difference between the results of two GC columns is greater than 25%.

Abbreviations

AS	Post Digestion Spike (GFAA Samples - See Note 1 below)
Batch	Designation given to identify a specific extraction, digestion, preparation set, or analysis set
CAP	Capillary Column CCB Continuing Calibration Blank
CCV	Continuing Calibration Verification
CF	Confirmation analysis of original
C1	Confirmation analysis of A1 or D1
C2	Confirmation analysis of A2 or D2
C3	Confirmation analysis of A3 or D3
CRA	Low Level Standard Check - GFAA; Mercury
CRI	Low Level Standard Check - ICP
CV	Calibration Verification Standard
Dil Fac	Dilution Factor - Secondary dilution analysis
D1	Dilution 1
D2	Dilution 2
D3	Dilution 3
DLFac	Detection Limit Factor
DSH	Distilled Standard - High Level
DSL	Distilled Standard - Low Level
DSM	Distilled Standard - Medium Level
EB1	Extraction Blank 1
EB2	Extraction Blank 2
EB3	DI Blank
ELC	Method Extracted LCS
ELD	Method Extracted LCD
ICAL	Initial calibration
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
IDL	Instrument Detection Limit
ISA	Interference Check Sample A - ICAP
ISB	Interference Check Sample B - ICAP
Job No.	The first six digits of the sample ID which refers to a specific client, project and sample group Lab ID An 8 number unique laboratory identification
LCD	Laboratory Control Standard Duplicate
LCS	Laboratory Control Standard with reagent grade water or a matrix free from the analyte of interest
MB	Method Blank or (PB) Preparation Blank
MD	Method Duplicate
MDL	Method Detection Limit
MLE	Medium Level Extraction Blank
MRL	Method Reporting Limit Standard
MSA	Method of Standard Additions
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not Detected
PREPF	Preparation factor used by the Laboratory's Information Management System (LIMS)
PDS	Post Digestion Spike (ICAP)
RA	Re-analysis of original
A1	Re-analysis of D1
A2	Re-analysis of D2
A3	Re-analysis of D3
RD	Re-extraction of dilution
RE	Re-extraction of original
RC	Re-extraction Confirmation
RL	Reporting Limit
RPD	Relative Percent Difference of duplicate (unrounded) analyses
RRF	Relative Response Factor

QUALITY ASSURANCE METHODS

REFERENCES AND NOTES

Report Date: 05/09/2002

RT	Retention Time
RTW	Retention Time Window Sample ID A 9 digit number unique for each sample, the first six digits are referred as the job number
SCB	Seeded Control Blank
SD	Serial Dilution
UCB	Unseeded Control Blank
SSV	Second Source Verification Standard
SLCS	Solid Laboratory Control Standard(LCS)
PHC	pH Calibration Check
LCSP	pH Laboratory Control Sample
LCDP	pH Laboratory Control Sample Duplicate
MDPH	pH Sample Duplicate
MDFP	Flashpoint Sample Duplicate
LCFP	Flashpoint LCS
G1	Gelex Check Standard Range 0-1
G2	Gelex Check Standard Range 1-10
G3	Gelex Check Standard Range 10-100
G4	Gelex Check Standard Range 100-1000

Note 1: The Post Spike Designation on Batch QC for GFAA is designated with an "S" added to the current abbreviation used. EX. LCSS=LCS Post Spike (GFAA); MSS=MS Post Spike (GFAA)

SEVERN TRENT SERVICES

STL Chicago
2417 Bond Street
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Fax: 708-534-5211

Contact: David Meiri	Contact: Pete McCauley
Company: RETEC	Company: ComEd
Address: 8605 W. Bryn Mawr Ave, Ste 301, Chicago, IL 60631	Address:
Phone: (773) 714-9900	Phone: (312) 394-4470
Fax: (773) 714-9805	Fax:
E-Mail: dmeiri@retec.com	PO#: Quote:

Lab Lot# 2[illegible]723

Package Sealed: Yes (No)	Samples Sealed: Yes (No)
Received on Ice: (Yes) No	Samples Intact: (Yes) No
Temperature °C of Cooler: [illegible]	
Within Hold Time: (Yes) No	Preserv. Indicated: (Yes) No NA
pH Check OK: (Yes) No NA	Res. Cl₂ Check OK: (Yes) No NA
Sample Labels and COC Agree: (Yes) No	COC not present

Sampler Name: R. Beck	Signature: R. Beck
Project Name: Griess-Pfleger-Tannery	Project Number: CEDI4-15159-220
Project Location: Waukegan, IL	Date Required: Standard TAT; Hard Copy: / / ; Fax: / /
Lab PM: Eric Lang	

Laboratory ID	MS/MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Metals* 6010B	TDS 160.1	Additional Analyses / Remarks
1		MW-14-050902	5/09/02	1255	W		X	X	

Relinquished By: R. Beck	Company: RETEC	Date: 5/15/02	Time: 0932
Received By: E. L.	Company: STL	Date: 5/15/02	Time: 0932
Relinquished By:	Company:	Date:	Time:
Received By: [signature]	Company: STL	Date: 5/15/02	Time: 1130

Matrix Key: WW = Wastewater; W = Water; S = Soil; SL = Sludge; MS = Miscellaneous; OL = Oil; A = Air; SE = Sediment; SO = Solid; DS = Drum Solid; DL = Drum Liquid; L = Leachate; WI = Wipe; O =

Container Key: 1. Plastic; 2. VOA Vial; 3. Sterile Plastic; 4. Amber Glass; 5. Widemouth Glass; 6. Other

Preservative Key: 1. HCl, Cool to 4°; 2. H2SO4, Cool to 4°; 3. HNO3, Cool to 4°; 4. NaOH, Cool to 4°; 5. NaOH/Zn, Cool to 4°; 6. Cool to 4°; 7. None

COMMENTS: * calcium, iron, magnesium, manganese, arsenic, and antimony

Date Received: 5/15/02
Courier: EL
Hand Delivered: [X]
Bill of Lading:

STL Chicago is a part of Severn Trent Laboratories, Inc.

MWG13-15_46465

SEVERN TRENT SERVICES

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Chicago IL 60631
Phone: (773) 714-9900
Fax: (773) 714-9905
E-Mail: dmairi@retec.com

Contact: Pete McCauley
Company: ComEd
Address:
Phone: (312) 394-4470
Fax:
PO#: Quote:

Lab Lot# 209723

Package Sealed: Yes / No
Samples Sealed: Yes / No
Received on Ice: Yes / No
Sample Intact: Yes / No
Temperature °C 66 Cooler

Sampler Name: R. Beck / A. Rodriguez / G. Kenyon
Signature: R. Beck
Project Name: Gross-Pflegger Tannery
Project Number: CEDI4-15159-2200
Project Location: Waukegan, IL
Date Required: Standard TAT
Hard Copy: / /
Fax: / /
Lab PM: Eric Long

Within Hold Time: Yes / No
Preserv. Indicated: Yes / No / NA
pH Check OK: Yes / No / NA
Rx Cl2 Check OK: Yes / No / NA
Sample Labels and COC Agree: Yes / No
COC not present

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Metals* 6010B	TDS 160.1	Additional Analyses / Remarks
2		MW-10-050902	5/9/02	1215	W		X	X	
3		MW-11-050902	5/9/02	1345	W		X	X	
4		MW-12-050902	5/9/02	1120	W		X	X	
5		MW-13-050902	5/9/02	1030	W		X	X	
6		MW-4-051002	5/10/02	0900	W		X	X	
7		MW-101-051002	5/10/02		W		X	X	
8		MW-6B2-051002	5/10/02	1010	W		X	X	

RELINQUISHED BY: Ky Beck COMPANY: RETEC DATE: 5/15/02 TIME: 0932
RELINQUISHED BY: COMPANY: DATE: TIME:

RECEIVED BY: COMPANY: STL DATE: 5/15/02 TIME: 0932
RECEIVED BY: COMPANY: STL DATE: 5/15/02 TIME: 1130

Matrix Key
WW = Wastewater, W = Water, S = Soil, SL = Sludge, MS = Miscellaneous, OL = Oil, A = Air, SE = Sediment, SO = Solid, DS = Drum Solid, DL = Drum Liquid, L = Leachate, WI = Wipe, O = _____

Container Key
1. Plastic, 2. VOA Vial, 3. Sterile Plastic, 4. Amber Glass, 5. Widemouth Glass, 6. Other _____

Preservative Key
1. HCl, Cool to 4°, 2. H2SO4, Cool to 4°, 3. HNO3, Cool to 4°, 4. NaOH, Cool to 4°, 5. NaOH/Zn, Cool to 4°, 6. Cool to 4°, 7. None

COMMENTS: *calcium, iron, magnesium, manganese, arsenic, and antimony

Date Received: 5/15/02
Courier: EL
Hand Delivered
Bill of Lading

STL Chicago is a part of Severn Trent Laboratories, Inc.

STI #008 (0600)

MWG13-15_46466

SEVERN TRENT SERVICES

STL Chicago
2417 Bond Street
University Park, IL 60466
Phone: 708-534-6200
Fax: 708-534-5211

Contact: David Meiri
Company: RETEC
Address: 8GST W. Bryn Mawr Ave, Ste 301
Chicago, IL 60631
Phone: (773) 714-9900
Fax: (773) 714-9805
E-Mail: dmeiri@retec.com

[redacted]ontact: Pete McCauley
[redacted]ompany: ComEd
Address:
Phone: (312) 394-4470
Fax:
PO#: Quote:

Lab Lot# 20[redacted]23

Package Sealed: Yes (No) | [redacted]amples Sealed: Yes (No)
Received on Ice: (Yes) No | Samples Intact: (Yes) No
Temperature °C of Cooler:
Within Hold Time: (Yes) No | Preserv. Indicated: (Yes) No NA
pH Check OK: (Yes) No NA | Res Cl₂ Check OK: (Yes) No NA
Sample Labels and COC Agree: (Yes) No COC not present

Sampler Name: R. Beck / G. Kayo
Signature: R. Beck / Glen B. Kayo
Project Name: Griess-Pfleger Tannery
Project Number: CEDI4-15159-220
Project Location: Waukegan, IL
Lab PM: Eric Lang
Date Required: Standard TAT
Hard Copy: __/__/__
Fax: __/__/__

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Metals* 6010B	TDS 160.1	Additional Analyses / Remarks
9		MW-6BS-051002	5/10/02	1130	W		X	X	
10		MW-6-051002	5/10/02	1230	W		X	X	
11		MW-102-051002	5/10/02		W		X	X	
12		MW-9-051002	5/10/02	1530	W		X	X	
13		MW-5-051302	5/13/02	1010	W		X	X	
14		MW-5A-051302	5/13/02	0920	W		X	X	
15		MW-3-051302	5/13/02	1340	W		X	X	

RELINQUISHED BY: R. Beck	COMPANY: RETEC	DATE: 5/16/02	TIME: 0932	RECEIVED BY: [signature]	COMPANY: STL	DATE: 5/15/02	TIME: 0932
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY: [signature]	COMPANY: STL	DATE: 5/15/02	TIME: 1150

Matrix Key: WW = Wastewater; W = Water; S = Soil; SL = Sludge; MS = Miscellaneous; OL = Oil; A = Air; SE = Sediment; SO = Solid; DS = Drum Solid; DL = Drum Liquid; L = Leachate; W = Wipe; O =

Container Key: 1. Plastic 2. VOA Vial 3. Sterile Plastic 4. Amber Glass 5. Widemouth Glass 6. Other

Preservative Key: 1. HCl, Cool to 4° 2. H2SO4, Cool to 4° 3. HNO3, Cool to 4° 4. NaOH, Cool to 4° 5. NaOH/Zn, Cool to 4° 6. Cool to 4° 7. None

COMMENTS: *calcium, iron, magnesium, manganese, arsenic, and antimony

Date Received: 5/15/02
Courier: EL
Hand Delivered: X
Bill of Lading:

STL Chicago is a part of Severn Trent Laboratories, Inc.

STL-8208 (0603)

MWG13-15_46467

SEVERN TRENT SERVICES

STL Chicago
2417 Bond Street
University Park, IL 60466
Phone: 708-534-5200
Fax: 708-534-5211

Contact: David Meiri
Company: RETEC
Address: 3600 W. Bryn Mawr Ave. Ste 301
Chicago, IL 60631
Phone: (773) 714-9900
Fax: (773) 714-9805
E-Mail: dmeiri@retec.com

Contact: Pete McCawley
Company: ComEd
Address:
Phone: (312) 394-4470
Fax:
PO#: Quote:

Lab Lot# 209723

Temperature °C of Cooler:

Sampler Name: R. Beck/G. Kays
Signature: R. Beck / G. Kays

Project Name: Gross-Pfingsten Tannery
Project Number: CE014-1515-226

Project Location: Waukegan, IL
Date Required: Standard TAT
Hard Copy: ___/___/___
Fax: ___/___/___

Lab PM: Eric Lang

Laboratory ID	MS-MSD	Client Sample ID	Sampling Date	Sampling Time	Matrix	Comp/Grab	Metals* 6010B	TDS 160.1
16		MW-1-051302	5/13/02	1635	W		X	X
17		MW-1A-051302	5/13/02	1735	W		X	X
18		MW-2-051302	5/13/02	1545	W		X	X
19	X	MW-7-051402	5/14/02	1035	W		X	X
20		MW-7A-051402	5/14/02	0930	W		X	X
21		MW-8-051302	5/13/02	1445	W		X	X

Bottle #
/ Cont.
Volume
Preserv.

Within Hold Time: (Yes) No
pH Check OK: (Yes) No NA
Sample Labels and COC Agree: (Yes) No
Preserv. Indicated: Yes No NA
Res Cl_2 Check OK: (Yes) No NA
COC not present

Additional Analyses / Remarks

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
G. Beck	RETEC	5/15/02	0932	[illegible]	STL	5/15/02	0932
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
				[illegible]	STL	5/15/02	1130

Matrix Key
WW = Wastewater, W = Water, S = Soil, SL = Sludge, MS = Miscellaneous, OL = Oil, A = Air, SE = Sediment, SO = Solid, DS = Drum Solid, DL = Drum Liquid, L = Leachate, WI = Wipe, O = _____

Container Key
1. Plastic, 2. VOA Vial, 3. Sterile Plastic, 4. Amber Glass, 5. Widemouth Glass, 6. Other _____

Preservative Key
1. HCl, Cool to 4°, 2. H_2SO_4, Cool to 4°, 3. HNO3, Cool to 4°, 4. NaOH, Cool to 4°, 5. NaOH/Zn, Cool to 4°, 6. Cool to 4°, 7. None

COMMENTS: * Calcium, iron, magnesium, manganese, arsenic, and antimony

Date Received: 5/15/02
Courier: EL
Hand Delivered: X
Bill of Lading:

MWG13-15_46468

Appendix C

Appendix C

Supplemental Tier 1 Screening Values from Illinois EPA

"Connie Sullinger" <Connie.Sullinger@epa.state.il.us>
03/30/01 10:46 AM

To: <dmorgan@thermoretec.com>
cc: 'Tim Murphy' <Tim.Murphy@epa.state.il.us>
Subject: Griess-Pfleger Tannery and General Boiler sites

Per our meeting yesterday, I am providing you with the following information. We have not developed objectives for beta-BHC. Use the objective for endrin and total the concentrations of the endrin compounds (i.e., endrin aldehyde). The following are the objectives for 2-butanone:

Migration to Class I Groundwater: 17 mg/kg
Migration to Class II Groundwater: 17 mg/kg
Industrial/Commercial Ingestion: 1,000,000 mg/kg
Industrial/Commercial Inhalation: 22,000 mg/kg
Construction Worker Ingestion: 410,000 mg/kg
Construction Worker Inhalation: 140 mg/kg
Class I Groundwater Objective: 4.2 mg/l
Class II Groundwater Objective: 4.2 mg/l

In addition, I want to clarify an issue that was discussed in the meeting. In the discussion of the ingestion exposure route, you asked about statistical approaches. I am not sure that I made it clear that if you have a normal or lognormal data set, you should use the USEPA Concentration Term Guidance that specifies how to calculate the RME concentration using the t statistic and "H" statistic. In the event that the distribution is determined to be nonparametic (i.e.,using a procedure such as the Shapiro Wilk), procedures such as the nonparametic bootstrap t can be used for calculating a concentration term.

David Morgan
04/10/01 10:57 AM

To: 'Connie Sullinger' <Connie.Sullinger@epa.state.il.us>
cc: 'Tim Murphy' <Tim.Murphy@epa.state.il.us>, peter.b.mccauley@ucm.com, David_Lewis@metcalfeddy.com
Subject: Re: Griess-Pfleger Tannery and General Boiler sites

Connie

I reviewed IRIS for Beta BHC (also known as Beta HCH) and there are oral CSFs and inhalation URFs for this compound. There is physical-chemical data for this compound in the Soil Screening Guidance User's Guide. Do you want us to calculate Tier 1 screening values for this compound and submit the calculated values to you or will you calculate them?

==========

David Morgan
ThermoRetec Consulting Company
3040 William Pitt Way
Pittsburgh, Pennsylvania 15238
Phone: (412) 826-3340 Fax: (412) 826-3409
dmorgan@thermoretec.com
"Connie Sullinger" <Connie.Sullinger@epa.state.il.us>

"Connie Sullinger" <Connie.Sullinger@epa.state.il.us>
03/30/01 10:46 AM

To: <dmorgan@thermoretec.com>
cc: 'Tim Murphy' <Tim.Murphy@epa.state.il.us>
Subject: Griess-Pfleger Tannery and General Boiler sites

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Construction Worker Inhalation: 140 mg/kg
Class I Groundwater Objective: 4.2 mg/l
Class II Groundwater Objective: 4.2 mg/l

In addition, I want to clarify an issue that was discussed in the meeting. In the discussion of the ingestion exposure route, you asked about statistical approaches. I am not sure that I made it clear that if you have a normal or lognormal data set, you should use the USEPA Concentration Term Guidance that specifies how to calculate the RME concentration using the t statistic and "H" statistic. In the event that the distribution is determined to be nonparametic (i.e.,using a procedure such as the Shapiro Wilk), procedures such as the nonparametic bootstrap t can be used for calculating a concentration term.

"Connie Sullinger" <Connie.Sullinger@epa.state.il.us>
04/16/01 09:49 AM

To: <DMorgan@thermoretec.com>
cc:
Subject: Re: Griess-Pfleger Tannery and General Boiler sites

We do not calculate objectives based upon cancer for Class C carcinogens, only A and B carcinogens. You can include the information if you wish.

>>> "David Morgan" <DMorgan@thermoretec.com> 04/10/01 09:57AM >>>

Connie

I reviewed IRIS for Beta BHC (also known as Beta HCH) and there are oral CSFs and inhalation URFs for this compound. There is physical-chemical data for this compound in the Soil Screening Guidance User's Guide. Do you want us to calculate Tier 1 screening values for this compound and submit the calculated values to you or will you calculate them?

David Morgan
ThermoRetec Consulting Company
3040 William Pitt Way
Pittsburgh, Pennsylvania 15238
Phone: (412) 826-3340 Fax: (412) 826-3409
dmorgan@thermoretec.com

"Connie Sullinger" <Connie.Sullinger@epa.state.il.us>
03/30/01 10:46 AM

To: <dmorgan@thermoretec.com>
cc: "Tim Murphy" <Tim.Murphy@epa.state.il.us>
Subject: Griess-Pfleger Tannery and General Boiler sites

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t statistic and "H" statistic. In the event that the distribution is

determined to be nonparametic (i.e.,using a procedure such as the Shapiro Wilk), procedures such as the nonparametic bootstrap t can be used for calculating a concentration term.

[redacted]

T[redacted] RISK FACTOR= 1E-06

RESIDENTIAL

[redacted]

SOIL PAR.	Surface	Subsurface
foc= (g/g)	0.006	0.002
ρs= (kg/L)	2.65	2.65
θw= (L/L)	0.1	0.2
θa= (L/L)	0.13	0.3
ρb= (kg/L)	1.5	1.5
θt= (L/L)	0.284	0.13

DATE= 12-Jun-03
PROJECT NAME= Caterpillar Corp of Aiken
PROJECT NUMBER=
CITY Cane Stream
COUNTY=
PROJECT MANAGER= Kathy Vinegar

	(c)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)=SOLID AT 30 DEGREES C CHEMICAL NAME	MIGRATION TO GROUNDWATER (GW) SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	USE Cost IF "<" INHAL. or MIGRATION TO GROUNDWATER FOR THOSE CHEMICALS DESIGNATED WITH A (*) (**)=Melting point "<" 30 degrees C INHALATION CARC. (mg/kg)	INHALATIO NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	GROUNDWATER OBJECTIVES AND STANDARDS CLASS I GW STD / OBJ. (mg/L)	CLASS II GW STD. /OBJ. (mg/L)	VF (M^3/kg)	Di (CM^2/S)	Do CM^2/S	Dw (CM^2/S)	Koc (L/kg)	H' UNITLESS	Kd SURFACE (L/kg)	Kd SUB (L/kg)	ORGANS AFFECTED
[redacted]	CUMENE	6.63E+01	4.31E+01		4.76E+02	8.85E+02	1.43E+03		0.7	3.5	1.13E+03	6.90E-03	1.20E-02	7.10E-06	6.59E+02	4.82E+01	5.19E+00	1.73E+00	
[redacted]	N-PROPYLBENZENE (PROV)	7.34E+00	1.75E+01			2.81E+02	7.82E+02		0.07	0.35					8.04E+02	4.31E-01	4.82E+00	1.61E+00	
[redacted]	1,3,5-TRIMETHYLBENZENE (Prov)	1.81E+01	8.04E+01		7.16E+01	4.12E+02	3.91E+03		0.35	1.75	6.13E+04	6.41E-03	1.21E-04	7.04E-06	1.16E+03	2.53E-01	7.00E+00	2.34E+00	
[redacted]	1,2,4-TRIMETHYLBENZENE (Prov)	1.07E+01	5.01E+01		4.46E+01	1.65E+02	3.91E+03		0.35	1.75	7.16E+03	6.80E-03	1.04E-04	6.81E-06	6.17E+02	3.60E-01	3.67E+00	1.22E+00	
[redacted]	ACENAPHTHYLENE (PROVISIONAL)	2.99E+01	1.50E+03			3.54E+01	2.34E+03		0.21	1.05	1.74E+03	4.39E-03	9.1E-03	7.53E-06	3.44E+03	5.51E-03	2.04E+01	6.82E+00	
[redacted]	BENZO(g,h,i)PERYLENE (PROVISIO	3.2E+04	1.42E+05			6.82E+00	2.34E+03		0.21	1.05					3.44E+06	5.71E-06	2.33E+04	7.77E+03	
[redacted]	PHENANTHRENE (PROVISIONAL)	7.81E+01	1.40E+03			3.46E+02	2.34E+03		0.21	1.05					3.33E+04	8.43E-04	2.80E+02	9.44E+01	

isopropylbenzene is cumene

use cumene for p-isopropyltoluene

MWG13-15_46475

CHEMICAL NUMBER	

SSL EQUATIONS USED

TARGET RISK FACTOR=	1E-06

RESIDENTIAL

SOIL PARAMETERS	Surface Soils	Subsurface
foc (g/g)	0.006	0.002
n (L/L)	0.43	0.43
ρs (kg/L)	2.65	2.65
w (g/g)	0.1	0.2
θam (L/L)	0.15	0.3
ρb (kg/L)	1.8	1.8
θw (L/L)	0.284	0.13

DATE= 15-Jun-00
PROJECT NAME= Container Corp of Amer
PROJECT NUMBER=
CITY Carol Stream
COUNTY=
PROJECT MANAGER= Kathy Vinegge

#	(c)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)=SOLID AT 30 DEGREES C CHEMICAL NAME	MIGRATION TO GROUNDWATER (GW) SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	USE Csat IF "<" INHAL, or MIGRATION TO GROUNDWATER FOR THOSE CHEMICALS DESIGNATED WITH A (*) (*)=Melting point "<" 30 degrees C INHALATION CARC. (mg/kg)	INHALATIO NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	GROUNDWATER OBJECTIVES AND STANDARDS CLASS I GW STD./ OBJ. (mg/L)	CLASS II GW STD. /OBJ. (mg/L)	VF (M^3/kg)	Di (CM^2/S)	Dei (CM^2/S)	Dw (CM^2/S)	Koc (L/kg)	H' UNITLESS	Kd SURFACE (L/kg)	Kd SUB (L/kg)	ORGANS AFFECTED
283	2-METHYLNAPHTHALENE(PROVIS	5.61E+01	2.51E+02			1.01E+03	2.34E+03		0.21	1.05					6.82E+03	2.13E-02	4.06E+01	1.36E+01	
220	DIBENZOFURAN (Provisional)	1.32E+01	7.67E+01			6.11E+02	3.12E+02		0.028	0.14					1.35E+04	5.33E-04	8.10E+01	2.70E+01	

[redacted]

TA RISK FACTOR=	1E-06

INDUSTRIAL

SOIL PAR.	Surface	Subsurface
foc= (g/g)	0.006	0.002
n= (Lp/Ls)	0.43	0.43
Ps= (kg/L)	2.65	2.65
w= (gw/gs)	0.1	0.2
Θw= (Lw/Ls)	0.15	0.3
Pb= (kg/L)	1.5	1.5
Θa= (La/Ls)	0.281	0.13

DATE= 12-Jun-03
PROJECT NAME= Container Corp of Amer
PROJECT NUMBER=
CITY Carol Stream
COUNTY=
PROJECT MANAGER= Kathy Vieregge

	(a)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)= SOLID AT 30 DEGREES C	MIGRATION TO GROUNDWATER (GW)		USE Csat IF "<" INHAL. or MIGRATION TO GROUNDWATER, FOR THOSE CHEMICALS DESIGNATED WITH A (*) (*)= Melting point "<" 30 degrees C					GROUNDWATER OBJECTIVES AND STANDARDS		[illegible]								[illegible]
	CHEMICAL NAME	SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	INHALATION CARC. (mg/kg)	INHALATION NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	CLASS I GW STD./OBJ. (mg/L)	CLASS II GW STD./OBJ. (mg/L)	VF (M^3/kg)	Di (CM^2/S)	Dw (CM^2/S)	[illegible] (CM^2/S)	Koc (L/kg)	H' UNITLESS	Kd SURFACE (L/kg)	Kd SUB. (L/kg)	ORGANS AFFECTED
[illegible]	*CUMENE	6.83E+01	4.31E+02		7.81E+03	8.85E+02	2.044E+05		0.7	3.5	1.30E+03	6.50E-02	1.70E-02	7.10E-06	6.50E+02	4.92E+01	5.10E+00	1.70E+00	
[illegible]	*N-PROPYLBENZENE (PROV)	2.34E+00	1.29E+01			2.61E+02	2.044E+04		0.07	0.35					6.04E+02	4.31E-01	4.07E+00	1.41E+00	
[illegible]	*1,2,4-TRIMETHYLBENZENE (Prov)	1.81E+01	9.04E+01		1.13E+02	4.12E+02	1.022E+05		0.35	1.75	1.20E+04	4.43E-02	1.22E-04	7.84E-06	1.18E+03	2.33E-01	7.08E+00	2.36E+00	
[illegible]	*1,3,5-TRIMETHYLBENZENE (Prov)	1.02E+01	5.09E+01		7.13E+01	1.65E+02	1.022E+05		0.35	1.75	8.14E+03	6.02E-02	3.06E-04	6.07E-06	6.13E+02	3.40E-01	3.67E+00	1.22E+00	
[illegible]	ACENAPHTHYLENE (PROVISIONAL	3.09E+01	1.50E+02			3.34E+02	6.132E+04		0.21	1.05	1.64E+03	4.30E-02	5.17E-07	7.53E-06	3.44E+03	4.51E-03	2.06E+01	6.82E+00	
[illegible]	BENZO(g,h,i)PERYLENE (PROVISIO	3.26E+04	1.63E+05			6.02E+00	6.132E+04		0.21	1.05					3.86E+06	3.71E-06	2.31E+04	7.72E+03	
[illegible]	PHENANTHRENE (PROVISIONAL)	2.81E+02	1.40E+03			2.40E+02	6.132E+04		0.21	1.05					3.33E+04	6.43E-04	2.00E+02	6.66E+01	
[illegible]																			
[illegible]																			

MWG13-15_46477

CAS CHEMICAL NUMBER [illegible]	[illegible]
[redacted]	

SSL EQUATIONS USED

TARGET RISK FACTOR=	1E-06

INDUSTRIAL

[illegible]	[illegible]	[illegible]
foc (g/g)	0.006	0.002
n (Lp/Ls)	0.43	0.43
Pb (kg/L)	2.65	2.65
w (g/g)	0.1	0.2
Ow (Lw/Ls)	0.15	0.3
Pb (kg/L)	1.5	1.5
Oa (La/Ls)	0.281	0.13

DATE= 19-Jun-00
PROJECT NAME= Container Corp of Amer
PROJECT NUMBER=
CITY Carol Stream
COUNTY=
PROJECT MANAGER= Kathy Vieregge

#	(c)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)=SOLID AT 30 DEGREES C CHEMICAL NAME	MIGRATION TO GROUNDWATER (GW) SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	USE Csat IF "<" INHAL. or MIGRATION TO GROUNDWATER FOR THOSE CHEMICALS DESIGNATED WITH A (*) (*)=Melting point "<" 30 degrees C INHALATION CARC. (mg/kg)	INHALATIO NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	GROUNDWATER OBJECTIVES AND STANDARDS CLASS I GW STD / OBJ. (mg/L)	CLASS II GW STD. /OBJ. (mg/L)
283	2-METHYLNAPHTHALENE (PROVIS	5.61E+01	2.81E+02			1.03E+03	8.13E+04		0.21	1.05
220	DIBENZOFURAN (Provisional)	1.52E+01	7.63E+01			6.11E+02	8.17E+03		0.028	0.11

CHEMICAL NAME	VF (M^3/kg)	Di (CM^2/S)	Da (CM^2/S)	Dw (CM^2/S)	Koc (L/kg)	H' UNIT-LESS	Kd SURFACE (L/kg)	Kd SUB (L/kg)	ORGANS AFFECTED
2-METHYLNAPHTHALENE (PROVIS					6.82E+03	2.13E-02	4.09E+01	1.58E+01	
DIBENZOFURAN (Provisional)					1.13E+04	5.33E-04	8.90E+01	2.70E+01	

MWG13-15_46478

ET RISK FACTOR= 1E-06

CONSTRUCTION WORKE

SOIL PARAM	Surface	Subsurface
foc (g/g)	0.006	0.002
θa (Lpr/L)	0.43	0.43
Pr (kg/L)	2.65	2.65
w (g/g)	0.1	0.2
θw (Lw/Ls)	0.15	0.3
Pb (kg/L)	1.5	1.5
θa (La/Ls)	0.284	0.13

DATE= 12-Jun-00
PROJECT NAME= Container Corp of Amer
PROJECT NUMBER=
CITY Carol Stream
COUNTY=
PROJECT MANAGER= Kathy Veraggo

	(+)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)=SOLID AT 30 DEGREES C	MIGRATION TO GROUNDWATER (GW)		USE Csat IF "<" INHAL or MIGRATION TO GROUNDWATER FOR THOSE CHEMICALS DESIGNATED WITH A (*) (*)=Melting point "<" 30 degrees C					GROUNDWATER OBJECTIVES AND STANDARDS											
	CHEMICAL NAME	SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	INHALATION CARC. (mg/kg)	INHALATIO NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	CLASS I GW STD/OBJ. (mg/L)	CLASS II GW STD./OBJ. (mg/L)	VF (M^3/kg)	Di (CM^2/S)	Da CM^2/S	Dw (CM^2/S)	Koc (L/kg)	H' UNIT-LESS	Kd SURFACE (L/kg)	Kd SUB (L/kg)	ORGANS AFFECTED
[illegible]	*CUMENE	8.63E+01	4.31E+02		4.92E+00	8.85E+02	2.040E+04		0.7	3.5	8.78E+00	6.50E-02	1.20E-02	7.10E-06	6.90E+02	4.87E+01	5.10E+00	1.70E+00	
[illegible]	*N-PROPYLBENZENE (PROV)	2.34E+00	1.29E+01			2.61E+02	2.040E+03		0.07	0.35					8.04E+02	4.31E-01	4.87E+00	1.61E+00	
[illegible]	*1,2,4-TRIMETHYLBENZENE (Prov)	1.81E+01	8.04E+01		7.31E-01	4.12E+02	1.020E+04		0.35	1.75	4.71E+01	6.43E-02	1.37E-04	7.94E-06	1.10E+03	2.53E-01	7.04E+00	2.36E+00	
[illegible]	*1,3,5-TRIMETHYLBENZENE (Prov)	1.02E+01	5.09E+01		4.63E-01	1.85E+02	1.020E+04		0.35	1.75	5.50E+01	6.02E-02	3.06E-04	8.67E-06	6.12E+02	3.60E-01	3.67E+00	1.22E+00	
[illegible]	ACENAPHTHYLENE (PROVISIONAL	2.99E+01	1.50E+02			3.34E+02	6.121E+04		0.21	1.05	1.34E+03	4.39E-02	5.17E-01	7.53E-06	3.44E+03	4.51E-03	2.06E+01	6.82E+00	
[illegible]	BENZO(g,h,i)PERYLENE (PROVISIO	3.24E+04	1.62E+05			4.60E+00	6.131E+04		0.21	1.05					3.86E+06	5.74E-06	2.32E+04	7.72E+03	
[illegible]	PHENANTHRENE (PROVISIONAL)	2.81E+03	1.40E+03			3.40E+02	6.121E+04		0.21	1.05					3.35E+04	9.43E-04	2.02E+02	6.64E+01	

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[illegible] CHEMICAL NUMBER [illegible] | [illegible]

[redacted]

SSL EQUATIONS USED

TARGET RISK FACTOR= 1E-06

CONSTRUCTION WORKE

[illegible]	[illegible]	[illegible]
foc (g/g)	0.006	0.002
n (L/L)	0.43	0.43
Ps (kg/L)	2.65	2.65
w (g/g)	0.1	0.2
Θw (L/L)	0.15	0.3
Pb (kg/L)	1.5	1.5
Θa (L/L)	0.284	0.13

DATE= 15-Jun-00
PROJECT NAME= Container Corp of Amer
PROJECT NUMBER=
CITY Carol Stream
COUNTY=
PROJECT MANAGER= Kathy Viarengo

#	(+)= CARCINOGENIC (*)= MELTING POINT < 30 C (**)=SOLID AT 30 DEGREES C CHEMICAL NAME	MIGRATION TO GROUNDWATER (GW) SSL CLASS I GW (mg/kg)	SSL CLASS II GW (mg/kg)	USE Csat IF "<" INHAL. or MIGRATION TO GROUNDWATER FOR THOSE CHEMICALS DESIGNATED WITH A (*) (*)=Melting point "<" 30 degrees C INHALATION CARC. (mg/kg)	INHALATION NONCARC. (mg/kg)	C sat (mg/kg)	INGESTION NONCARC. (mg/kg)	INGESTION CARC. (mg/kg)	GROUNDWATER OBJECTIVES AND STANDARDS CLASS I GW STD./OBJ. (mg/L)	CLASS II GW STD./OBJ. (mg/L)	VF (M^3/kg)	Di (CM^2/S)	Da (CM^2/S)	Dw (CM^2/S)	Koc (L/kg)	[illegible] UNITLESS	Kd SURFACE (L/kg)	Kd SUB (L/kg)	ORGANS AFFECTED
263	2-METHYLNAPHTHALENE(PROVISI	3.81E+01	3.81E+02			1.05E+03	6.121E+04		0.21	1.05					6.82E+03	2.13E-02	4.89E+01	1.36E+01	
229	DIBENZOFURAN (Provisional)	1.52E+01	7.62E+01			4.11E+02	8.182E+02		0.028	0.14					1.33E+04	5.33E-04	4.10E+01	2.70E+01	

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Appendix D

Appendix D

Supplemental Tier 1 Screening Values Calculated by RETEC

This appendix provides the results of calculating Tier 1 screening values for soil and groundwater for the pesticide beta-BHC, also known as beta-HCH.

The toxicological parameters used in this evaluation are presented in Table 1. Beta-BHC is considered a potential carcinogen by the United States Environmental Protection Agency (USEPA) and USEPA provides an oral cancer slope factor (CSF) and inhalation unit risk factor (URF) for this constituent on its Integrated Risk Information System (IRIS) website (USEPA, 2001). Values for benzene and toluene are provided in Table 1 as well. Tier 1 screening values were calculated for benzene and toluene and compared to values in the Tier 1 look up tables in Tiered Approach to Corrective Action Objectives or TACO (IPCB, 2000) as a check of the methodology. It should be noted that the Tier 1 screening values in the proposed revisions to TACO (IPCB, 2000) were used as opposed to the Tier 1 screening values in the currently approved version of TACO (IPCB, 2001).

Tables 2 and 3 present the results of calculating Tier 1 screening values for ingestion and inhalation exposures associated with soil in a residential setting. Equations S1 and S2 (ingestion of soil), S4 and S6 (inhalation of volatiles) and S11 and S13 (inhalation of dust) from Appendix C of TACO were used. To solve equations S4 and S6, the volatilization factor (VF) is needed. Also, equation S29 for calculating the soil saturation limit, Csat, is needed. Table 4 presents the results of calculating VF and Csat for the industrial/commercial worker.

The values of solubility, melting point, organic carbon partition coefficient, Henry's law constant, vapor phase diffusivity and water phase diffusivity were provided in USEPA's Soil Screening Guidance (USEPA, 1996) for all three constituents.

Table 5 presents results for benzene and toluene for the residential setting along with the Tier 1 screening values from the look up tables in Appendix B of TACO. The results are the same when expressed at the same number of significant figures as the values in the Tier 1 look up tables.

Tables 6 and 7 present the results of calculating Tier 1 screening values for ingestion and inhalation exposures associated with soil for an industrial/commercial worker. Equations S1 and S3 (ingestion of soil), S4 and S6 (inhalation of volatiles) and S11 and S13 (inhalation of dust) from Appendix C of TACO were used. As before, to solve equations S4 and S6, VF and Csat are needed. Table 8 presents the results of calculating VF and Csat for the industrial/commercial worker.

Table 9 presents results for benzene and toluene for the industrial/commercial worker along with the Tier 1 screening values from the look up tables in Appendix B of TACO. The results are the same when expressed at the same number of significant figures as the values in the Tier 1 look up tables.

Tables 10 and 11 present the results of calculating Tier 1 screening values for ingestion and inhalation exposures associated with soil for a construction worker. Equations S1 and S3 (ingestion of soil), S5 and S7 (inhalation of volatiles) and S12 and S14 (inhalation of dust) from Appendix C of TACO were used. Table 12 presents VF and Csat for the construction worker.

Table 9 also presents results for benzene and toluene for the construction worker along with the Tier 1 screening values from the look up tables in Appendix B of TACO. The results are virtually the same when expressed at the same number of significant figures as the values in the Tier 1 look up tables.

Table 13 presents the calculated groundwater screening values based on ingestion exposure for a resident for Class I groundwater. Equation S23 in Appendix C of TACO was used to calculate the groundwater screening values based on carcinogenic effects and this equation was modified to calculate the groundwater screening values for noncarcinogens effects. The Tier 1 groundwater screening value in Table E of Appendix B of TACO for benzene and toluene are the MCLs for these constituents (see Table 13), so the values in the lookup tables in TACO differ from these calculated Tier 1 screening values. However, the calculations in Table 13 are believed to be correct. It should be noted that equation S23 in TACO is used to calculate Health Based Limits (HBLs) in the Soil Screening Guidance (USEPA, 1996) and these HBLs are cited in TACO as one source of groundwater screening values used to calculate the soil component of the groundwater ingestion exposure route. Furthermore, the Soil Screening Guidance provides a HBL of 0.00005 mg/L for beta-BHC, which, to one significant figure, is the same as the value calculated in Table 13, 0.000047 mg/L. This provides evidence that the calculations in Table 13 are correct.

Table 14 presents the calculated groundwater screening values based on ingestion exposure for a resident for Class II groundwater. It was assumed that the Tier 1 screening value for Class II groundwater would be 5 times greater than the Tier 1 screening value. This is the case for benzene, but not for toluene.

Table 15 presents the calculated Tier 1 screening values for the soil component of the groundwater ingestion route using equations S17 and S18 from Appendix C of TACO. Table 16 presents results for benzene and toluene for Class I and Class II groundwater. The results are the same when expressed at the same number of significant figures as the values in the Tier 1 look up tables.

References

IPCB, 2000. Proposed Amendments to Tiered Approach to Corrective Action Objectives, 35 Illinois Administrative Code 742, First Order, Illinois Pollution Control Board, July 27.

IPCB, 2001. Tiered Approach to Corrective Action Objectives, 35 Illinois Administrative Code 742, Illinois Pollution Control Board, January 6.

USEPA, 1996. Soil Screening Guidance: User's Guide, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Publication 9355.4-23.

USEPA, 2001. Integrated Risk Information System, www.epa.gov/ngispgm3/iris/index.html, United States Environmental Protection Agency.

Table 1 Toxicological Parameters

Constituent	CAS No.	Cancer Toxicity Parameters				Chronic Noncancer Toxicity Parameters				Subchronic Noncancer Toxicity Parameters			
		CSFo		URF		RfDco		RfCc		RfDso		RfCs	
		(mg/kg-day)^-1	Source	(ug/m3)^-1	Source	(mg/kg-day)	Source	(mg/m3)	Source	(mg/kg-day)	Source	(mg/kg-day)	Source
Pesticides													
Beta BHC	319857	1.8E+00	IRIS	5.3E-04	IRIS								
Miscellaneous													
Benzene	71432	5.5E-02	IRIS	7.8E-06	IRIS								
Toluene	108883					2.0E-01	IRIS	4.0E-01	IRIS	2.0E+00	HEAST	9.6E-01	STSC,1999

CSFo = oral cancer slope factor
URF = inhalation unit risk factor
RfDco = chronic oral reference dose
RfCc = chronic inhalation reference concentration
RfDso = subchronic oral reference dose
RfCs = subchronic inhalation reference concentration

IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEAPV = USEPA's National Center for Environmental Assessment provisional value
STSC = Superfund Technical Support Center
isopr. benz. = value for isopropylbenzene used
pyrene = value for pyrene used
chronic = chronic value used as subchronic value

Table 2 Calculated Residential Tier 1 Screening Values for Ingestion of Soil

Input Parameters

Cancer		Noncancer	
TR	1E-06	THQ	1
IFsoil-adj	114	IRsoil (mg/day)	200
EF (days/yr)	350	EF (days/yr)	350
ATc (years)	70	ED (years)	6
		BW (kg)	15
		ATnc (years)	6

Calculated Parameters

Constituent	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)
Pesticides			
Beta BHC	0.36	NA	0.36
Miscellaneous			
Benzene	12	NA	12
Toluene	NA	15,643	15,643

TR = target risk level
IFsoil-adj = adjusted soil intake factor
EF = exposure frequency
ATc = averaging time (cancer)

THQ = target hazard quotient
IRsoil = soil ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATnc = averaging time (noncancer)

Table 3 Calculated Residential Tier 1 Screening Values for Inhalation Exposures Associated with Soil

Input Parameters

Cancer		Noncancer	
TR	1E-06	THQ	1
EF (days/yr)	350	EF (days/yr)	350
ED (years)	30	ED (years)	30
ATc (years)	70	ATnc (years)	30
PEF (m3/kg)	1.32E+09	PEF (m3/kg)	1.32E+09

Calculated Parameters

	Inhalation of Volatilized Chemicals					Inhalation of Dust			Inhalation
Constituent	VF (m3/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Csat (mg/kg)	Overall (mg/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)	Overall (mg/kg)
Pesticides									
Beta BHC	1.3E+06	6.0	NA	1,000,000	6.0	6.1E+03	NA	6.1E+03	6.0
Miscellaneous									
Benzene	2.7E+03	0.8	NA	869	0.8	4.1E+05	NA	4.1E+05	0.8
Toluene	3.9E+03	NA	1,637.5	654	654.1	NA	5.5E+06	5.5E+06	654.1

TR = target risk level
EF = exposure frequency
ED = exposure duration
ATc = averaging time (cancer)
VF = volatilization factor
Csat = soil saturation limit

THQ = target hazard quotient
EF = exposure frequency
ED = exposure duration
ATnc = averaging time (noncancer)
PEF = particulate emission factor

Table 4 Soil Volatilization Model for Resident

System Parameters

Variable Name	Value	Units	Description
DF	1	unitless	dilution factor
Q/C	68.81	g/m²-s / Kg/m²	inverse dispersion factor; value from TACO
pb	1.5	g/cm³	bulk soil density; default value from TACO
mw	0.15	L-wat/L-soil	water-filled soil porosity; default value in TACO
d	200	m	source thickness; effectively infinite
ps	2.65	g/cm³	soil particle density
foc	0.006	Kg-oc/Kg-soil	fraction organic carbon; default from TACO
T	30.0	yr	exposure interval
	9.46E+08	sec	
CF1	10000	cm²/m²	conversion factor
CF2	41	mol/atm-m³	conversion factor
MPcut	30	°C	melting point cut-off

Intermediate System Variables

Variable Name	Value	Units	Description
n =	0.43	L-pore/L-soil	total soil porosity
na =	0.28	L-air/L-soil	air-filled soil porosity

Table 4 Soil Volatilization Model for Resident (Cont'd)

Chemical-Specific Variables

Chemical	Input and Output Values: Source Concentrat. Cs (mg/Kg)	Transport Factor (1/VF) (Kg/m³)	Exposure Pt. Concentrat. Ca (mg/m³)	Adjusted Soil Sat. Limit Csatadj (mg/Kg)	Chemical Properties: Solubility in Water S (mg/L)	Melting Point MP (°C)	Org. Carbon Part. Coef. Koc (mg/Kg / mg/L)	Koc Type 1 = nonionic. org. 2 = ionic. org. 3 = inorganic	Henry's Law Constant H (atm-m³/mol)	Vapor Phase Diffusivity Dv (cm²/s)	Water Phase Diffusivity Dw (cm²/s)
Pesticides											
Beta BHC	1	7.63E-07	7.63E-07	1.00E+06	2.40E-01	315	1.26E+03	1	7.43E-07	1.42E-02	7.34E-06
Miscellaneous											
Benzene	1	3.71E-04	3.71E-04	8.69E+02	1.75E+03	5.5	5.89E+01	1	5.55E-03	8.80E-02	9.80E-06
Toluene	1	2.55E-04	2.55E-04	6.54E+02	5.26E+02	-94.9	1.82E+02	1	6.64E-03	8.70E-02	8.60E-06

Table 4 **Soil Volatilization Model for Resident (Cont'd)**

Chemical-Specific Variables

Chemical	Intermediate Variables						Transport Factor	Soil Saturation Limit	
	Henry's Law Constant	Soil-Water Partition Coefficient	Apparent Diffusivity	Average Flux Factor	Maximum Flux Factor	Volatilization Factor		Calculated Soil Sat. Limit	Adjusted Soil Sat. Limit
	H'	Kp	Da	FFa	FFm	VFon	(1/VF)	Csat	Csatadj
	(dimensionless)	(L/Kg)	(cm²/s)	(g-soil/m²-a)	(g-soil/m²-a)	(Kg/m³)	(Kg/m³)	(mg/Kg)	(mg/Kg)
Pesticides									
Beta BHC	3.05E-05	7.56E+00	9.09E-09	5.25E-05	3.17E-01	7.63E-07	7.63E-07	1.84E+00	1.00E+06
Miscellaneous									
Benzene	2.28E-01	3.53E-01	2.15E-03	2.55E-02	3.17E-01	3.71E-04	3.71E-04	8.69E+02	8.69E+02
Toluene	2.72E-01	1.09E+00	1.01E-03	1.75E-02	3.17E-01	2.55E-04	2.55E-04	6.54E+02	6.54E+02

Table 5 Summary of Calculated Tier 1 Screening Values for Residential Scenario to Values in Lookup Tables

Constituent	Residential			
	Ingestion		Inhalation	
	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)
Miscellaneous				
Benzene	12	12	0.8	0.8
Toluene	16,000	16,000	650	650

Table 6 Calculated Industrial/Commercial Worker Tier 1 Screening Values for Ingestion of Soil

Input Parameters

Cancer		Noncancer	
TR	1E-06	THQ	1
IRsoil (mg/day)	50	IRsoil (mg/day)	50
EF (days/yr)	250	EF (days/yr)	250
ED (years)	25	ED (years)	25
BW (kg)	70	BW (kg)	70
ATc (years)	70	ATnc (years)	25

Calculated Parameters

Constituent	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)
Pesticides			
Beta BHC	3.2	NA	3.2
Miscellaneous			
Benzene	104	NA	104
Toluene	NA	408,800	408,800

TR = target risk level
IRsoil = soil ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATc = averaging time (cancer)

THQ = target hazard quotient
IRsoil = soil ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATnc = averaging time (noncancer)

Table 7 Calculated Industrial/Commercial Worker Tier 1 Screening Values for Inhalation Exposures Associated with Soil

Input Parameters

Cancer		Noncancer	
TR	1E-06	THQ	1
EF (days/yr)	250	EF (days/yr)	250
ED (years)	25	ED (years)	25
ATc (years)	70	ATnc (years)	25
PEF (m3/kg)	1.24E+09	PEF (m3/kg)	1.24E+09

Calculated Parameters

	Inhalation of Volatilized Chemicals					Inhalation of Dust			Inhalation
Constituent	VF (m3/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Csat (mg/kg)	Overall (mg/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)	Overall (mg/kg)
Pesticides									
Beta BHC	1.5E+06	11.5	NA	1,000,000	11.5	9.6E+03	NA	9.6E+03	11.5
Miscellaneous									
Benzene	3.1E+03	1.6	NA	869	1.6	6.5E+05	NA	6.5E+05	1.6
Toluene	4.5E+03	NA	2,609.7	654	654.1	NA	7.2E+06	7.2E+06	654.1

TR = target risk level
EF = exposure frequency
ED = exposure duration
ATc = averaging time (cancer)
VF = volatilization factor

THQ = target hazard quotient
EF = exposure frequency
ED = exposure duration
ATnc = averaging time (noncancer)
PEF = particulate emission factor

Table 8 Soil Volatilization Model for Industrial/Commercial Worker

System Parameters

Variable Name	Value	Units	Description
DF	1	unitless	dilution factor
Q/C	85.81	g/m²-s / Kg/m³	inverse dispersion factor; value from TACO
ρb	1.5	g/cm³	bulk soil density; default value from TACO
nw	0.15	L-wat/L-soil	water-filled soil porosity; default value in TACO
d	200	m	source thickness; effectively infinite
ρs	2.65	g/cm³	soil particle density
foc	0.006	Kg-oc/Kg-soil	fraction organic carbon; default from TACO
T	25.0	yr	exposure interval
	7.88E+08	sec	
CF1	10000	cm²/m²	conversion factor
CF2	41	mol/elm-m³	conversion factor
MPcut	30	°C	melting point cut-off

Intermediate System Variables

Variable Name	Value	Units	Description
n =	0.43	L-pore/L-soil	total soil porosity
na =	0.28	L-air/L-soil	air-filled soil porosity

Table [redacted] Soil Volatilization Model for Industrial/Commercial Wo[redacted] (Cont'd)

Chemical-Specific Variables

Chemical	Input and Output Values				Chemical Properties							
	Source Concentrat. Cs (mg/Kg)	Transport Factor (1/VF) (Kg/m³)	Exposure Pt. Concentrat. Ca (mg/m³)	Adjusted Soil Sat. Limit Csatadj (mg/Kg)	Solubility in Water S (mg/L)	Melting Point MP (°C)	Org. Carbon Part. Coef. Koc (mg/Kg / mg/L)	Koc Type 1 = nonionic. org. 2 = ionic. org. 3 = inorganic	Henry's Law Constant H (atm-m³/mol)	Vapor Phase Diffusivity Dv (cm²/s)	Water Phase Diffusivity Dw (cm²/s)
Pesticides											
Beta BHC	1	6.70E-07	6.70E-07	1.00E+06	2.40E-01	315	1.26E+03	1	7.43E-07	1.42E-02	7.34E-06
Miscellaneous											
Benzene	1	3.26E-04	3.26E-04	8.69E+02	1.75E+03	5.5	5.89E+01	1	5.55E-03	8.80E-02	9.80E-06
Toluene	1	2.24E-04	2.24E-04	6.54E+02	5.26E+02	-94.9	1.82E+02	1	6.64E-03	8.70E-02	8.60E-06

Table 8 **Soil Volatilization Model for Industrial/Commercial Worker (Cont'd)**

Chemical-Specific Variables

Chemical	Intermediate Variables						Transport Factor	Soil Saturation Limit	
	Henry's Law Constant	Soil-Water Partition Coefficient	Apparent Diffusivity	Average Flux Factor	Maximum Flux Factor	Volatilization Factor		Calculated Soil Sat. Limit	Adjusted Soil Sat. Limit
	H'	Kp	Da	FFa	FFm	VFon	(1/VF)	Csat	Csatadj
	(dimensionless)	(L/Kg)	(cm^2/s)	($g\text{-soil}/m^2\text{-a}$)	($g\text{-soil}/m^2\text{-a}$)	(Kg/m^3)	(Kg/m^3)	(mg/Kg)	(mg/Kg)
Pesticides									
Beta BHC	3.05E-05	7.56E+00	9.09E-09	5.75E-05	3.81E-01	6.70E-07	6.70E-07	1.84E+00	1.00E+06
Miscellaneous									
Benzene	2.28E-01	3.53E-01	2.15E-03	2.79E-02	3.81E-01	3.26E-04	3.26E-04	8.69E+02	8.69E+02
Toluene	2.72E-01	1.09E+00	1.01E-03	1.92E-02	3.81E-01	2.24E-04	2.24E-04	6.54E+02	6.54E+02

Table 9 Summary of Calculated Tier 1 Screening Values for Industrial/Commercial Worker and Construction Worker to Values in Lookup Tables

Constituent	Industrial/Commercial Worker				Construction Worker			
	Ingestion		Inhalation		Ingestion		Inhalation	
	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)
Miscellaneous								
Benzene	100	100	1.6	1.6	2,300	2,300	2.2	2.3
Toluene	410,000	410,000	650	650	410,000	410,000	42	41

Table 10 Calculated Construction Worker Tier 1 Screening Values for Ingestion of Soil

Input Parameters

Cancer		Noncancer	
TR	1E-06	THQ	1
IRsoil (mg/day)	480	IRsoil (mg/day)	480
EF (days/yr)	30	EF (days/yr)	30
ED (years)	1	ED (years)	1
BW (kg)	70	BW (kg)	70
ATc (years)	70	ATnc (years)	0.115

Calculated Parameters

Constituent	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)
Pesticides			
Beta BHC	69	NA	69
Miscellaneous			
Benzene	2,258	NA	2,258
Toluene	NA	408,090	408,090

TR = target risk level
IRsoil = soil ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATc = averaging time (cancer)

THQ = target hazard quotient
IRsoil = soil ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATnc = averaging time (noncancer)

Table 11 Calculated Construction Worker Tier 1 Screening Values for Inhalation Exposures Associated with Soil

Input Parameters

Cancer		Noncancer	
TR	1.00E-06	THQ	1
EF (days/yr)	30	EF (days/yr)	30
ED (years)	1	ED (years)	1
ATc (years)	70	ATnc (years)	0.115
PEF (m3/kg)	1.32E+09	PEF (m3/kg)	1.32E+09

Calculated Parameters

	Inhalation of Volatilized Chemicals					Inhalation of Dust			Inhalation
Constituent	VF (m3/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Csat (mg/kg)	Overall (mg/kg)	Cancer (mg/kg)	Noncancer (mg/kg)	Overall (mg/kg)	Overall (mg/kg)
Pesticides									
Beta BHC	1.0E+04	16.3	NA	1,000,000	16.3	2.1E+05	NA	2.1E+05	16.3
Miscellaneous									
Benzene	2.1E+01	2.3	NA	869	2.3	1.4E+07	NA	1.4E+07	2.3
Toluene	3.0E+01	NA	40.7	654	40.7	NA	1.8E+08	1.8E+08	40.7

TR = target risk level
EF = exposure frequency
ED = exposure duration
ATc = averaging time (cancer)
VF = volatilization factor

THQ = target hazard quotient
EF = exposure frequency
ED = exposure duration
ATnc = averaging time (noncancer)
PEF = particulate emission factor

Table 12 Soil Volatilization Model for Construction Worker

System Parameters

Variable Name	Value	Units	Description
DF	1	unitless	dilution factor
Q/C	85.81	g/m²-s / Kg/m³	inverse dispersion factor; value from TACO
pb	1.5	g/cm³	bulk soil density; default value from TACO
nw	0.15	L-wat/L-soil	water-filled soil porosity; default value in TACO
d	200	m	source thickness; effectively infinite
ps	2.65	g/cm³	soil particle density
foc	0.006	Kg-oc/Kg-soil	fraction organic carbon; default from TACO
T	0.1	yr	exposure interval
	3.63E+06	sec	
CF1	10000	cm²/m²	conversion factor
CF2	41	mol/atm-m³	conversion factor
MPcut	30	°C	melting point cut-off

Intermediate System Variables

Variable Name	Value	Units	Description
n =	0.43	L-pore/L-soil	total soil porosity
na =	0.28	L-air/L-soil	air-filled soil porosity

Table 1[redacted] Soil Volatilization Model for Construction Worker (Cons[redacted]

Chemical-Specific Variables

Chemical	Input and Output Values: Source Concentrat. Cs (mg/Kg)	Transport Factor (1/VF) (Kg/m³)	Exposure Pt. Concentrat. Ca (mg/m³)	Adjusted Soil Sat. Limit Csatadj (mg/Kg)	Chemical Properties: Solubility In Water S (mg/L)	Melting Point MP (°C)	Org. Carbon Part. Coef. Koc (mg/Kg / mg/L)	Koc Type 1 = non/ionic. org. 2 = ionic. org. 3 = inorganic	Henry's Law Constant H (atm-m³/mol)	Vapor Phase Diffusivity Dv (cm²/s)	Water Phase Diffusivity Dw (cm²/s)
Pesticides											
Beta BHC	1	9.88E-06	9.88E-06	1.00E+06	2.40E-01	315	1.26E+03	1	7.43E-07	1.42E-02	7.34E-06
Miscellaneous											
Benzene	1	4.80E-03	4.80E-03	8.69E+02	1.75E+03	5.5	5.89E+01	1	5.55E-03	8.80E-02	9.80E-06
Toluene	1	3.30E-03	3.30E-03	6.54E+02	5.26E+02	-94.9	1.82E+02	1	6.64E-03	8.70E-02	8.60E-06

Table 12 Soil Volatilization Model for Construction Worker (Cont'd)

Chemical-Specific Variables

Chemical	Intermediate Variables						Transport Factor	Soil Saturation Limit	
	Henry's Law Constant	Soil-Water Partition Coefficient	Apparent Diffusivity	Average Flux Factor	Maximum Flux Factor	Volatilization Factor		Calculated Soil Sat. Limit	Adjusted Soil Sat. Limit
	H'	Kp	Da	FFa	FFm	VFon	(1/VF)	Csat	Csatadj
	(dimensionless)	(L/Kg)	(cm^2/s)	($g\text{-}soil/m^2\text{-}s$)	($g\text{-}soil/m^2\text{-}s$)	(Kg/m^3)	(Kg/m^3)	(mg/Kg)	(mg/Kg)
Pesticides									
Beta BHC	3.05E-05	7.56E+00	9.09E-09	8.47E-04	8.27E+01	9.88E-06	9.88E-06	1.84E+00	1.00E+06
Miscellaneous									
Benzene	2.28E-01	3.53E-01	2.15E-03	4.12E-01	8.27E+01	4.80E-03	4.80E-03	8.69E+02	8.69E+02
Toluene	2.72E-01	1.09E+00	1.01E-03	2.83E-01	8.27E+01	3.30E-03	3.30E-03	6.54E+02	6.54E+02

Table 13 Groundwater Objective for Caculating the Soil Component of the Groundwater Ingestion Exposure Route (Class I)

Input Parameters

Cancer		Noncancer	
TR	1.00E-06	THQ	1
IRw (L/day)	2	IRw (L/day)	2
EF (days/yr)	350	EF (days/yr)	350
ED (years)	30	ED (years)	30
BW (kg)	70	BW (kg)	70
ATc (years)	70	ATnc (years)	30

Calculated Parameters

Constituent	Cancer (mg/L)	Noncancer (mg/L)	Overall (mg/L)	Tier 1 ScreeningValue in Lookup Table (mg/L)	Groundwater Objective (mg/L)
Pesticides					
Beta BHC	0.000047	NA	0.000047	NA	0.000047
Miscellaneous					
Benzene	0.0015	NA	0.0015	0.005	0.005
Toluene	NA	7.3000	7.3000	1	1

TR = target risk level
IRw = groundwater ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATc = averaging time (cancer)

THQ = target hazard quotient
IRw = groundwater ingestion rate
EF = exposure frequency
ED = exposure duration
BW = body weight
ATnc = averaging time (noncancer)

Table 14 Groundwater Objective for Caculating the Soil Component of the Groundwater Ingestion Exposure Route (Class II)

Calculated Parameters

Constituent	Calculated Tier 1 Value (mg/L)	Tier 1 ScreeningValu in Lookup Table (mg/L)	Groundwater Objective (mg/L)
Pesticides			
Beta BHC	0.00024	NA	0.00024
Miscellaneous			
Benzene	0.025	0.025	0.025
Toluene	5	2.5	2.5

Table 15 Tier 1 Screening Values for the Soil Component of the Groundwater Ingestion Exposure Route

Input Parameters

	Ingestion
foc (kg-OC/kg)	0.002
nw	0.3
na	0.13
pb (kg/L)	1.5
DF	20

Calculated Parameters

	Koc	H'	Kd	Koverall	Class I Groundwater			Class II Groundwater		
Constituent	(L/kg)	dimensionless	(L/kg)	(dless)	Cgw-sv (mg/L)	Cw (mg/L)	Cs (mg/kg)	Cgw-sv (mg/L)	Cw (mg/L)	Cs (mg/kg)
Pesticides										
Beta BHC	1.25E+03	3.05E-05	2.52E+00	2.7	0.000047	0.00095	0.0026	0.00024	0.0047	0.013
Miscellaneous										
Benzene	5.89E+01	2.28E-01	1.18E-01	0.34	0.005	0.10	0.034	0.03	1	0.17
Toluene	1.82E+02	2.72E-01	3.64E-01	0.59	1	20	12	2.5	50	29

foc = fraction organic carbon
nw = water-filled soil porosity
na = air-filled soil porosity
pb = dry soil bulk density
DF = dilution factor

Koc = organic carbon partition coefficient
H' = dimensionless Henry's law constant
Kd = soil to water partition coefficient
Koverall = overall soil to water and air partition coefficient
Cgw-sv = groundwater screening value
Cw = target soil leachate concentration
Cs = screening value for the soil component of the groundwater ingestion exposure route

Table 16 Summary of Calculated Tier 1 Screening Values to Values in Lookup Tables for Groundwater Ingestion

Constituent	Soil Component of Groundwater Ingestion Exposure Route				Groundwater Component of Groundwater Ingestion Exposure Route for Calculating the Soil Component			
	Class I		Class II		Class I		Class II	
	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)	Lookup Table (mg/kg)	Calculated (mg/kg)
Miscellaneous								
Benzene	0.03	0.03	0.017	0.17	0.005	0.005	0.025	0.025
Toluene	12	12	29	29	1	1	2.5	2.5

Appendix E

Appendix E

Development of Screening Values for Essential Nutrients

Development of Screening Values for Essential Nutrients

1.0 Introduction

The purpose of this document is to evaluate the potential toxicity of the essential nutrients calcium, magnesium, potassium and sodium to people and ecological receptors. In the case of humans, toxicological information is reviewed, where available, and upper bound acceptable daily intakes (UADI) are estimated. Since these chemicals are essential nutrients, they are inherently nontoxic at low levels of exposure where low levels are very high relative to intakes of chemicals that are considered toxic. Using these UADIs, screening levels are calculated for soil based on incidental ingestion and water based on the assumption that the water is used as a drinking water source. It is important to remember that since these chemicals are essential to the proper functioning of the body, daily exposure is necessary, so these screening levels must be interpreted with caution.

In the case of ecological receptors, screening levels are presented, where possible, for water based on potential adverse effects to aquatic organisms. In applying these screening levels, it must be remembered that these chemicals are also essential to the functioning of most living things. Thus, while some organisms are adversely affected by elevated concentrations, other organisms will thrive in an environment with these elevated levels. Therefore, reducing concentrations of these nutrients below dietary thresholds for this latter group of organisms will result in adverse effects. Therefore, these screening levels should also be interpreted with caution.

2.0 Human Health Screening Values

2.1 Overview of Chemical and Toxicological Data

In developing human health screening values for the essential nutrients, a review of the available pharmacological and toxicological data was made. The data that were gathered include solubility information as well as dietary nutrient requirements. A chemical's solubility is a measure of the amount of the chemical that will dissolve in water. The solubility of a chemical is dependent upon the form that it is present in. None of the essential nutrients considered in this evaluation are present in their pure elemental form in nature, but generally take the form of mineral salts or hydroxides. These forms and their associated solubilities are discussed in greater detail below for each essential nutrient.

Since these chemicals are essential to the functioning of the body, they are generally not the subject of toxicological or epidemiological studies. However, they are the subject of extensive nutritional evaluation. Thus, dietary nutrient requirements for each essential nutrient are the primary sources of information compiled and reviewed for this paper. Beginning in 1941, the National Academy of Sciences published recommended dietary allowances (RDAs) for nutrients essential for human health. Recent efforts to revise the approach to establishing and applying RDAs has resulted in the Institute of Medicine Food and Nutrition Board's Standing Committee on the Scientific Evaluation of Dietary Reference Intakes (DRI Committee) concluding that the RDAs should be replaced in their entirety by a new set of values termed the dietary reference intakes (DRIs).

According to the DRI Committee, DRIs are reference values to be used in planning and assessing diets for healthy populations as well as for other purposes (IM, 1997). The DRIs encompass the estimated average requirement (EAR), the RDA, the adequate intake (AI), and the tolerable upper intake level (UL). The EAR is the nutrient intake value adequate to meet the nutritional needs of 50 percent of a specified life stage and gender group, where life stage is generally the age of an individual but also accounts for the nutritional requirements of pregnant and lactating women. The EAR is expressed as a daily value averaged over time (usually at least one week) and is used in determining the RDA. The RDA is the average daily dietary intake level that is sufficient to meet the nutritional needs of 97 to 98 percent of individuals in a life stage and gender group. The RDA for a nutrient is a value to be used as a goal for dietary intake by healthy individuals. If insufficient data are available to calculate the EAR (and subsequently to determine the RDA), no RDA will be set and an AI will be developed based on the data available. The AI is based on observed or experimentally determined estimates of the average nutrient intake by a group of healthy people and can be used as a goal for the nutrient intake of individuals. The UL is defined as the highest level of daily nutrient intake from food, water and supplements that is likely to pose no risks of adverse health effects to most individuals in the general population. The UL is not intended to be a recommended level of intake but is intended to connote a level of intake that can be tolerated biologically. There may be insufficient data on which to develop a UL for some nutrients, however this does not mean that there is no potential for adverse effects resulting from high intake. The available DRIs for each of the essential nutrients included in this evaluation are discussed in greater detail below for each chemical.

2.2 Calcium

2.2.1 Overview of Pharmacological/Toxicological Data

The CRC Handbook of Chemistry and Physics (CRC Handbook) states that calcium is the fifth most abundant element in the earth's crust making up about 3% by weight (Lide, 1993). It is an essential constituent of leaves, bones, teeth and shells and occurs abundantly in nature in the carbonate or limestone form ($CaCO_3$). The carbonate form is responsible for hardness in water. Other common forms of calcium in nature include carbide (CaC_2) and chloride ($CaCl_2$). Elemental carbon decomposes in water to form the hydroxide $Ca(OH)_2$. The solubilities of these forms of calcium in water vary considerably from the relatively low soluble carbonate form (14 mg/L at 25 °C) to the relatively soluble chloride form (745,000 mg/L at 20 °C) (Lide, 1993).

According to the DRI Committee, calcium accounts for 1 to 2 percent of adult human body weight, primarily found in teeth and bones (IM, 1997). Though much information is available regarding the nutritional effects of calcium, the DRI Committee concluded that insufficient evidence was available to derive EARs (and subsequently RDAs). Therefore, AI values were developed for each life stage and gender group. In addition to the AIs, ULs have been determined for calcium. Several adverse health effects are related to excess intake of calcium (primarily from nutritional supplements). The most widely studied and biologically important are: kidney stone formation (nephrolithiasis), the syndrome of hypercalcemia and renal insufficiency with and without alkalosis (historically referred to as milk-alkali syndrome), and the interaction of calcium with the

absorption of other essential minerals (IM, 1997). Since the purpose of this evaluation is to develop an UADI, the ULs were used for this purpose. The ULs for calcium for each life stage group are given in the table below (IM, 1997).

Life Stage Group	Tolerable Upper Intake Level, UL (g/day)
0 through 6 months	Not determinable
7 through 12 months	Not determinable
1 though 3 years	2.5
4 through 8 years	2.5
9 through 18 years	2.5
19 through 70 years	2.5
> 70 years	2.5
Pregnancy: < 18 years	2.5
19 through 50 years	2.5
Lactation: < 18 years	2.5
19 through 50 years	2.5

Consistent with the methodology in the Tiered Approach to Corrective Action Objectives (TACO) (IPCB, 2001), UADIs were developed for children ages 1 through 6 and adults. The selected UADIs were 2.5 g/day or 2,500 mg/day for both age groups.

2.2.2 Derivation of Human Health Screening Values

Soil

Since the UADI has units of mg/day, the following equation is used to estimate the intake of calcium from incidentally ingested soil:

$$I = IR_s \bullet CF \bullet C_s$$

where:

I = intake (mg/day)
IR_s = ingestion rate of soil (mg/day)
CF = conversion factor
$= 10^{-6}$ kg/mg
C_s = concentration of calcium in soil (mg/kg)

If the intake is kept below the UADI, then the maximum allowed soil concentration is determined by setting I to UADI in the above equation and solving this equation for C_s.

$$C_s = UADI/(IR_s \bullet CF)$$

Based on the soil ingestion rates given in TACO (IPCB, 2001), the ingestion rate of 200 mg/day was used for children ages 1 through 6 years and the ingestion rate of 100 mg/day was used for adults. An ingestion rate of 480 mg/day from TACO (IPCB, 2001) was used for construction workers, although it is not clear that the UADI is applicable to these workers because their exposure is assumed to occur over a short period of time (30 days) and the UADI may reflect much longer duration exposures. The human health screening values for calcium in soil are 12,500,000 mg/kg for children, 25,000,000 mg/kg for adults and 5,200,000 mg/kg for construction workers (see Table 1). Since these concentrations

exceed the physical limit for calcium in soil (1,000,000 mg/kg), any concentration of calcium in soil is acceptable.

Drinking Water

Since the UADI has units of mg/day, the following equation is used to estimate the intake of calcium from incidentally ingested drinking water:

$$I = IR_w \bullet C_w$$

where:

I = intake (mg/day)
IR_w = ingestion rate of drinking water (L/day)
C_w = concentration of calcium in drinking water (mg/L)

If the intake is kept below the UADI, then the maximum allowed drinking water concentration is determined by setting I to UADI in the above equation and solving this equation for C_w.

$$C_w = UADI/IR_w$$

Based on the drinking water ingestion rates given in the EPA Region III Risk-Based Concentration Table (USEPA, 1999), the ingestion rate of 1 L/day was used for children ages 1 through 6 years and the ingestion rate of 2 L/day was used for adults. The human health screening values for calcium in drinking water are therefore 2,500 mg/L for children and 1,250 mg/L for adults.

2.3 Magnesium

2.3.1 Overview of Pharmacological/Toxicological Data

The CRC Handbook reports that magnesium is the eighth most abundant element in the earth's crust and is an important element in both plant and animal life (Lide, 1993). Elemental magnesium is not found in nature, but rather in combined forms such as magnesite ($MgCO_3$), dolomite and other minerals. Magnesium in water decomposes to the hydroxide form ($Mg(OH)_2$). This hydroxide form (milk of magnesia) as well as the chloride, sulfate and citrate forms are used in medicines. The naturally occurring forms of magnesium in water have low solubilities (hydroxide form - 9 mg/L at 18 °C, magnesite form – 106 mg/L), while the citrate form is relatively soluble (200,000 mg/L at 25 °C) (Lide, 1993).

The DRI Committee states that the magnesium content of the human body is approximately 25 g of which between 50 and 60 percent resides in bone in the normal adult (IM, 1997). Magnesium is a required component for more than 300 enzyme systems (IM, 1997). In determining DRIs for magnesium, the DRI Committee concluded that insufficient information was available to derive EARs for infants (ages 0 through 12 months) and therefore established AIs for this life stage group. For all other life stage groups, sufficient information was available to derive EARs and subsequently RDAs. The DRIs for each life stage group are presented in the table below (IM, 1997).

Life Stage Group	EAR (mg/day)		RDA (mg/day)		AI (mg/day)	
	Male	Female	Male	Female	Male	Female
0 through 6 months					30	30
7 through 12 months					75	75
1 through 3 years	65	65	80	80		
4 through 8 years	110	110	130	130		
9 through 13 years	200	200	240	240		
14 through 18 years	340	300	410	360		
19 through 30 years	330	255	400	310		
31 through 50 years	350	265	420	320		
51 through 70 years	350	265	420	320		
>70 years	350	265	420	320		
Pregnancy: < 18 years		335		400		
19 through 30 years		290		350		
31 through 50 years		300		360		
Lactation: < 18 years		300		360		
19 through 30 years		255		310		
31 through 50 years		265		320		

There is no evidence of adverse effects from the consumption of naturally occurring magnesium in foods, however, adverse effects from magnesium containing supplements may include diarrhea (IM, 1997). Therefore, ULs were developed which represent intake from a pharmacological magnesium supplement and do not include intake from food and water, as do the ULs for calcium above. The ULs for magnesium based on supplementary magnesium in the diet are given in the table below (IM, 1997).

Life Stage Group	Tolerable Upper Intake Level, UL (mg/day)
0 through 6 months	Not determinable
7 through 12 months	Not determinable
1 though 3 years	65
4 through 8 years	110
9 through 18 years	350
19 through 70 years	350
> 70 years	350
Pregnancy: < 18 years	350
19 through 50 years	350
Lactation: < 18 years	350
19 through 50 years	350

Consistent with TACO, UADIs were developed for children ages 1 through 6 and adults. The conservatively selected UADIs were 65 mg/day for children and 350 mg/day for adults.

2.3.2 Derivation of Human Health Screening Values

Soil

Based on the equations and intake assumptions presented previously, human health soil screening values were calculated for magnesium. The human health screening values for

magnesium in soil are 325,000 mg/kg for children, 3,500,000 mg/kg for adults and 730,000 mg/kg for construction workers (see Table 1). Since the concentration for adults exceeds the physical limit for magnesium in soil (1,000,000 mg/kg), any concentration of magnesium in soil is acceptable for an adult. It must be remembered that these values apply to magnesium in supplements and may not be relevant to the form of magnesium in soil.

Drinking Water

Based on the equation and intake assumptions presented previously, human health drinking water screening values were calculated for magnesium. The human health screening values for magnesium in drinking water are 65 mg/L for children and 175 mg/L for adults. It must be remembered that these values apply to magnesium in supplements and may not be relevant to the form of magnesium in water.

2.4 Potassium

2.4.1 Overview of Pharmacological/Toxicological Data

The CRC Handbook reports that potassium is the seventh most abundant element in the earth's crust, making up approximately 2.4% by weight (Lide, 1993). Potassium is an essential nutrient for plant growth and is found in most soils. Elemental potassium is never found free in nature, but it readily found in mineral forms. Most of the mineral forms are relatively insoluble, and as with other metals of the alkali group, potassium decomposes in water to the hydroxide form. The solubility of potassium hydroxide ranges between 1,070,000 mg/L at 15 °C and 1,780,000 mg/L at 100 °C (Lide, 1993).

Potassium is an essential element for the human body involved in both electrical and cellular functions (NLM, 2001). The DRI Committee has not established DRIs for potassium however, the U.S. Food and Drug Administration (FDA) provides a reference value for nutrition labeling for potassium of 3,500 mg/day (USFDA, 1999). MedlinePlus, a service of the National Library of Medicine and the National Institutes of Health, indicates that some experts recommend a potassium intake of between 2,000 and 2,500 mg/day (NLM, 2001). MedlinePlus also states that the average American diet provides between 2,000 and 6,000 mg/day of potassium (NLM, 2001). The UADI should be the lowest dose that could cause adverse effects. In the absence of such data, the highest reported acceptable level is used as the UADI. Therefore, a value of 3,500 mg/day was used as the UADI for potassium for children ages 1 through 6 and adults.

2.4.2 Derivation of Human Health Screening Values

Soil

Based on the equations and intake assumptions presented previously, human health soil screening values were calculated for potassium. The human health screening values for potassium in soil are 17,500,000 mg/kg for children, 35,000,000 mg/kg for adults and 7,300,000 mg/kg for construction workers (see Table 1). Since these concentrations exceed the physical limit for potassium in soil (1,000,000 mg/kg), any concentration of potassium in soil is acceptable.

Drinking Water

Based on the equations and intake assumptions presented previously, human health drinking water screening values were calculated for potassium. The human health screening values for potassium in drinking water are 3,500 mg/L for children and 1,750 mg/L for adults.

2.5 Sodium

2.5.1 Overview of Pharmacological/Toxicological Data

The CRC Handbook reports that sodium is the sixth most abundant element on earth, comprising approximately 2.6% of the earth's crust (Lide, 1993). The most common form of sodium is common salt or sodium chloride (NaCl), however it is present in many other minerals. As with other members of the alkali group, sodium decomposes in water to form the hydroxide form. Most forms of sodium are relatively soluble and range from 357,000 mg/L of NaCl at 0 °C to 3,470,000 mg/L of NaOH at 100 °C (Lide, 1993).

Sodium is an essential element for the human body involved in regulating blood pressure and blood volume and in the functioning of muscles and nerves (NLM, 2001). The DRI Committee has not established DRIs for sodium however, the FDA provides a reference value for nutrition labeling for sodium of 2,400 mg/day (USFDA, 1999). MedlinePlus indicates that the National Research Council of the National Academy of Sciences recommends an approximate daily range of 1,100 to 3,300 mg/day (NLM, 2001). MedlinePlus also states that the average intake in the United States is between 4,000 and 5,000 mg/day of sodium (NLM, 2001). The UADI should be the lowest dose that could cause adverse effects. In the absence of such data, the highest reported acceptable level is used as the UADI. Therefore, a value of 3,300 mg/day was used as the UADI for sodium for children 1 through 6 years and adults.

2.5.2 Derivation of Human Health Screening Values

Soil

Based on the equations and intake assumptions presented previously, human health soil screening values were calculated for sodium. The human health screening values for sodium in soil are 16,500,000 mg/kg for children, 33,000,000 mg/kg for adults and 6,900,000 mg/kg for construction workers (see Table 1). Since these concentrations exceed the physical limit for sodium in soil (1,000,000 mg/kg), any concentration of sodium in soil is acceptable.

Drinking Water

Based on the equations and intake assumptions presented previously, human health drinking water screening values were calculated for sodium. The human health screening values for sodium in drinking water are 1,100 mg/L for children and 550 mg/L for adults.

3.0 Surface Water Screening Values for Ecological Effects

3.1 Overview

The nutrients calcium, magnesium, potassium, and sodium are present in surface water at varying concentrations in natural systems as a result of natural mineral weathering. In Illinois freshwater streams, average concentrations of calcium range from 30 to 100

mg/L, 5 to 10 mg/L for magnesium, 1 to 5 mg/L for potassium, and 10 to 20 mg/L for sodium,; however, concentrations of these ions can vary depending on the waterbody type (typically higher in lakes and ponds) and flushing rates (USGS, 2001a; 2001b). They can also be considerably higher in groundwater, because groundwater is in contact with minerals over a prolonged time and therefore greater solubilization generally occurs in groundwater as compared to surface water.

In this section, screening values are identified for aquatic organisms (e.g., fish, aquatic invertebrates, and algae) for calcium, magnesium, potassium, and sodium based on laboratory toxicity tests using the freely dissolved forms of these ions. There is a high degree of uncertainty associated with these values since so few toxicity data are available for these common ions. Each screening value is based on the toxicity observed in a single organism (i.e., *Daphnia magna*), and as such, the screening values do not confer protection to the entire aquatic community. However, since the screening values represent the lowest chronic value identified in the literature, the values are most likely very conservative.

There is additional uncertainty associated with any screening level developed for these constituents, because they are essential nutrients to most organisms and a level that is toxic to one organism could be a level that is inadequate for another organism. In particular, if the naturally occurring level exceeds the screening level, then the entire aquatic community will have adapted to this "elevated concentration", so reducing the concentration of the nutrient could adversely affect the local community. Thus, scientific judgment must be employed when applying these screening levels.

3.2 Calcium

Suter and Tsao (1996) proposed a screening value of 116 mg/L for calcium. The screening value is based on the lowest chronic value identified in the literature and is based on tests reporting chronic toxicity to *Daphnia magna* exposed to $CaCl_2 \cdot 2H_20$. At 116 mg/L, a 16% reduction in reproduction was observed. The confidence in the screening value is low.

3.3 Magnesium

Suter and Tsao (1996) proposed a screening value of 82 mg/L for magnesium based on the lowest chronic value identified in the literature. The screening value is based on tests reporting chronic toxicity to *Daphnia magna* exposed to $MgCl_2 \cdot 6H_20$. At 82 mg/L, a 16% reduction in reproduction was observed. The confidence in the screening value is low.

3.4 Potassium

Suter and Tsao (1996) proposed a screening value of 53 mg/L for potassium based on the lowest chronic value identified in the literature. The screening value is based on tests reporting chronic toxicity to *Daphnia magna* exposed to KCl. At 53 mg/L, a 16% reduction in reproduction was observed. The confidence in the screening value is low.

3.5 Sodium

Suter and Tsao (1996) proposed a screening value of 680 mg/L for potassium in based on the lowest chronic value identified in the literature. This value is based on exposure to freshwater organisms. The screening value is based on tests reporting chronic toxicity to *Daphnia magna* exposed to NaCl. At 680 mg/L, a 16% reduction in reproduction was observed. The confidence in the screening value is low.

4.0 References

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Table 1 Soil and Drinking Water Screening Levels for Human Health Effects

Intake Parameters		
Soil ingestion rate		
Child	200	mg/day
Adult	100	mg/day
Construction worker	480	mg/day
Conversion factor	1.E-06	kg/mg
Drinking water ingestion rate		
Child	1	L/day
Adult	2	L/day

Toxicological Data and Screening Levels

	Upperbound Acceptable Daily Intake (UADI)				Screening Levels				
	Child		Adult		Soil			Drinking Water	
Chemical	Value mg/day	Basis	Value mg/day	Basis	Child mg/kg	Adult mg/kg	Con. Work. mg/kg	Child mg/L	Adult mg/L
Calcium	2,500	tolerable upper intake level (UL)	2,500	UL	12,500,000	25,000,000	5,200,000	2,500	1,250
Magnesium	65	UL for supplementary Mg	350	UL for supplementary Mg	325,000	3,500,000	730,000	65	175
Potassium	3,500	highest recommended intake reported in literature	3,500	highest recommended intake reported in literature	17,500,000	35,000,000	7,300,000	3,500	1,750
Sodium	3,300	highest recommended intake reported in literature	3,300	highest recommended intake reported in literature	16,500,000	33,000,000	6,900,000	3,300	1,650

Table 2 Surface Water Screening Levels for Ecological Receptors

Chemical	Value mg/L	Basis
Calcium	116	LCV from *Daphia magna* toxicity studies
Magnesium	82	LCV from *Daphia magna* toxicity studies
Potassium	53	LCV from *Daphia magna* toxicity studies
Sodium	680	LCV from *Daphia magna* toxicity studies

Notes:
LCV = Lowest Chronic Value

Appendix F

Appendix F

Calculation of Tier 2 Screening Values for Selected Constituents

This appendix provides the results of calculating Tier 2 screening values for the soil component of the groundwater ingestion exposure route for the following constituents: methylene chloride, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, carbazole, pentachlorophenol, beta-BHC, 4,4'-DDT, and dieldrin. In a Tier 2 evaluation, the additive effects of multiple noncarcinogenic chemicals acting on the same target organ should be considered. However, all of the chemicals included in this Tier 2 evaluation are considered carcinogenic. For this evaluation, a site-specific organic carbon content of 5.13% was used to estimate Tier 2 screening levels for the soil component of the groundwater ingestion exposure route.

Table 1 presents the calculation of a pH-specific organic carbon to water partitioning coefficient (K_{oc}) for pentachlorophenol. The estimation of the K_{oc} involved two calculations as outlined in the Technical Background Document to the Soil Screening Guidance (USEPA, 1996). First, the extent of ionization was calculated with the following equation.

$$f_{n,\,acid} = [HA]/([HA] + [A^-]) = (1 + 10^{(pH - pKa)})^{-1}$$

where:

$f_{n,\,acid}$ = fraction of neutral species present for organic acids (unitless)

[HA] = equilibrium concentration of organic acid (mol/L)

[A-] = equilibrium concentration of anion (mol/L)

pKa = acid dissociation constant (unitless)

Second, the K_{oc} was calculated using the following equation.

$$K_{oc} = K_{oc,n} * f_n + K_{oc,i} * (1 - f_n)$$

where:

K_{oc} = soil organic carbon to water partition coefficient (L/kg)

$K_{oc,n}$ = partition coefficient for the neutral species (L/kg)

f_n = fraction of neutral species present for acids or bases

$K_{oc,i}$ = partition coefficient for the ionized species (L/kg)

In Table 1, the K_{oc} for pentachlorophenol was calculated based on a site-specific pH of 7.8.

Table 2 presents the calculated Tier 2 screening values for the soil component of the groundwater ingestion route for soil using equations from Appendix C of TACO (IPCB, 2001). In Table 2, the column labeled K_d, the soil to water partitioning coefficient, is calculated from equation S-19. $K_{overall}$, the overall soil to water partitioning coefficient, is calculated from equation S-17. $C_{gw\text{-}sv}$, groundwater screening values, were obtained from Appendix B, Table F of TACO for all constituents except beta-BHC. The value for beta-BHC is provided in Appendix C of this report. C_w, the target soil leachate concentration, is calculated from equation S18. Finally, C_s, the Tier 2 screening value for the soil component of the groundwater ingestion exposure route, is calculated from equation S17.

References

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USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Solid Waste and Emergency Response, Washington, D.C. EPA/540/R-95/128.

Table 1 Calculation of pH-specific Organic Carbon to Water Partition Coefficient

Constituent: Pentachlorophenol

Parameter	Value
pKa	4.8
$K_{oc,n}$	19953
$K_{oc,i}$	398

Results

pH (unitless)	f_n (unitless)	K_{oc} (L/kg)	K_{oc} from Table 42 of USEPA (1996) (L/kg)
Validation			
4.9	0.4427	9055	9055
6.8	0.0099	592	592
8	0.0006	410	410
Results			
7.8	0.0010	418	

Table 2 Tier 2 Screening Values for the Soil Component of the Groundwater Ingestion Exposure Route

Input Parameters

Parameter	Value	Parameter
foc (kg-OC/kg)	0.0513	K (m/yr)
nw	0.3	i (m/m)
na	0.13	d (m)
pb (kg/L)	1.5	I (m/yr)
DF	20	L (m)

Calculated Parameters

Chemical	Koc (L/kg)	H' unitless	Kd (L/kg)	Koverall unitless	Cgw-sv (mg/L)	Cw (mg/L)	Cs (mg/kg)
VOCs							
Methylene Chloride	1.17E+01	8.98E-02	6.00E-01	0.8	0.00500	0.10000	0.081
SVOCs							
PAHs							
Benzo(a)anthracene	3.98E+05	1.37E-04	2.04E+04	20,417.6	0.00010	0.00200	41
Benzo(b)fluoranthene	1.23E+06	4.55E-03	6.31E+04	63,099.2	0.00010	0.00200	126
Benzo(a)pyrene	1.02E+06	4.63E-05	5.23E+04	52,326.2	0.00020	0.00400	209
Carbazole	3.00E+03	3.55E-06	1.54E+02	154.1	0.00400	0.08000	12
Pentachlorophenol	4.18E+02	1.00E-06	2.14E+01	21.6	0.00100	0.02000	0.43
Pesticides							
beta-BHC	1.26E+03	3.05E-05	6.46E+01	64.8	0.00005	0.00100	0.065
4,4'-DDT	2.63E+06	3.32E-04	1.35E+05	134,919.2	0.00030	0.00600	809.5
Dieldrin	2.14E+04	6.19E-04	1.10E+03	1,098.0	5.00E-06	0.00010	0.11

foc = fraction organic carbon
nw = water-filled soil porosity
na = air-filled soil porosity
pb = dry soil bulk density
DF = dilution factor

K = hydraulic conductivity
i = gradient
d = thickness of groundwater
I = infiltration rate
L = length of source

Koc = organic carbon partition coefficient
H' = dimensionless Henry's law constant
Kd = soil to water partition coefficient
Koverall = overall soil to water and air partition coefficient
Cgw-sv = groundwater screening value
Cw = target soil leachate concentration
Cs = screening value for the soil component of the groundwater ingestion exposure route

Appendix G

Appendix G

Calculation of Acute Action Level for Arsenic

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Client Comed | Date Oct 31, 2001
Site Tannery | By DJM
Subject Ars. Acute Tox. | App. JAG

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Arsenic Acute Toxicity

$$HI = I_i / RfD_{o\text{-}a} + I_d / RfD_{d\text{-}a}$$

$$I_i = \frac{IR_s * CF * ABS_i * C_s}{BW}$$

$$I_d = \frac{SA * AF * CF * ABS_d * C_s}{BW}$$

$RfD_{o\text{-}a}$ = 0.005 mg/kg-day, provisional MRL for acute oral toxicity from ATSDR

$RfD_{d\text{-}a}$ = assumed to be the same as $RfD_{o\text{-}a}$

$$HI = \left[\left(\frac{IR_s * CF * ABS_i}{BW \cdot RfD_{o\text{-}a}}\right) + \left(\frac{SA * AF * CF * ABS_d}{BW \cdot RfD_{d\text{-}a}}\right)\right] \cdot C_s$$

$$C_s = \frac{THI}{\left[\left(\frac{IR_s * CF * ABS_i}{BW \cdot RfD_{o\text{-}a}}\right) + \left(\frac{SA \cdot AF \cdot CF \cdot ABS_d}{BW \cdot RfD_{d\text{-}a}}\right)\right]}$$

MWG13-15_46528

ThermoRetec
Smart Solutions. Positive Outcomes.

$THI = 1$

$IR_s = 480\ mg/day$

$CF = 10^{-6}\ kg/mg$ (conversion factor)

$ABS_i = 0.8$ for arsenic

$BW = 70\ kg$

$SA = 3300\ cm^2/day$

$AF = 0.5\ mg/cm^2$

$ABS_d = 0.03$ for arsenic

$$C_s = \frac{1}{\left[\left(\frac{480\ mg/kg \cdot 10^{-6}\ kg/mg \cdot 0.8}{70\ kg \cdot 0.005\ mg/kg\text{-}day}\right) + \left(\frac{3300\ cm^2 \cdot 0.5\ mg/cm^2 \cdot 10^{-6}\ kg/mg \cdot 0.03}{70\ kg \cdot 0.005\ mg/kg\text{-}day}\right)\right]}$$

$$= \frac{1}{\left[1.1 \times 10^{-3}\ kg/mg + 1.4 \times 10^{-4}\ kg/mg\right]}$$

$$= \frac{1}{1.24 \times 10^{-3}\ kg/mg}$$

$$\simeq 800\ mg/kg$$

Appendix H

Appendix H

Tier 3 Evaluation for Area 1B

1.0 Introduction

This appendix presents Tier 3 screening values and forward risk calculations for the current on-site maintenance worker and future on-site outdoor worker at Area 1B of the Tannery Site from ingestion, dermal contact and particulate inhalation exposure to surface and subsurface soil based upon central tendency exposure (CTE) and reasonable maximum exposure (RME) scenarios.

Five constituents were identified in surface or subsurface soil that exceed the Industrial/Commercial Tier 1 screening values for soil ingestion, calculated according to TACO (IPCB, 2001). These constituents include arsenic, benzo(a)anthracene (BaA), benzo(a)pyrene (BaP), benzo(b)fluoranthene (BbF), and dibenz(a,h)anthracene. Additionally, similar acting chemicals were evaluated according to TACO, Section 742.915(h). Table F in Appendix A of TACO (IPCB, 2001) identifies the lungs as the target organ for arsenic for the inhalation route. Beryllium, cadmium and nickel are the only other constituent detected at the site that are identified in Table F as acting on the same target organ group as arsenic (lungs). Therefore, Tier 3 screening values and risk calculations were also calculated for beryllium, cadmium and nickel for the inhalation pathway only.

Likewise, Table F in Appendix A of TACO (IPCB, 2001) identifies the gastrointestinal system as the target organ for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. Chrysene and indeno(1,2,3-cd)pyrene are the only other constituent detected at the site that are identified in Table F as acting on the same target organ group as benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene (gastrointestinal system). Therefore, Tier 3 screening values and risk calculations were also calculated for chrysene and indeno(1,2,3-cd)pyrene.

The screening equations and risk calculations presented in this memo are derived using guidance from *U.S. EPA's Risk Assessment Guidance for Superfund (RAGS), Part A* (1989); *Massachusetts Guidance for Disposal Site Risk Characterization* (1995); *Illinois Pollution Control Board Tiered Approach to Corrective Action Objective (TACO)* (IPCB, 2001); *U.S. EPA's Region IV Human Health Risk Assessment Bulletins – Supplement to RAGS* (1995); *U.S. EPA's Soil Screening Guidance* (1996); *U.S. EPA's Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (2001); *U.S. EPA's Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure* (1993) and a Memorandum from U.S. EPA Toxicologist Robert Benson (1998). Although Tier 3 screening values and risk calculations were derived in a similar manner as the Tier 2 screening values, they are not identical to Tier 2 equations for the following reasons:

- The Tier 3 screening values and risk calculations incorporate innovations in risk assessment not found in Tier 2 screening value equations (IPCB, 2001), such as a modified method of assessing inhalation exposure using receptor-specific inhalation rates and exposure times.

- The Tier 3 screening values and risk calculations incorporate dermal exposure to soil, which is not included in the Tier 2 screening value (SSL) equations (IPCB, 2001).

- The Tier 3 screening values and risk calculations incorporate chemical-specific oral and dermal absorption factors (when available), which are not included in the Tier 2 screening value equations (IPCB, 2001).
- The Tier 3 screening values and risk calculations incorporate a fraction of ingestion and dermal contact based upon expected industrial activity patterns and the fraction of the site that is contaminated.

2.0 Noncancer Tier 3 Screening Values and Risk Calculations

The Tier 3 evaluation identifies a CTE scenario, which incorporates average exposure assumptions into the screening values and risk calculations. In addition, Tier 3 calculations were evaluated for a RME scenario, which incorporates upperbound exposure assumptions into the screening values and risk calculations. U.S. EPA's *Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure* (1993) provides guidance on how to identify appropriate CTE and RME exposure assumptions for a particular receptor. This guidance also provides standard default exposure assumptions, which were implemented into the Tier 3 screening values and forward risk calculations for this site. CTE and RME exposure assumptions for the current on-site maintenance worker (MW) are presented in Tables 1 and 2, respectively. CTE and RME exposure assumptions for the future on-site outdoor worker (OW) are presented in Tables 3 and 4, respectively.

2.1 Ingestion Calculations

Noncancer Tier 3 screening values and risk calculations related to incidental ingestion of soil are calculated using a modified version of the Tier 1 and 2 screening equation (equation [1]), which is presented below.

[1]

$$\frac{THQ \bullet BW \bullet AT \bullet 365\frac{d}{yr}}{\frac{1}{RfD_O} \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$$

2.1.1 Tier 3 Ingestion Noncancer Screening Value

The Tier 3 screening value calculation has been modified from the above Tier 1 and 2 calculation to account for the oral absorption and fraction of ingestion. The Tier 3 screening value calculation is presented below (modifications are in bold):

[2]

$$\textit{Tier 3 Ingestion Noncancer Screening Value, SVing (mg/kg)} = \frac{[THQ \times BW \times AT_{NC} \times 365\ d/yr]}{[IRsoil \times \mathbf{FI} \times 10^{-6}\ kg/mg \times EF \times ED \times \mathbf{ABSo} \times (1/RfDo)]}$$

where:

THQ	=	Target Hazard Quotient *(1), unitless*
BW	=	Body Weight (*70 kg, CTE and RME, both receptors*)
AT_{NC}	=	Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

IRsoil = Ingestion Rate *[CTE = 20 mg/day (both receptors); RME = 50 mg/day (both receptors)]*

FI = Fraction Ingested *[CTE = 10% (both receptors); RME = 20% (both receptors)]*

EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*

ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

ABSo = Oral Absorption Factor (*chemical-specific or default of 1*), unitless

RfDo = Oral Reference Dose *(chemical-specific), mg/kg-day*

The CTE and RME input parameters for the Tier 3 soil ingestion screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil ingestion screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral reference dose) are presented in Table 5.

2.1.2 Tier 3 Ingestion Noncancer Risk Calculation

The Tier 3 risk calculation has been modified from the above Tier 1 and 2 calculation to account for the oral absorption and fraction ingestion. The Tier 3 risk calculation is presented below (modifications are in bold):

[3]

$$\textit{Tier 3 Ingestion Noncancer Risk (unitless)} = \frac{[Csoil \times IRsoil \times FI \times 10^{-6}\ kg/mg \times EF \times ED \times ABSo \times (1/RfDo)]}{[BW \times AT_{NC} \times 365\ d/yr]}$$

where:

Csoil = Concentration in soil *(chemical-specific), mg/kg*

IRsoil = Ingestion Rate *[CTE = 20 mg/day (both receptors); RME = 50 mg/day (both receptors)]*

FI = Fraction Ingested *[CTE = 10% (both receptors); RME = 20% (both receptors)]*

EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*

ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

ABSo = Oral Absorption Factor (*chemical-specific or default of 1*), unitless

RfDo = Oral Reference Dose *(chemical-specific), mg/kg-day*

BW = Body Weight *(70 kg, CTE and RME, both receptors)*

AT_{NC} = Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

The CTE and RME input parameters for the Tier 3 soil ingestion risk calculation for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil ingestion risk calculation for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral reference dose) are presented in Table 5.

2.2 Dermal Contact Calculations

2.2.1 Tier 3 Dermal Contact Noncancer Screening Value

Noncancer Tier 1 and 2 screening equations related to dermal contact with soil are not presented in the (SSL) screening equations (IPCB, 2001). Therefore, the Tier 3 dermal screening equation is presented below. Per request by Illinois EPA (personal conversation with Tom Hornshaw, April 25, 2002), quantitative dermal evaluation for PAHs should not be calculated. Instead, dermal contact with PAHs is accounted for by assuming the quantitative results from ingestion (e.g., dermal risk = ingestion risk; dermal screening value = ingestion screening value).

Tier 3 Dermal Contact Noncancer Screening Value, SVderm (mg/kg) =

$$\frac{[THQ \times BW \times AT_{NC} \times 365\ d/yr]}{[BSAE \times FD \times 10^{-6}\ kg/mg \times AF \times EF \times ED \times ABSd \times (1/RfDd)]} \quad [4]$$

where:

THQ	=	Target Hazard Quotient *(1), unitless*
BW	=	Body Weight (*70 kg, CTE and RME, both receptors*)
AT_{NC}	=	Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
BSAE	=	Body Surface Area Exposed (*3,300 cm^2, CTE and RME, both receptors*)
FD	=	**Fraction of dermal contact with affected soil** ***[CTE = 10% (both receptors); RME = 20% (both receptors)]***
AF	=	Soil Adherence Factor *[CTE = 0.02 mg/cm^2 (both receptors); RME = 0.2 mg/cm^2 (both receptors)]*
EF	=	Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED	=	Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSd	=	**Dermal Absorption Factor** ***(chemical-specific), %/day***
RfDd	=	Dermal Reference Dose *(chemical-specific), mg/kg-day*

The CTE and RME input parameters for the Tier 3 dermal contact screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 dermal contact screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., dermal absorption factor, dermal reference dose) are presented in Table 5.

2.2.2 Tier 3 Dermal Contact Noncancer Risk Calculation

Noncancer Tier 1 and 2 screening equations related to dermal contact with soil are not presented in the (SSL) screening equations (IPCB, 2001). Therefore, the Tier 3 dermal risk calculation is presented below.

[5]

$$\textit{Tier 3 Dermal Contact Noncancer Risk (unitless)} = \frac{[Csoil \times BSAE \times FD \times 10^{-6}\ kg/mg \times AF \times EF \times ED \times ABSd \times (1/RfDd)]}{[BW \times AT_{NC} \times 365\ d/yr]}$$

where:

Csoil	=	Concentration in soil (*chemical-specific*), mg/kg
BSAE	=	Body Surface Area Exposed (*3,300 cm^2, CTE and RME, both receptors*)
FD	=	**Fraction of dermal contact with affected soil** ***[CTE = 10% (both receptors); RME = 20% (both receptors)]***
AF	=	Soil Adherence Factor *[CTE = 0.02 mg/cm^2 (both receptors); RME = 0.2 mg/cm^2 (both receptors)]*
EF	=	Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED	=	Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSd	=	**Dermal Absorption Factor** (*chemical-specific*), *%/day*
RfDd	=	Dermal Reference Dose *(chemical-specific), mg/kg-day*
BW	=	Body Weight (*70 kg, CTE and RME, both receptors*)
AT_{NC}	=	Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

The CTE and RME input parameters for the Tier 3 dermal contact risk calculation for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 dermal contact risk calculation for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., dermal absorption factor, dermal reference dose) are presented in Table 5.

2.3 Inhalation Calculations

Noncancer Tier 3 screening values and risk calculations related to inhalation are calculated using a modified version of the Tier 1 and 2 screening equation (equation [6]), which is presented below.

[6]

$$\frac{THQ \bullet AT \bullet 365\frac{d}{yr}}{EF \bullet ED \bullet \left(\frac{1}{RfC} \bullet \frac{1}{PEF}\right)}$$

The Tier 3 screening values and risk calculations have been modified from the above Tier 1 and 2 calculation to account for the discontinuous inhalation experienced by typical receptors (e.g., industrial workers typically work 8 hours per day) while using toxicity values [inhalation Reference Concentrations (RfC) and inhalation Unit Risks (URF)], which are based upon continuous inhalation. The discontinuous inhalation calculation is derived using equations presented in a memorandum by U.S. EPA Toxicologist Robert Benson (Benson, 1998) and accounts for a specific receptor's inhalation rate, exposure frequency, and exposure duration. This equation is derived from "Adjustment for Occupational Scenarios" in the memo by Benson (Benson, 1998). Contrary to the different adjustments for residential and occupational scenarios in Benson's memo, Equations [7] and [8] are used to calculated an inhaled volume for the current maintenance worker and future outdoor worker, as opposed to the older U.S. EPA default inhalation rate of 20 m^3/day, which is used in Benson's residential equation.

[7]

$$VEr_{(m^3/day)} = \frac{IR \times ET}{24_{hours/day}}$$

where:

VE_r	=	**Receptor inhaled volume during exposure** ***[CTE= 5.2 m^3/day (both receptors); RME= 12 m^3/day (both receptors)]***
IR	=	Inhalation rate *[CTE=31.2 m^3/day or 1.3 m^3/hr (both receptors); RME=36 m^3/day or 1.5 m^3/hr (both receptors)]*
ET	=	Exposure time *[CTE = 4 hours/day (both receptors); RME = 8 hours/day (both receptors)]*

Notes:
VE_r is changed from the original VE_{ok} (occupational default minute volume) because it will be used for all receptors. The equation to calculate VE_r is not specifically noted in Benson, 1998 but is a logical method to calculate daily inhalation.

2.3.1 Tier 3 Inhalation Noncancer Screening Value

The Tier 3 screening value calculation for a inhalation of particulates has been modified from the Tier 1 and 2 equation and is presented below (modifications are in bold):

[8]

Tier 3 Inhalation Noncancer Screening Value, SVinh

$$\frac{[THQ \times AT_{NC} \times 365\ d/yr]}{[(VEr/VEh) \times EF \times ED \times (1/RfC \times 1/PEF)]}$$

where:

THQ = Target Hazard Quotient *(1)*, unitless
AT_{NC} = Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
VE_r = **Receptor inhaled volume during exposure** *[CTE= 5.2 m^3/day (both receptors); RME= 12 m^3/day (both receptors)]*
VE_h = **Human default inhaled volume** *(20m^3/day, CTE and RME, both receptors)*
EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
RfC = Inhalation Reference Concentration (*chemical-specific*), *mg/m^3*
PEF = Particulate Emission Factor (*1.32E+09 m^3/kg, CTE and RME*)

The CTE and RME input parameters for the Tier 3 inhalation screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 inhalation screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., inhalation reference concentration) are presented in Table 5. A detailed description of the PEF used in equation [8] is presented below.

Particulate Emission Factor (PEF) For this site, all constituents identified for Tier 3 screening calculations are non-volatile. Therefore, a default residential PEF for industrial scenarios is presented for these two constituents. The PEF relates the concentration of a constituent in soil to the concentration of dust particulates in the air (USEPA, 1996; USEPA, 2001). The PEF is based on the "unlimited reservoir" model from Cowherd et al. (1985) developed to estimate particulate emissions due to wind erosion (USEPA, 1996). The PEF input parameter is the same for the CTE and RME exposure scenario and both types of industrial workers. The PEF value is presented in Tables 1 through 4.

2.3.2 Tier 3 Inhalation Noncancer Risk Calculation

The Tier 3 risk calculation for inhalation of soil particulates has been modified from the Tier 1 and 2 equation and is presented below (modifications are in bold):

[9]

Tier 3 Inhalation Noncancer Risk (unitless) =

$$\frac{[Csoil \times (VEr/VEh) \times EF \times ED \times (1/RfC \times 1/PEF)]}{[AT_{NC} \times 365\ d/yr]}$$

where:

Csoil	=	Concentration in soil (*chemical-specific*), *mg/kg*
VE_r	=	**Receptor inhaled volume during exposure** *[CTE= 5.2 m^3/day (both receptors); RME= 12 m^3/day (both receptors)]*
VE_h	=	**Human default inhaled volume** (*20m^3/day, CTE and RME, both receptors*)
EF	=	Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED	=	Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
RfC	=	Inhalation Reference Concentration (*chemical-specific*), *mg/m^3*
PEF	=	Particulate Emission Factor (*1.32E+09 m^3/kg, CTE and RME, receptors*)
AT_{NC}	=	Averaging Time, noncancer *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*

The CTE and RME input parameters for the Tier 3 inhalation risk calculation for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 inhalation risk calculation for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., inhalation reference concentration) are presented in Table 5.

2.4 Noncancer Toxicity Information

For the Tier 3 screening calculations, dermal toxicity values are assumed to be equal to oral toxicity values. The oral reference dose (RfDo) and inhalation reference concentration (RfC) for the 10 constituents are presented in Table 5. Noncancer toxicity values are not available for any of the six PAHs. Although oral reference doses and inhalation reference concentrations may be available for beryllium, cadmium, or nickel, they are not presented in Table 5 because the Tier 3 evaluation for these metals is based upon carcinogenic effects of inhalation only.

2.5 Noncancer Screening Values

The Tier 3 CTE and RME noncancer screening values for the current maintenance worker and future outdoor worker are presented in Tables 6 through 9.

The combined Tier 3 screening value (SVcomb) for all three soil pathways (ingestion, dermal contact, inhalation) is presented below in equation [10]:

$$1/SVcomb = 1/SVing + 1/SVderm + 1/SVinh \qquad [10]$$

Noncancer toxicity values are only available for arsenic. Therefore, Tier 3 CTE and RME noncancer screening values for arsenic are presented below.

Combined Noncancer Soil Screening Values for the Current Maintenance Worker

- CTE arsenic screening value = 118,418.6 mg/kg
- RME arsenic screening value = 8,901.2 mg/kg

Combined Noncancer Soil Screening Values for the Future Outdoor Worker

- CTE arsenic screening value = 19,466.1 mg/kg
- RME arsenic screening value = 2,563.5 mg/kg

2.6 Comparison of Soil Concentrations to Tier 3 Noncancer Screening Values

Tier 3 CTE and RME noncancer screening values for arsenic were compared to surface and subsurface soil concentrations (C_{soil}), which are identified as the upperbound estimate of average (UEA). C_{soil} values are presented in Tables 6 through 9 and below:

- Arsenic, surface soil (C_{soil} = 8.81 mg/kg), and
- Arsenic, subsurface soil (C_{soil} = 28.8 mg/kg)

Any C_{soil} value for a constituent that exceeds its respective CTE or RME Tier 3 combined noncancer screening value may pose a potential human health risk. The surface and subsurface C_{soil} values for arsenic do not exceed either the CTE or RME Tier 3 combined noncancer screening values for either receptor, indicating no potential for adverse risk for the current maintenance worker or for the future outdoor worker.

2.7 Calculation of Tier 3 Soil Noncancer Risks for a Current Maintenance Worker

Tier 3 CTE and RME noncancer risks for the current maintenance worker were calculated using both the surface and subsurface soil exposure point concentrations (C_{soil}), and the results of these comparisons are provided in Tables 6 and 7. C_{soil} values are presented below:

- Arsenic, surface soil (C_{soil} = 8.81 mg/kg), and
- Arsenic, subsurface soil (C_{soil} = 28.8 mg/kg)

The resulting CTE and RME noncancer risks for arsenic in surface soil are 7.4E-05 and 9.9E-04, respectively. Both of these noncancer risks are below an acceptable chronic threshold level of 1, indicating no potential for adverse risk from surface soil for the current maintenance worker. The resulting CTE and RME noncancer risks for arsenic in subsurface soil are 2.4E-04 and 3.2E-03, respectively. Both of these noncancer risks are below an acceptable chronic threshold level of 1, indicating no potential for adverse risk from subsurface soil for the current maintenance worker.

2.8 Calculation of Tier 3 Soil Noncancer Risks for a Future Outdoor Worker

Tier 3 CTE and RME noncancer risks for the future outdoor worker were calculated using both the surface and subsurface soil exposure point concentrations (C_{soil}), and the results of these comparisons are provided in Tables 8 and 9. C_{soil} values are presented below:

- Arsenic, surface soil (C_{soil} = 8.81 mg/kg), and
- Arsenic, subsurface soil (C_{soil} = 28.8 mg/kg)

The resulting CTE and RME noncancer risks for arsenic in surface soil are 4.5E-04 and 3.4E-03, respectively. Both of these noncancer risks are below an acceptable chronic threshold level of 1, indicating no potential for adverse risk from surface soil for the future outdoor worker. The resulting CTE and RME noncancer risks for arsenic in subsurface soil are 1.5E-03 and 1.1E-02, respectively. Both of these noncancer risks are below an acceptable chronic threshold level of 1, indicating no potential for adverse risk from subsurface soil for the future outdoor worker.

3 Cancer Tier 3 Screening Values and Risk Calculations

The Tier 3 screening value and risk calculation equations for carcinogenic constituents are identical to those calculations for noncarcinogenic constituents, with the exception of toxicity values. For example, the Inhalation Unit Risk Factor (URF) is used instead of the Inhalation Reference Concentration (RfC). When using an inhalation unit risk factor, a conversion factor of 1,000 ug/mg must also be used. A conversion factor is not necessary when using the oral slope factor instead of the oral reference dose.

3.1 Ingestion Calculations

Cancer Tier 3 screening values and risk calculations related to incidental ingestion of soil are calculated using a modified version of the Tier 1 and 2 screening equation (equation [11]), which is presented below.

[11]

$$\frac{TR \bullet BW \bullet AT_c \bullet 365\frac{d}{yr}}{SF_o \bullet 10^{-6}\frac{kg}{mg} \bullet EF \bullet ED \bullet IR_{soil}}$$

3.1.1 Tier 3 Ingestion Cancer Screening Value

The Tier 3 screening value calculation has been modified from the above Tier 1 and 2 calculation to account for the oral absorption and fraction of ingestion. The Tier 3 screening value calculation is presented below (modifications are in bold):

[12]

$$\textit{Tier 3 Ingestion Cancer Screening Value, SVing (mg/kg)} = \frac{[TR \times BW \times AT_C \times 365\ d/yr]}{[IRsoil \times \mathbf{FI} \times 10^{-6}\ kg/mg \times EF \times ED \times \mathbf{ABSo} \times SFo)]}$$

where:

TR = Target Risk Level (*1E-06*), *unitless*
BW = Body Weight (*70 kg, CTE and RME, both receptors*)
AT_C = Averaging Time, cancer (*70 years, CTE and RME, both receptors*)
IRsoil = Ingestion Rate *[CTE = 20 mg/day (both receptors); RME = 50 mg/day (both receptors)]*
FI = Fraction Ingested *[CTE = 10% (both receptors); RME = 20% (both receptors)]*
EF = *Exposure Frequency (CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSo = Oral Absorption Factor (*chemical-specific or default of 1*), *unitless*
SFo = Oral Slope Factor *(chemical-specific), mg/kg-day*$^{-1}$

The CTE and RME input parameters for the Tier 3 soil ingestion screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil ingestion screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral slope factor) are presented in Table 5.

3.1.2 Tier 3 Ingestion Cancer Risk Calculation

The Tier 3 risk calculation has been modified from the above Tier 1 and 2 calculation to account for the oral absorption and fraction ingestion. The Tier 3 risk calculation is presented below (modifications are in bold):

Tier 3 Ingestion Cancer Risk (unitless) = [13]

$$\frac{[Csoil \times IRsoil \times FI \times 10^{-6}\ kg/mg \times EF \times ED \times ABSo \times SFo]}{[BW \times AT_C \times 365\ d/yr]}$$

where:

Csoil = Concentration in soil (*chemical-specific*), *mg/kg*
IRsoil = Ingestion Rate *[CTE = 20 mg/day (both receptors); RME = 50 mg/day (both receptors)]*
FI = Fraction Ingested *[CTE = 10% (both receptors); RME = 20% (both receptors)]*
EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSo = Oral Absorption Factor (*chemical-specific or default of 1*), *unitless*

SFo = Oral Slope Factor *(chemical-specific), mg/kg-day^{-1}*
BW = Body Weight (*70 kg, CTE and RME, both receptors*)
AT_C = Averaging Time, cancer (*70 years, CTE and RME, both receptors*)

The CTE and RME input parameters for the Tier 3 soil ingestion risk calculations for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil ingestion risk calculations for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral slope factor) are presented in Table 5.

3.2 Dermal Contact Calculations

Cancer Tier 1 and 2 screening equations related to dermal contact with soil are not presented in the (SSL) screening equations (IPCB, 2001). Therefore, the Tier 3 dermal screening equation is presented below. Per request by Illinois EPA (personal conversation with Tom Hornshaw, April 25, 2002), quantitative dermal evaluation for PAHs should not be calculated. Instead, dermal contact with PAHs is accounted for by assuming the quantitative results from ingestion (e.g., dermal risk = ingestion risk; dermal screening value = ingestion screening value).

3.2.1 Tier 3 Dermal Contact Cancer Screening Value

Cancer Tier 1 and 2 screening equations related to dermal contact with soil are not presented in the (SSL) screening equations (IPCB, 2001). Therefore, the Tier 3 dermal screening equation is presented below.

Tier 3 Dermal Contact Cancer Screening Value, SVderm (mg/kg) =

$$\frac{[TR \times BW \times AT_C \times 365\ d/yr]}{[BSAE \times FD \times 10^{-6}\ kg/mg \times AF \times EF \times ED \times ABSd \times SFd]} \quad [14]$$

where:

TR = Target Risk Level (*1E-06*), *unitless*
BW = Body Weight (*70 kg, CTE and RME, both receptors*)
AT_C = Averaging Time, cancer (*70 years, CTE and RME, both receptors*)
BSAE = Body Surface Area Exposed (*3,300 cm^2, CTE and RME, both receptors*)
FD = **Fraction of dermal contact with affected soil** ***[CTE = 10% (both receptors); RME = 20% (both receptors)]***
AF = Soil Adherence Factor *[CTE = 0.02 mg/cm^2 (both receptors); RME = 0.2 mg/cm^2 (both receptors)]*
EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*

ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSd = **Dermal Absorption Factor (*chemical-specific default of 1*), *%/day***
SFd = Dermal Slope Factor *(chemical-specific), mg/kg-day^{-1}*

The CTE and RME input parameters for the Tier 3 soil dermal contact screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil dermal contact screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral slope factor) are presented in Table 5.

3.2.2 Tier 3 Dermal Contact Cancer Risk Calculation

Cancer Tier 1 and 2 screening equations related to dermal contact with soil are not presented in the (SSL) screening equations (IPCB, 2001). Therefore, the Tier 3 dermal risk calculation is presented below.

[15]

$$\textit{Tier 3 Dermal Contact Cancer Risk (unitless)} = \frac{[Csoil \times BSAE \times FD \times 10^{-6}\ kg/mg \times AF \times EF \times ED \times ABSd \times SFd]}{[BW \times AT_C \times 365\ d/yr]}$$

where:

Csoil = Concentration in soil *(chemical-specific), mg/kg*
BSAE = Body Surface Area Exposed *(3,300 cm^2, CTE and RME, both receptors)*
FD = Fraction of dermal contact with affected soil *[CTE = 10% (both receptors); RME = 20% (both receptors)]*
AF = Soil Adherence Factor *[CTE = 0.02 mg/cm^2 (both receptors); RME = 0.2 mg/cm^2 (both receptors)]*
EF = Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED = Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
ABSd = **Dermal Absorption Factor (*chemical-specific*), *%/day***
SFd = Dermal Slope Factor *(chemical-specific), mg/kg-day^{-1}*
BW = Body Weight *(70 kg, CTE and RME)*
AT_C = Averaging Time, cancer (70 years, *CTE and RME)*

The CTE and RME input parameters for the Tier 3 soil dermal contact risk calculations for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 soil dermal contact risk calculations for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., oral absorption factor, oral slope factor) are presented in Table 5.

3.3 Inhalation Calculations

3.3.1 Tier 3 Inhalation Cancer Screening Value

The Tier 3 screening value equation for carcinogenic constituents is identical to the screening value equation for noncarcinogenic constituents, with the exception that the Inhalation Unit Risk Factor (URF) is used instead of the Inhalation Reference Concentration (RfC). When using an inhalation unit risk factor, a conversion factor of 1,000 ug/mg must also be used.

[16]

$$\textit{Tier 3 Inhalation Cancer Screening Value, SVing (mg/kg)} = \frac{[TR \times AT_C \times 365\ d/yr]}{[(VEr/VEh) \times URF \times 1{,}000\ ug/mg \times EF \times ED \times (1/PEF)]}$$

where:

TR	=	Target Risk Level (*1E-06*), *unitless*
AT_C	=	Averaging Time, cancer (*70 years, CTE and RME, both receptors*)
VE_r	=	**Receptor inhaled volume during exposure** *[CTE= 5.2 m^3/day (both receptors); RME= 12 m^3/day (both receptors)]*
VE_h	=	**Human default inhaled volume** (*20m^3/day, CTE and RME, both receptors*)
URF	=	Inhalation Unit Risk Factor (*chemical-specific*), *($\mu g/m^3$)$^{-1}$*
EF	=	Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED	=	Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
PEF	=	Particulate Emission Factor (*1.32E+09 m^3/kg, CTE and RME*)

The CTE and RME input parameters for the Tier 3 inhalation screening value for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 inhalation screening value for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., inhalation unit risk factor) are presented in Table 5.

3.3.2 Tier 3 Inhalation Cancer Risk Calculation

The Tier 3 risk calculation has been modified from the Tier 1 and 2 equation and is presented below (modifications are in bold):

[17]

$$\textit{Tier 3 Inhalation Cancer Risk (unitless)} = \frac{[Csoil \times (VEr/VEh) \times EF \times ED \times URF \times 1{,}000\ ug/mg \times (1/PEF)]}{[AT_C \times 365\ d/yr]}$$

where:

Csoil	=	Concentration in soil (*chemical-specific*), *mg/kg*
VE_r	=	**Receptor inhaled volume during exposure** *[CTE= 5.2 m^3/day (both receptors); RME= 12 m^3/day (both receptors)]*
VE_h	=	**Human default inhaled volume** (*20m^3/day, CTE and RME, both receptors*)
EF	=	Exposure Frequency *(CTE MW = 36 days/year; RME MW = 72 days/year; CTE OW = 219 days/year; RME OW = 250 days/year)*
ED	=	Exposure Duration *[CTE = 5 years (both receptors); RME = 25 years (both receptors)]*
URF	=	Inhalation Unit Risk Factor (*chemical-specific*), *($\mu g/m^3$)$^{-1}$*
PEF	=	Particulate Emission Factor (*1.32E+09 m^3/kg, CTE and RME*)
AT_C	=	Averaging Time, cancer *(70 years, CTE and RME)*

The CTE and RME input parameters for the Tier 3 inhalation risk calculations for the current maintenance worker are presented in Tables 1 and 2, respectively. The CTE and RME input parameters for the Tier 3 inhalation risk calculations for the future outdoor worker are presented in Tables 3 and 4, respectively. Chemical-specific input parameters (e.g., inhalation unit risk factor) are presented in Table 5.

3.4 Cancer Toxicity Information

For the Tier 3 screening calculations, dermal toxicity values are assumed to be equal to oral toxicity values. The oral slope factor (SFo) and inhalation unit risk factor (URF) for the 10 constituents are presented in Table 5. Although oral slope factors may be available for beryllium, cadmium, or nickel, they are not presented in Table 5 because the Tier 3 evaluation for these metals is based upon carcinogenic effects of inhalation only.

3.5 Cancer Screening Values

The combined Tier 3 screening value (SVcomb) for all three soil pathways (ingestion, dermal contact, inhalation) is presented below in equation [18]:

$$1/SVcomb = 1/SVing + 1/SVderm + 1/SVinh \quad [18]$$

The Tier 3 CTE and RME combined cancer screening values for the current maintenance worker and future outdoor worker are presented below and in Tables 6 through 9.

Combined Cancer Soil Screening Values for the Current Maintenance Worker

- CTE arsenic screening value = 3,604.8 mg/kg
- RME arsenic screening value = 54.96 mg/kg
- CTE BaA screening value = 3,402.8 mg/kg
- RME BaA screening value = 68.05 mg/kg
- CTE BaP screening value = 340.1 mg/kg
- RME BaP screening value = 6.8 mg/kg

- CTE BbF screening value = 3,402.8 mg/kg
- RME BbF screening value = 68.05 mg/kg
- CTE beryllium screening value = 300,099.04 mg/kg
- RME beryllium screening value = 13,004.3 mg/kg
- CTE cadmium screening value = 400,132.05 mg/kg
- RME cadmium screening value = 17,339.05 mg/kg
- CTE chrysene screening value = 340,277.8 mg/kg
- RME chrysene screening value = 6,805.5 mg/kg
- CTE dibenz(a,h)anthracene screening value = 340.3 mg/kg
- RME dibenz(a,h)anthracene screening value = 6.8 mg/kg
- CTE indeno(1,2,3-cd)pyrene screening value = 3,402.8 mg/kg
- RME indeno(1,2,3-cd)pyrene screening value = 68.05 mg/kg
- CTE nickel screening value = 3,000,990.4 mg/kg
- RME nickel screening value = 130,042.9 mg/kg

Combined Cancer Soil Screening Values for the Future Outdoor Worker

- CTE arsenic screening value = 592.6 mg/kg
- RME arsenic screening value = 15.8 mg/kg
- CTE BaA screening value = 559.4 mg/kg
- RME BaA screening value = 19.6mg/kg
- CTE BaP screening value = 55.9 mg/kg
- RME BaP screening value = 1.96 mg/kg
- CTE BbF screening value = 559.4 mg/kg
- RME BbF screening value = 19.6 mg/kg
- CTE beryllium screening value = 49,331.3 mg/kg
- RME beryllium screening value = 3,745.2 mg/kg
- CTE cadmium screening value = 65,775.1 mg/kg
- RME cadmium screening value = 4,993.6 mg/kg
- CTE chrysene screening value = 55,936.1 mg/kg
- RME chrysene screening value = 1,960 mg/kg
- CTE dibenz(a,h)anthracene screening value = 55.9 mg/kg
- RME dibenz(a,h)anthracene screening value = 1.96 mg/kg
- CTE indeno(1,2,3-cd)pyrene screening value = 11,187.2 mg/kg
- RME indeno(1,2,3-cd)pyrene screening value = 19.6 mg/kg
- CTE nickel screening value = 493,313.5 mg/kg
- RME nickel screening value = 37,452.4 mg/kg

3.6 Comparison of Soil Concentrations to Tier 3 Cancer Screening Values

Tier 3 CTE and RME cancer screening values for the 10 constituents were compared to surface and subsurface soil concentrations (C_{soil}), which are identified as the upperbound estimate of average (UEA). C_{soil} values are presented in Tables 6 through 9 and below:

- Arsenic, surface soil (C_{soil} = 8.81 mg/kg), and
- Arsenic, subsurface soil (C_{soil} = 28.8 mg/kg)

- BaA, surface soil (C_{soil} = 5.84 mg/kg), and
- BaA, subsurface soil (C_{soil} = 3.6 mg/kg)

- BaP, surface soil (C_{soil} = 3.2 mg/kg), and
- BaP, subsurface soil (C_{soil} = 9.9 mg/kg)

- BbF, surface soil (C_{soil} = 5.35 mg/kg), and
- BbF, subsurface soil (C_{soil} = 21.5 mg/kg)

- Beryllium, surface soil (C_{soil} = 1.2 mg/kg), and
- Beryllium, subsurface soil (C_{soil} = 1.7 mg/kg)

- Cadmium, surface soil (C_{soil} = 4.7 mg/kg), and
- Cadmium, subsurface soil (C_{soil} = 1.3 mg/kg)

- Chrysene, surface soil (C_{soil} = 5.6 mg/kg), and
- Chrysene, subsurface soil (C_{soil} = 2.4 mg/kg)

- Dibenz(a,h)anthracene, surface soil (C_{soil} = 1.3 mg/kg), and
- Dibenz(a,h)anthracene, subsurface soil (C_{soil} = 0.6 mg/kg)

- Indeno(1,2,3-cd)pyrene, surface soil (C_{soil} = 6.8 mg/kg), and
- Indeno(1,2,3-cd)pyrene, subsurface soil (C_{soil} = 1.9 mg/kg)

- Nickel, surface soil (C_{soil} = 16.7 mg/kg), and
- Nickel, subsurface soil (C_{soil} = 14.3 mg/kg)

Any C_{soil} value for a constituent that exceeds its respective CTE or RME Tier 3 combined cancer screening value may pose a potential human health risk. A summary of results is presented below.

- The **surface** and **subsurface** C_{soil} values for all 10 constituents do not exceed the **CTE Tier 3 combined cancer screening values for either receptor**, indicating no potential for adverse risk for the current maintenance worker or for the future outdoor worker based upon a CTE scenario.

- The **surface** C_{soil} values for all 10 constituents do not exceed the **RME Tier 3 combined cancer screening values for the current maintenance worker,** indicating no potential for adverse risk for the current maintenance worker based upon a RME scenario.

- The **subsurface** C_{soil} values for all 10 constituents, **except benzo(a)pyrene,** do not exceed the **RME Tier 3 combined cancer screening values for the current maintenance worker**, indicating no potential for adverse risk for the current maintenance worker based upon a RME scenario. The subsurface C_{soil} value for benzo(a)pyrene (9.9 mg/kg) is not significantly greater than the RME Tier 3 combined screening value (6.8 mg/kg) for the current maintenance worker.

- The **surface** C_{soil} values for all 10 constituents, except **benzo(a)pyrene**, do not exceed the **RME Tier 3 combined cancer screening values for the future outdoor worker**, indicating no potential for adverse risk for the future outdoor worker based upon a RME scenario. The surface C_{soil} value for benzo(a)pyrene (3.2 mg/kg) is not significantly greater than the RME Tier 3 combined screening value (1.96 mg/kg) for the future outdoor worker.

- The **subsurface** C_{soil} values for all 10 constituents, except **arsenic, benzo(a)pyrene,** and **benzo(b)fluoranthene** do not exceed the **RME Tier 3 combined cancer screening values for the future outdoor worker**, indicating no potential for adverse risk for the future outdoor worker based upon a RME scenario. The subsurface C_{soil} value for arsenic (28.8 mg/kg) is not significantly greater than the RME Tier 3 combined screening value (15.8 mg/kg) for the future outdoor worker. The subsurface C_{soil} value for benzo(a)pyrene (9.9 mg/kg) is not significantly greater than the RME Tier 3 combined screening value (1.96 mg/kg) for the future outdoor worker. The subsurface C_{soil} value for benzo(b)fluoranthene (21.5 mg/kg) is not significantly greater than the RME Tier 3 combined screening value (19.6 mg/kg) for the future outdoor worker.

3.7 Calculation of Tier 3 Soil Cancer Risks for a Current Maintenance Worker

Tier 3 CTE and RME cancer risks for the current maintenance worker were calculated using both the surface and subsurface soil exposure point concentrations (C_{soil}), and the results of these comparisons are provided in Tables 6 and 7. When evaluating carcinogenic risks, an acceptable cancer risk range of 10^{-6} to 10^{-4} is consistent with the National Oil and Hazardous Substance Pollution Contingency Plan (1990) and with Illinois regulations (Section 742.900; Subpart I of TACO). According to the Illinois EPA, a site with carcinogenic risks less than 10^{-6} generally should be considered a no-action site. For sites with carcinogenic risks greater than 10^{-6}, further risk evaluation of the site is required. For sites with a carcinogenic risk greater than 10^{-4}, corrective action is normally required (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002).

The resulting RME cancer risks for all 10 constituents in surface soil are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from surface soil for the current maintenance worker based upon a RME scenario. In addition, the resulting cumulative RME surface soil cancer risk (1.1E-06) is within an acceptable cancer risk range of 10^{-6} to 10^{-4}. The resulting RME cancer risks for all 10 constituents in subsurface soil, except benzo(a)pyrene, are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from subsurface soil for the current maintenance worker based upon a RME scenario. The resulting benzo(a)pyrene RME subsurface soil cancer risk (1.4E-06) and cumulative RME subsurface soil cancer risk (2.5E-06) are both within an acceptable cancer risk range of 10^{-6} to 10^{-4}. Therefore, all surface and subsurface soil RME cancer risks are above Illinois EPA no-action level of 10^{-6}, but fall within the carcinogenic risk range of 10^{-6} to 10^{-4}, where additional site evaluation is required. The CTE cancer risk calculations provide that additional evaluation.

The resulting CTE cancer risks for all 10 constituents in surface soil and subsurface soil are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from surface or subsurface soil for the current maintenance worker based upon a CTE scenario. In addition, the resulting CTE cumulative cancer risks were also below the Illinois EPA no-action level of 10^{-6} (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002) and below the acceptable cancer risk range of 10^{-6} to 10^{-4}.

In summary, all surface and subsurface soil cancer risks based upon RME scenarios are within an acceptable cancer risk range of 10^{-6} to 10^{-4}, while the CTE cancer risks are below 10^{-6}. The RME and CTE assumptions were kept very conservative to allow for unrestricted industrial use. While it is possible that Area 1B will be used in the future, the majority of the site is expected to be covered with buildings or surface cover (pavement, gravel, etc.), which also limits direct contact. This, taken in consideration, along with the results of the Tier 3 risk evaluation indicate little or no potential for adverse risk from surface or subsurface soil for the current maintenance worker based upon both CTE and RME scenarios.

3.8 Calculation of Tier 3 Soil Cancer Risks for a Future Outdoor Worker

Tier 3 CTE and RME cancer risks for the future outdoor worker were calculated using both the surface and subsurface soil exposure point concentrations (C_{soil}), and the results of these comparisons are provided in Tables 8 and 9. When evaluating carcinogenic risks, an acceptable cancer risk range of 10^{-6} to 10^{-4} is consistent with the National Oil and Hazardous Substance Pollution Contingency Plan (1990) and with Illinois regulations (Section 742.900; Subpart I of TACO). According to the Illinois EPA, a site with carcinogenic risks less than 10^{-6} generally should be considered a no-action site. For sites with carcinogenic risks greater than 10^{-6}, further risk evaluation of the site is required. For sites with a carcinogenic risk greater than 10^{-4}, corrective action is normally required (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002). The resulting RME cancer risks for all 10 constituents, except benzo(a)pyrene, in surface soil are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from surface soil for the future outdoor worker based upon a RME scenario. The resulting benzo(a)pyrene RME surface soil cancer risk (1.6E-06) and cumulative RME surface soil cancer risk (3.8E-06) are both within an acceptable cancer risk range of 10^{-6} to 10^{-4}.

The resulting RME cancer risks for all 10 constituents in subsurface soil, except arsenic, benzo(a)pyrene, and benzo(b)fluoranthene, are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from subsurface soil for the future outdoor worker based upon a RME scenario. The resulting arsenic RME subsurface soil cancer risk (1.8E-06), benzo(a)pyrene RME subsurface soil cancer risk (5.0E-06), benzo(b)fluoranthene RME subsurface soil cancer risk (1.1E-06),and cumulative RME subsurface soil cancer risk (8.6E-06) are all within an acceptable cancer risk range of 10^{-6} to 10^{-4}. All surface and subsurface soil RME cancer risks are above Illinois EPA no-action level of 10^{-6}, but fall within the carcinogenic risk range of 10^{-6} to 10^{-4}, where additional site evaluation is required. The CTE cancer risk calculations provide that additional evaluation.

The resulting CTE cancer risks for all 10 constituents in surface soil and subsurface soil are below an acceptable cancer risk range of 10^{-6} to 10^{-4}, indicating no potential for adverse risk from surface or subsurface soil for the future outdoor worker based upon a CTE scenario. In addition, the resulting CTE cumulative cancer risks were also below the Illinois EPA no-action level of 10^{-6} (personal communication with Connie Sullinger of Illinois EPA, April 9, 2002) and below the acceptable cancer risk range of 10^{-6} to 10^{-4}.

In summary, all surface and subsurface soil cancer risks based upon RME scenarios are within an acceptable cancer risk range of 10^{-6} to 10^{-4}, while the CTE cancer risks are below 10^{-6}. The RME and CTE assumptions were kept very conservative to allow for unrestricted industrial use. While it is possible that Area 1B will be used in the future, the majority of the site is expected to be covered with buildings or surface cover (pavement, gravel, etc.), which also limits direct contact. This, taken in consideration, along with the results of the Tier 3 risk evaluation indicate little or no potential for adverse risk from surface or subsurface soil for the future outdoor worker based upon both CTE and RME scenarios.

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Table 1 Summary of Central Tendency Exposure (CTE) Assumptions for the Current On-Site Maintenance Worker

Parameter	Value	Rationale/Reference
General Assumptions:		
BW (body weight)	70 kg	standard default for adult [EPA, 1991]
AT (averaging times):		
Carcinogenic effects	70 yrs	standard default [EPA, 1991]
Chronic effects (noncarc.)	5 yrs	standard CTE default occupational assumption - adult [EPA, 1993]
ED (exposure duration)	5 yrs	standard CTE default occupational assumption - adult [EPA, 1993]
Surface Soil Exposure Assumptions:		
Incidental Ingestion		
IR (ingestion rate)	20 mg/day	average daily soil ingestion among adults gardening [EPA, 1997; T4-15]
EF (exposure frequency)	36 days/year	assumes exposure to site 3 times per month for a year [professional judgement]
FI (fraction ingested)	10%	4 hours per day outdoors [4 hr/d / 8 hr/d = 0.5] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [EPA Region IV, 1996; EPA, 1998; Magee et al., 1998]
Dermal Contact		
TBS (total body surface area)	3300 cm^2	recommended industrial CTE surface area for soil contact [EPA, 2001, Exhibit 3-5]
FBE (fraction of body exposed)	100.0%	assumes complete exposure
AF (soil adherence factor)	0.02 mg/cm^2	recommended industrial CTE adherence factor for soil contact [EPA, 2001; Exhibit 3-5]
EF (exposure frequency)	36 days/year	assumes exposure to site 3 times per month for a year [professional judgement]
FD (fraction dermal contact)	10%	4 hours per day outdoors [4 hr/d / 8 hr/d = 0.5] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [Magee et al., 1998; EPA Region IV, 1996; EPA, 2001]
Inhalation of Dust/Volatiles:		
IR (inhalation rate)	1.3 m^3/hr	recommended mean hourly inhalation rate for outdoor workers [EPA, 1997; T5-23]
ET (exposure time)	4 hr/day	50% time outdoors in an 8-hour workday to account indoor activities during colder 8 months [professional judgement]
EF (exposure frequency)	36 days/year	assumes exposure to site 3 times per month for a year [professional judgement]
PEF (particulate emission factor)	1.32E+09 m^3/kg	recommended PEF [EPA, 1996]

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Table 2 Summary of Reasonable Maximum Exposure (RME) Assumptions for the Current On-Site Maintenance Worker

General Assumptions	Site-specific	Rationale
BW (body weight)	70 kg	standard default for adult [EPA, 1991]
AT (averaging times):		
Carcinogenic effects	70 yrs	standard default [EPA, 1991]
Chronic effects (noncarc.)	25 yrs	standard RME default occupational assumption - adult [EPA, 1993]
EF (exposure frequency)	72 days/year	assumes exposure to site 6 times per month for a year [professional judgement]
ED (exposure duration)	25 yrs	standard RME default occupational assumption - adult [EPA, 1993]
Surface Soil Exposure Assumptions		
Incidental Ingestion		
IR (ingestion rate)	50 mg/day	standard exposure assumption for occupational adults [IPCB, 2001, Appendix C, Table B; EPA, 1991; EPA, 1997, T1-2]
FI (fraction ingested)	20%	8 hours per day outdoors [8 hr/d / 8 hr/d = 1.0] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [EPA Region IV, 1996; EPA, 1998; Magee et al., 1996]
Dermal Contact		
TBS (total body surface area)	3300 cm^2	recommended industrial RME surface area for soil contact [EPA, 2001, Exhibit 3-6]
FBE (fraction of body exposed)	100.0%	assumes complete exposure
AF (soil adherence factor)	0.2 mg/cm^2	recommended industrial RME adherence factor for soil contact [EPA, 2001; Exhibit 3-6]
FD (fraction dermal contact)	20%	8 hours per day outdoors [8 hr/d / 8 hr/d = 1.0] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [Magee et al., 1998; EPA Region IV, 1996; EPA, 2001]
Inhalation of Dust/Volatiles:		
IR (inhalation rate)	1.5 m^3/hr	recommended mean inhalation rate for outdoor workers engaged in moderate activities [EPA, 1997; T5-23]
ET (exposure time)	8 hr/day	assumes 100% time outdoors in an 8-hour workday [professional judgement]
PEF (particulate emission factor)	1.32E+09 m^3/kg	recommended PEF [EPA, 1996]

EPA, 2001. Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E: Supplemental Guidance for Dermal Risk Assessment). Interim. Office of Emergency and Remedial Response,
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Table 3 Summary of Central Tendency Exposure (CTE) Assumptions for the Future On-Site Outdoor Worker

General Assumptions	Site-specific	
BW (body weight)	70 kg	standard default for adult [EPA, 1991]
AT (averaging times):		
Carcinogenic effects	70 yrs	standard default [EPA, 1991]
Chronic effects (noncarc.)	5 yrs	standard CTE default occupational assumption - adult [EPA, 1993]
ED (exposure duration)	5 yrs	standard CTE default occupational assumption - adult [EPA, 1993]
Surface Soil Exposure Assumptions		
Incidental Ingestion		
IR (ingestion rate)	20 mg/day	average daily soil ingestion among adults gardening [EPA, 1997; T4-15]
EF (exposure frequency)	219 days/year	CTE default for occupational scenario [EPA, 1993]; recommended Industrial CTE for soil contact [EPA, 2001, Exhibit 3-5]
FI (fraction ingested)	10%	4 hours per day outdoors [4 hr/d / 8 hr/d = 0.5] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [EPA Region IV, 1996; EPA, 1998; Magee et al., 1996]
Dermal Contact		
TBS (total body surface area)	3300 cm^2	recommended Industrial CTE surface area for soil contact [EPA, 2001, Exhibit 3-5]
FBE (fraction of body exposed)	100.0%	assumes complete exposure
AF (soil adherence factor)	0.02 mg/cm^2	recommended Industrial CTE adherence factor for soil contact [EPA, 2001; Exhibit 3-5]
EF (exposure frequency)	219 days/year	CTE default for occupational scenario [EPA, 1993]; recommended Industrial CTE for soil contact [EPA, 2001, Exhibit 3-5]
FD (fraction dermal contact)	10%	4 hours per day outdoors [4 hr/d / 8 hr/d = 0.5] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [Magee et al., 1996; EPA Region IV, 1996; EPA, 2001]
Inhalation of Dust/Volatiles:		
IR (inhalation rate)	1.3 m^3/hr	recommended mean hourly inhalation rate for outdoor workers [EPA, 1997; T5-23]
ET (exposure time)	4 hr/day	50% time outdoors in an 8-hour workday to account for indoor activities during colder 6 months [professional judgement]
EF (exposure frequency)	219 days/year	CTE default for occupational scenario [EPA, 1993]; recommended Industrial CTE for soil contact [EPA, 2001, Exhibit 3-5]
PEF (particulate emission factor)	1.32E+09 m^3/kg	recommended PEF [EPA, 1996]

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Table 4 Summary of Reasonable Maximum Exposure (RME) Assumptions for the Future On-Site Outdoor Worker

General Assumptions	Site-specific	
BW (body weight)	70 kg	standard default for adult [EPA, 1991]
AT (averaging times):		
Carcinogenic effects	70 yrs	standard default [EPA, 1991]
Chronic effects (noncarc.)	25 yrs	standard RME default occupational assumption - adult [EPA, 1993]
EF (exposure frequency)	250 days/year	standard RME default occupational assumption [EPA, 1991; EPA, 1993]
ED (exposure duration)	25 yrs	standard RME default occupational assumption - adult [EPA, 1993]
Surface Soil Exposure Assumptions		
Incidental Ingestion		
IR (ingestion rate)	50 mg/day	standard exposure assumption for occupational adults [IPCB, 2001, Appendix C, Table B; EPA, 1991; EPA, 1997, T1-2]
FI (fraction ingested)	20%	8 hours per day outdoors [8 hr/d / 8 hr/d = 1.0] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [EPA Region IV, 1996; EPA, 1998; Magee et al., 1996]
Dermal Contact		
TBS (total body surface area)	3300 cm^2	recommended industrial RME surface area for soil contact [EPA, 2001, Exhibit 3-5]
FBE (fraction of body exposed)	100.0%	assumes complete exposure
AF (soil adherence factor)	0.2 mg/cm^2	recommended industrial RME adherence factor for soil contact [EPA, 2001; Exhibit 3-5]
FD (fraction dermal contact)	20%	8 hours per day outdoors [8 hr/d / 8 hr/d = 1.0] x 20% of Area 1B shown to be impacted [total Area B1=11.2 acres] [professional judgement]
RAF (relative absorption factor)	chemical-specific	value varies according to chemical [Magee et al., 1996; EPA Region IV, 1996; EPA, 2001]
Inhalation of Dust/Volatiles:		
IR (inhalation rate)	1.5 m^3/hr	recommended mean inhalation rate for outdoor workers engaged in moderate activities [EPA, 1997; T5-23]
ET (exposure time)	8 hr/day	assumes 100% time outdoors in an 8-hour workday [professional judgement]
PEF (particulate emission factor)	1.32E+09 m^3/kg	recommended PEF [EPA, 1996]

EPA, 2001. Risk Assessment Guidance for Superfund. Volume I: Human Health Evaluation Manual (Part E: Supplemental Guidance for Dermal Risk Assessment). Interim. Office of Emergency and Remedial Response.

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Table 5 Summary of Toxicity Information

Compound	Tier 3 Input Parameters											
	Oral Absorption Factor (unitless)	Dermal Absorption Factor [1],[a] (%/day)	1/PEF [2] (kg/m^3)	Oral Reference Dose [b] (mg/kg-d)		Inhalation Reference Concentration (mg/m^3)		Oral Slope Factor [b] $(mg/kg-d)^{-1}$		Inhalation Unit Risk $(ug/m^3)^{-1}$	
Arsenic	0.8	0.03	7.58E-10	3.00E-04	[3]	NA	–	1.50E+00	[3]	4.30E-03	[3]
Benzo(a)anthracene	1	NA	7.58E-10	NA	–	NA	–	7.30E-01	[4]	NA	–
Benzo(a)pyrene	1	NA	7.58E-10	NA	–	NA	–	7.30E+00	[3]	9.00E-04	[4]
Benzo(b)fluoranthene	1	NA	7.58E-10	NA	–	NA	–	7.30E-01	[4]	NA	–
Beryllium [c]	NA	NA	7.58E-10	NA	–	NA	–	NA	–	2.40E-03	[3]
Cadmium [c]	NA	NA	7.58E-10	NA	–	NA	–	NA	–	1.80E-03	[3]
Chrysene [d]	1	NA	7.58E-10	NA	–	NA	–	7.30E-03	[4]	NA	–
Dibenz(a,h)anthracene	1	NA	7.58E-10	NA	–	NA	–	7.30E+00	[4]	NA	–
Indeno(1,2,3-cd)pyrene [d]	1	NA	7.58E-10	NA	–	NA	–	7.30E-01	[4]	NA	–
Nickel [c]	NA	NA	7.58E-10	NA	–	NA	–	NA	–	2.40E-04	[3]

Notes:

NA = Not available or not applicable

[a] Quantitative dermal evaluation not included for PAHs. Dermal contact with PAHs accounted for assuming quantitative results from ingestion (*e.g., dermal risk = ingestion risk; dermal screening value = ingestion screening value*).

[b] Dermal toxicity values are assumed to be equal to oral toxicity values.

[c] Although constituent does not exceed Tier 1 screening levels, it is a similar acting carcinogenic constituent as arsenic (target organ = lungs), which is a COC. Therefore, only carcinogenic inhalation evaluation for this constituent is presented per TACO Section 742.Appendix A, Table F.

[d] Although constituent does not exceed Tier 1 screening levels, it is a similar acting carcinogenic constituent as BaA, BaP & BfF (target organ = GI system), which are COC. Therefore, only carcinogenic evaluation for this constituent is presented per TACO Section 742.Appendix A, Table F.

References:

[1] USEPA Region III, 1995. USEPA, Region III, Hazardous Waste Management Division, Office of Superfund Programs, Region III Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure From Soil. EPA/903-K-95-003. December.

[2] USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R-95/128. May.

[3] USEPA, 2002. U.S. EPA's Integrated Risk Information System (IRIS). 2002. On-line database: www.epa.gov/iris

[4] As cited in USEPA's Region III September 2001 Risk Based Concentration (RBC) table as EPA-NCEA provisional value

Table 6 Summary of CTE Calculated Tier 3 Screening Values and Surface and Subsurface Soil Risks for the Current On-Site Maintenance Worker

Compound	CTE Noncancer Screening Values (SV) for On-Site Maintenance Worker Target Hazard Index = 1				CTE Cancer Screening Values (SV) for On-Site Maintenance Worker Target Risk Level = 1E-06				CTE Cancer Screening Values (SV) for On-Site Maintenance Worker Target Risk Level = 1E-05				Exposure Point Concentration	CTE Noncancer Risk Calculations for On-Site Maintenance Worker, Surface Soil				CTE Cancer Risk Calculations for On-Site Maintenance Worker, Surface Soil				Exposure Point Concentration	CTE Noncancer Risk Calculations for On-Site Maintenance Worker, Subsurface Soil				CTE Cancer Risk Calculations for On-Site Maintenance Worker, Subsurface Soil			
	Noncancer, Ingestion mg/kg	Noncancer, Dermal Contact (b) mg/kg	Noncancer, Inhalation mg/kg	Noncancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact (b) mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact (b) mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Surface Soil, C_{soil} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact (b)	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact (b)	Cancer, Inhalation	Cancer, Combined	Subsurface Soil, C_{soil} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact (b)	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact (b)	Cancer, Inhalation	Cancer, Combined
Arsenic	1.33E+05	1.08E+05	NA	1.18E+05	4.14E+03	3.33E+04	1.67E+05	3.80E+03	4.14E+04	3.33E+05	1.67E+06	3.80E+04	8.81E+00	6.62E-05	8.16E-05	NA	7.44E-05	2.13E-09	2.65E-10	5.29E-11	2.44E-09	2.88E+01	2.16E-04	2.64E-05	NA	2.43E-04	6.96E-09	8.61E-10	1.72E-10	7.99E-09
Benz(a)anthracene	NA	NA	NA	NA	6.81E+03	6.81E+03	NA	3.40E+03	6.81E+04	6.81E+04	NA	3.40E+04	5.84E+00	NA	NA	NA	NA	8.58E-10	8.58E-10	NA	1.72E-09	3.60E+00	NA	NA	NA	NA	5.29E-10	5.29E-10	NA	1.06E-09
Benzo(a)pyrene	NA	NA	NA	NA	6.81E+02	6.81E+02	8.00E+06	3.40E+02	6.81E+03	6.81E+03	8.00E+07	3.40E+03	3.20E+00	NA	NA	NA	NA	4.70E-09	4.70E-09	4.00E-13	9.41E-09	9.80E+00	NA	NA	NA	NA	1.43E-08	1.43E-08	1.24E-12	2.91E-08
Benzo(b)fluoranthene	NA	NA	NA	NA	6.81E+03	6.81E+03	NA	3.40E+03	6.81E+04	6.81E+04	NA	3.40E+04	5.33E+00	NA	NA	NA	NA	7.83E-10	7.83E-10	NA	1.57E-09	2.11E+01	NA	NA	NA	NA	3.10E-09	3.10E-09	NA	6.22E-09
Beryllium	NA	NA	NA	NA	NA	NA	3.00E+05	3.00E+05	NA	NA	3.00E+06	3.00E+06	1.20E+00	NA	NA	NA	NA	NA	NA	4.00E-12	4.00E-12	1.70E+00	NA	NA	NA	NA	NA	NA	5.66E-12	5.66E-12
Cadmium	NA	NA	NA	NA	NA	NA	4.00E+05	4.00E+05	NA	NA	4.00E+06	4.00E+06	4.70E+00	NA	NA	NA	NA	NA	NA	1.17E-11	1.17E-11	1.30E+00	NA	NA	NA	NA	NA	NA	3.24E-12	3.24E-12
Chrysene	NA	NA	NA	NA	6.81E+05	6.81E+05	NA	3.40E+05	6.81E+06	6.81E+06	NA	3.40E+06	2.34E+00	NA	NA	NA	NA	8.17E-12	8.17E-12	NA	1.63E-11	2.30E+00	NA	NA	NA	NA	3.30E-12	3.30E-12	NA	7.00E-12
Dibenz(a,h)anthracene	NA	NA	NA	NA	6.81E+02	6.81E+02	NA	3.40E+02	6.81E+03	6.81E+03	NA	3.40E+03	1.78E+00	NA	NA	NA	NA	1.85E-09	1.85E-09	NA	3.70E-09	6.00E-01	NA	NA	NA	NA	8.82E-10	8.82E-10	NA	1.76E-09
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	6.81E+03	6.81E+03	NA	3.40E+03	6.81E+04	6.81E+04	NA	3.40E+04	6.80E+00	NA	NA	NA	NA	9.99E-10	9.99E-10	NA	2.00E-09	1.80E+00	NA	NA	NA	NA	2.60E-10	2.60E-10	NA	5.30E-10
Nickel	NA	NA	NA	NA	NA	NA	3.00E+06	3.00E+06	NA	NA	3.00E+07	3.00E+07	1.67E+01	NA	NA	NA	NA	NA	NA	5.56E-12	5.56E-12	1.44E+01	NA	NA	NA	NA	NA	NA	4.80E-12	4.80E-12
																	7.4E-05				2.1E-08					2.4E-04				4.7E-08

Notes:
[illegible]

[illegible]

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Table 7 Summary of RME Calculated Tier 3 Screening Values and Surface and Subsurface Soil Risks for the Current On-Site Maintenance Worker

Compound	RME Noncancer Screening Values (SV) for On-Site Maintenance Worker Target Hazard Index = 1				RME Cancer Screening Values (SV) for On-Site Maintenance Worker Target Risk Level = 1E-06				RME Cancer Screening Values (SV) for On-Site Maintenance Worker Target Risk Level = 1E-05				Exposure Point Concentration	RME Noncancer Risk Calculations for On-Site Maintenance Worker, Surface Soil				RME Cancer Risk Calculations for On-Site Maintenance Worker, Surface Soil				Exposure Point Concentration	RME Noncancer Risk Calculations for On-Site Maintenance Worker, Subsurface Soil				RME Cancer Risk Calculations for On-Site Maintenance Worker, Subsurface Soil			
	Noncancer, Ingestion mg/kg	Noncancer, Dermal Contact [a] mg/kg	Noncancer, Inhalation mg/kg	Noncancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Surface Soil, C_{exp} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [a]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [a]	Cancer, Inhalation	Cancer, Combined	Subsurface Soil, C_{exp} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [a]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [a]	Cancer, Inhalation	Cancer, Combined
Arsenic	1.23E+04	2.88E+04	NA	8.90E+03	6.71E+01	1.67E+02	7.29E+03	3.30E+01	6.71E+02	1.67E+03	7.29E+04	3.30E+02	3.81E+00	6.62E-04	3.28E-04	NA	9.90E-04	1.09E-07	3.27E-08	1.21E-08	1.53E-07	2.88E+01	2.15E-03	1.87E-03	NA	3.74E-03	3.48E-07	1.72E-07	3.97E-09	5.24E-07
Benzo(a)anthracene	NA	NA	NA	NA	1.36E+02	1.36E+02	NA	6.81E+01	1.36E+03	1.36E+03	NA	6.81E+02	5.64E+00	NA	NA	NA	NA	4.71E-08	4.71E-08	NA	9.42E-08	3.80E+00	NA	NA	NA	NA	2.84E-08	2.84E-08	NA	5.70E-08
Benzo(a)pyrene	NA	NA	NA	NA	1.36E+01	1.36E+01	3.47E+04	6.80E+00	1.36E+02	1.36E+03	3.47E+05	6.80E+01	3.29E+00	NA	NA	NA	NA	2.33E-07	2.33E-07	9.23E-11	4.70E-07	9.80E+00	NA	NA	NA	NA	7.27E-07	7.27E-07	2.93E-10	1.45E-06
Benzo(b)fluoranthene	NA	NA	NA	NA	1.36E+02	1.36E+02	NA	6.81E+01	1.36E+03	1.36E+03	NA	6.81E+02	5.29E+00	NA	NA	NA	NA	3.83E-08	3.83E-08	NA	7.66E-08	2.13E+01	NA	NA	NA	NA	1.59E-07	1.59E-07	NA	3.19E-07
Beryllium	NA	NA	NA	NA	NA	NA	1.30E+04	1.30E+04	NA	NA	1.30E+05	1.30E+05	1.30E+00	NA	NA	NA	NA	NA	NA	8.73E-11	8.73E-11	1.78E+00	NA	NA	NA	NA	NA	NA	5.31E-10	5.31E-10
Cadmium	NA	NA	NA	NA	NA	NA	1.73E+04	1.73E+04	NA	NA	1.73E+05	1.73E+05	4.72E+00	NA	NA	NA	NA	NA	NA	2.71E-10	2.71E-10	1.39E+00	NA	NA	NA	NA	NA	NA	7.47E-11	7.47E-11
Chrysene	NA	NA	NA	NA	1.36E+04	1.36E+04	NA	6.81E+03	1.36E+05	1.36E+05	NA	6.81E+04	5.58E+00	NA	NA	NA	NA	4.08E-10	4.08E-10	NA	8.17E-10	2.26E+00	NA	NA	NA	NA	1.73E-10	1.73E-10	NA	3.50E-10
Dibenz(a,h)anthracene	NA	NA	NA	NA	1.36E+01	1.36E+01	NA	6.81E+00	1.36E+02	1.36E+02	NA	6.81E+01	1.26E+00	NA	NA	NA	NA	9.20E-08	9.20E-08	NA	1.84E-07	6.53E-01	NA	NA	NA	NA	4.41E-08	4.41E-08	NA	8.82E-08
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	1.36E+03	1.36E+03	NA	6.81E+02	1.36E+03	1.36E+03	NA	6.81E+02	6.80E+00	NA	NA	NA	NA	3.00E-08	3.00E-08	NA	5.99E-08	1.90E+00	NA	NA	NA	NA	1.40E-08	1.40E-08	NA	2.80E-08
PAHs[a]	NA	NA	NA	NA	NA	NA	1.30E+05	1.30E+05	NA	NA	1.30E+06	1.30E+06	1.67E+01	NA	NA	NA	NA	NA	NA	9.79E-10	9.79E-10	1.44E+01	NA	NA	NA	NA	NA	NA	5.11E-10	1.11E-09
																	9.9E-04				1.1E-06								2.1E-06

Notes:
NA = Not available or not applicable
[a] Dermal toxicity values are assumed to be equal to oral toxicity values
[b] Carcinogenic dermal evaluation not included for PAHs. Dermal contact with PAHs accounted for by using quantitative results from ingestion (e.g., dermal risk = ingestion risk, dermal screening value = ingestion screening value).
Shading indicates risk exceedance.
References:
[1] USEPA Region III, 1995. USEPA, Region III, Hazardous Waste Management Division, Office of Superfund Programs, Region III Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure From Soil. EPA903-K-95-003. December
[2] USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R-95/128. May
[3] USEPA, 2002. U.S. EPA's Integrated Risk Information System (IRIS). 2002. On-line database. www.epa.gov/iris
[4] Values used in USEPA's Region III September 2001 Risk Based Concentration (RBC) table as EPA-NCEA promulgated value

Table 8 Summary of CTE Calculated Tier 3 Screening Values and Surface and Subsurface Soil Risks for the Future On-Site Outdoor Worker

Compound	CTE Noncancer Screening Values (SV) for On-Site Outdoor Worker Target Hazard Index = 1				CTE Cancer Screening Values (SV) for On-Site Outdoor Worker Target Risk Level = 1E-06				CTE Cancer Screening Values (SV) for On-Site Outdoor Worker Target Risk Level = 1E-05				Exposure Point Concentration	CTE Noncancer Risk Calculations for On-Site Outdoor Worker, Surface Soil				CTE Cancer Risk Calculations for On-Site Outdoor Worker, Surface Soil				Exposure Point Concentration	CTE Noncancer Risk Calculations for On-Site Outdoor Worker, Subsurface Soil				CTE Cancer Risk Calculations for On-Site Outdoor Worker, Subsurface Soil			
	Noncancer, Ingestion mg/kg	Noncancer, Dermal Contact [a] mg/kg	Noncancer, Inhalation mg/kg	Noncancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Surface Soil, C_{ss} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [a]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [a]	Cancer, Inhalation	Cancer, Combined	Subsurface Soil, C_{ss} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [a]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [a]	Cancer, Inhalation	Cancer, Combined
Arsenic	2.19E+04	1.77E+05	NA	1.99E+04	8.61E+02	3.90E+03	2.73E+04	3.63E+03	8.61E+03	3.90E+04	2.73E+05	3.63E+03	9.01E+03	4.03E-04	4.96E-05	NA	4.53E-04	1.21E-08	1.65E-09	3.39E-10	1.40E-08	2.88E+01	1.32E-03	1.63E-04	NA	1.48E-03	4.23E-09	5.21E-09	1.86E-09	4.96E-09
Benzo(a)anthracene	NA	NA	NA	NA	1.12E+03	1.12E+03	NA	5.59E+02	1.12E+04	1.12E+04	NA	5.59E+03	5.64E+03	NA	NA	NA	NA	5.27E-09	1.27E-09	NA	1.94E-08	3.00E+03	NA	NA	NA	NA	2.22E-09	2.22E-09	NA	5.44E-09
Benzo(b)fluoranthene	NA	NA	NA	NA	1.12E+02	1.12E+02	1.22E+05	5.59E+01	1.12E+03	1.12E+03	1.22E+06	5.59E+02	3.30E+02	NA	NA	NA	NA	7.88E-08	2.88E-08	2.43E-11	5.72E-08	8.80E+02	NA	NA	NA	NA	8.85E-08	8.85E-08	7.53E-11	1.77E-07
Benzo(k)fluoranthene	NA	NA	NA	NA	1.12E+03	1.12E+03	NA	5.59E+02	1.12E+04	1.12E+04	NA	5.59E+03	5.25E+03	NA	NA	NA	NA	4.70E-09	4.70E-09	NA	9.39E-09	3.15E+01	NA	NA	NA	NA	1.92E-08	1.92E-08	NA	3.84E-08
Beryllium	NA	NA	NA	NA	NA	NA	4.93E+04	4.93E+04	NA	NA	4.93E+05	4.93E+05	1.30E+03	NA	NA	NA	NA	NA	NA	2.43E-11	2.43E-11	1.70E+03	NA	NA	NA	NA	NA	NA	3.43E-11	3.43E-11
Cadmium	NA	NA	NA	NA	NA	NA	6.54E+04	6.54E+04	NA	NA	6.54E+05	6.54E+05	4.70E+03	NA	NA	NA	NA	NA	NA	7.15E-11	7.15E-11	1.30E+03	NA	NA	NA	NA	NA	NA	1.87E-11	1.87E-11
Chrysene	NA	NA	NA	NA	1.12E+05	1.12E+05	NA	5.59E+04	1.12E+06	1.12E+06	NA	5.59E+05	5.59E+05	NA	NA	NA	NA	4.97E-11	4.97E-11	NA	9.94E-11	3.30E+03	NA	NA	NA	NA	2.13E-11	2.13E-11	NA	4.26E-11
Dibenz(a,h)anthracene	NA	NA	NA	NA	1.12E+02	1.12E+02	NA	5.59E+01	1.12E+03	1.12E+03	NA	5.59E+02	1.26E+02	NA	NA	NA	NA	1.13E-08	1.13E-08	NA	2.25E-08	8.80E+01	NA	NA	NA	NA	3.39E-09	5.39E-09	NA	1.07E-08
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	1.12E+03	1.12E+03	NA	5.59E+02	1.12E+04	1.12E+04	NA	5.59E+03	8.60E+02	NA	NA	NA	NA	8.88E-09	8.88E-09	NA	1.22E-08	1.80E+03	NA	NA	NA	NA	1.70E-09	1.70E-09	NA	3.40E-09
Lead	NA	NA	NA	NA	NA	NA	4.93E+05	4.93E+05	NA	NA	4.93E+06	4.93E+06	1.67E+01	NA	NA	NA	NA	NA	NA	3.39E-11	3.39E-11	1.44E+01	NA	NA	NA	NA	NA	NA	2.57E-11	2.57E-11
														4.5E-04				1.2E-07								1.5E-03				3.9E-07

Notes:
NA = Not available or not applicable
[a] Dermal toxicity values are adjusted to be equal to oral toxicity values
[b] Cumulative cancer risk/hazard not included for PAHs. Dermal contact with PAHs accounted for adjusting cumulative results from equation (e.g., dermal risk = ingestion risk; dermal screening value = ingestion screening value)
Shading indicates risk exceedance.
References:
(1) USEPA Region III. 1995. USEPA, Region III, Hazardous Waste Management Division, Office of Superfund Programs, Region III Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure From Soil. EPA/903/K-95-003. December
(2) USEPA. 1995. Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R-95/128. May
(3) USEPA. 2002. U.S. EPA's Integrated Risk Information System (IRIS). 2002. On-line database. www.epa.gov/iris
[c] Based on USEPA's Region III September 2001 Risk Based Concentration (RBC) table as EPA-NCEA provisional value

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Table 9 Summary of RME Calculated Tier 3 Screening Values and Surface and Subsurface Soil Risks for the Future On-Site Outdoor Worker

Compound	RME Noncancer Screening Values (SV) for On-Site Outdoor Worker Target Hazard Index = 1				RME Cancer Screening Values (SV) for On-Site Outdoor Worker Target Risk Level = 1E-06				RME Cancer Screening Values (SV) for On-Site Outdoor Worker Target Risk Level = 1E-05				Exposure Point Concentration	RME Noncancer Risk Calculations for On-Site Outdoor Worker, Surface Soil				RME Cancer Risk Calculations for On-Site Outdoor Worker, Surface Soil				Exposure Point Concentration	RME Noncancer Risk Calculations for On-Site Outdoor Worker, Subsurface Soil				RME Cancer Risk Calculations for On-Site Outdoor Worker, Subsurface Soil			
	Noncancer, Ingestion mg/kg	Noncancer, Dermal Contact [a] mg/kg	Noncancer, Inhalation mg/kg	Noncancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Cancer, Ingestion mg/kg	Cancer, Dermal Contact [a] mg/kg	Cancer, Inhalation mg/kg	Cancer, Combined mg/kg	Surface Soil, C_{exp} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [b]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [b]	Cancer, Inhalation	Cancer, Combined	Subsurface Soil, C_{exp} (mg/kg)	Noncancer, Ingestion	Noncancer, Dermal Contact [b]	Noncancer, Inhalation	Noncancer, Combined	Cancer, Ingestion	Cancer, Dermal Contact [b]	Cancer, Inhalation	Cancer, Combined
Arsenic	1.63E+03	7.74E+03	NA	1.26E+03	2.38E+01	4.62E+01	7.09E+03	1.54E+01	2.38E+02	4.62E+02	2.09E+04	1.54E+02	6.01E+00	3.29E-03	1.14E-03	NA	3.44E-03	3.99E-07	1.63E-07	4.21E-09	5.57E-07	7.99E+01	7.31E-03	3.72E-03	NA	1.12E-02	1.21E-06	5.90E-07	1.39E-06	1.62E-06
Benzo(a)anthracene	NA	NA	NA	NA	3.92E+01	3.92E+01	NA	1.96E+01	3.92E+02	3.92E+02	NA	1.96E+02	3.84E+00	NA	NA	NA	NA	1.49E-07	1.49E-07	NA	2.98E-07	3.60E+00	NA	NA	NA	NA	9.19E-08	9.19E-08	NA	1.84E-07
Benzo(a)pyrene	NA	NA	NA	NA	3.92E+00	3.92E+00	8.99E+03	1.96E+03	3.92E+01	3.92E+01	8.99E+04	1.96E+01	2.23E+00	NA	NA	NA	NA	8.19E-07	8.19E-07	3.29E-10	1.63E-06	8.90E+00	NA	NA	NA	NA	2.53E-06	2.53E-06	9.81E-10	5.05E-06
Benzo(b)fluoranthene	NA	NA	NA	NA	3.92E+01	3.92E+01	NA	1.96E+01	3.92E+02	3.92E+02	NA	1.96E+02	5.33E+00	NA	NA	NA	NA	1.38E-07	1.38E-07	NA	2.73E-07	2.13E+01	NA	NA	NA	NA	5.46E-07	5.46E-07	NA	1.10E-06
Beryllium	NA	NA	NA	NA	NA	NA	3.73E+03	3.73E+03	NA	NA	3.73E+04	3.73E+04	1.72E+00	NA	NA	NA	NA	NA	NA	1.30E-10	3.70E-10	1.72E+00	NA	NA	NA	NA	NA	NA	4.34E-10	4.54E-10
Chromium	NA	NA	NA	NA	NA	NA	4.99E+03	4.99E+03	NA	NA	4.99E+04	4.99E+04	4.70E+00	NA	NA	NA	NA	NA	NA	3.61E-10	3.61E-10	1.30E+00	NA	NA	NA	NA	NA	NA	2.39E-10	2.58E-10
Chrysene	NA	NA	NA	NA	3.92E+03	3.92E+03	NA	1.96E+03	3.92E+04	3.92E+04	NA	1.96E+04	2.36E+00	NA	NA	NA	NA	1.42E-08	1.42E-08	NA	2.84E-08	2.36E+00	NA	NA	NA	NA	6.09E-10	6.09E-10	NA	1.22E-09
Dibenz(a,h)anthracene	NA	NA	NA	NA	3.92E+00	3.92E+00	NA	1.96E+00	3.92E+01	3.92E+01	NA	1.96E+01	1.20E+00	NA	NA	NA	NA	3.21E-07	3.21E-07	NA	6.43E-07	8.80E-01	NA	NA	NA	NA	1.53E-07	1.53E-07	NA	3.06E-07
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	3.92E+01	3.92E+01	NA	1.96E+01	3.92E+02	3.92E+02	NA	1.96E+02	5.80E+00	NA	NA	NA	NA	1.73E-07	1.73E-07	NA	3.47E-07	1.90E+00	NA	NA	NA	NA	4.86E-08	4.86E-08	NA	9.71E-08
Lead	NA	NA	NA	NA	NA	NA	3.73E+04	3.73E+04	NA	NA	3.73E+05	3.73E+05	1.63E+01	NA	NA	NA	NA	NA	NA	1.41E-10	4.48E-10	1.44E+01	NA	NA	NA	NA	NA	NA	3.84E-10	3.84E-10
												3.4E-03									3.0E-06					1.1E-02				6.5E-06

Notes:
NA = Not available or not applicable
[a] Dermal toxicity values are assumed to be equal to oral toxicity values.
[b] Quantitative dermal evaluation not included for PAHs. Dermal contact with PAHs assumed for all having quantitative results from exposure (e.g., dermal risk = ingestion risk, dermal screening value = ingestion screening value)
Shading indicates risk exceedance.
References:
[1] USEPA Region III, 1998. USEPA, Region III, Hazardous Waste Management Division, Office of Superfund Programs. Region III Technical Guidance Manual, Risk Assessment, Assessing Dermal Exposure From Soil. EPA/903-K-95-003. December.
[2] USEPA, 1996. Soil Screening Guidance: Technical Background Document. Office of Emergency and Remedial Response, Washington, D.C. EPA/540/R-95/128. May.
[3] USEPA, 2022. U.S. EPA's Integrated Risk Information System (IRIS). 2022. On-line database: www.epa.gov/iris
[4] As used in USEPA's Region III September 2001 Risk Based Concentration (RBC) table as EPA-ACEA provisional value

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Statistical Calculations

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Appendix I

1.0 Introduction

This appendix presents a variety of statistical calculations for soil data at the tannery site. These general statistics are discussed in Section 2.0 of this appendix.

2.0 General Statistics

Tables 1 and 2 present statistical summaries of soil data for Area 1B (surface and subsurface soil). Each statistical summary table is composed of several categories of statistical information, as discussed below.

A. Sample Counts. In this category, the following statistical information is provided:

- number of samples
- number of rejected samples
- number of valid samples
- number of detects
- number of nondetects
- percent nondetects

The percent nondetects is calculated as follows (assuming the number of valid samples is greater than zero):

$$PercNonDet = 100 \bullet \frac{NonDet}{NumValSamp}$$

where:

PercNonDet	=	percent of nondetects
NonDet	=	number of nondetects
NumValSamp	=	number of valid samples

B. Basic Statistics. In this category, the following statistical information is provided:

- minimum detection limit
- maximum detection limit
- minimum detected concentration
- maximum detected concentration
- sample with the maximum detected concentration

C. General Summary Statistics. This category provides a variety of summary statistics, including:

- median
- mean or average
- standard deviation
- coefficient of variation

- geometric mean
- geometric standard deviation

In calculating all these summary statistics, nondetects are replaced with half the detection limit.

The median is the concentration at the middle of a sorted list of samples. If the number of samples is odd, the median is the concentration of the middle sample. If the number of samples is even, the median is the average of the concentrations of the two samples in the middle of the list.

The average, x_{avg}, is given by:

$$x_{avg} = \frac{\sum x_i}{n}$$

where

x_i = the value of sample number i
n = number of samples

The standard deviation is the sample standard deviation, s, given by:

$$s = \sqrt{\sum \frac{(x_{avg} - x_i)^2}{(n-1)}}$$

The coefficient of variation, CoefVar, is given by:

$$CoefVar = \frac{s}{x_{avg}}$$

The geometric mean and geometric standard deviation are calculated as follows:

- The data is logarithmically transformed using the natural logarithm (ln).
- The average and standard deviation are calculated for the transformed data, $x_{t\text{-}avg}$ and s_t, respectively, using the equations above.
- The geometric mean, x_{gmean}, and geometric standard deviation, s_g, are calculated by transforming back $x_{t\text{-}avg}$ and s_t, as follows:

$$x_{gmean} = e^{x_{t\text{-}avg}}$$

$$s_g = e^{s_l}$$

D. Testing of Normality of Data. In this category, the data is tested to determine if it is represented by a normal distribution. One of two tests is employed. If there are 50 samples or less, the Shapiro-Wilk test of normality is utilized (Shapiro and Wilk, 1965). Using the procedures outlined in Gilbert (1987), the data is sorted and manipulated to calculate a W test statistic. This W-statistic was compared to a W value at a 0.05 quantile. The W value at the 0.05 quantile is found by referring to a lookup table (see Table A7 in Appendix A of Gilbert (1987)). If the W-statistic is greater than or equal to the W value, the data is considered to be normally distributed.

If there are more than 50 samples, the D'Agostino test of normality is utilized (D'Agostino, 1971), which is a two tailed statistical test. Using the procedures outlined in Gilbert (1987), the data is sorted and manipulated to calculate the Y test statistic. For a test of normality at the 0.05 level of significance, the Y values at the 0.025 quantile, Y0.025, and 0.975 quantile, Y0.975, are determined by interpolating from a lookup table (e.g., Table A8 in Appendix A of Gilbert (1987)). The data is considered to be normally distributed if the Y statistic satisfies the following condition:

$$Y_{0.25} \leq Y - statistic \leq Y_{0.975}$$

E. Testing of Log-Normality of Data. In this category, the data is tested to determine if it is represented by a log-normal distribution. The data is transformed by taking the natural logarithm of each sample value. The procedures described previously are then applied to the transformed data. If there are 50 samples or less, the Shapiro-Wilk test of normality is used. If there are more than 50 samples, the D'Agostino test of normality is utilized.

F. 95% Upper Confidence Limits on the Mean. In this category, 95% upper confidence limits on the mean (95% UCLs) are calculated using procedures for different distributions of data. If there were greater than or equal to 50% non-detect values in the data set, or the data was neither normally nor log-normally distributed, then the data was assumed to be nonparametric.

For normally distributed data, the 95% UCL, UCL_{norm}, is calculated with the following equation (USEPA, 1992):

$$UCL_{norm} = x_{avg} + \frac{t \cdot s}{\sqrt{n}}$$

The one tail t-statistic at a 95% level, t, depends on the number of samples, n, and the standard deviation of the data, s, and comes from Table A2 in Appendix A of Gilbert (1987).

For log-normally distributed data, the 95% UCL, UCL_{ln}, is calculated using three different procedures. USEPA (1992) originally proposed calculating the 95% UCL for lognormally distributed data using the H-statistic, H, in the following equation:

$$UCL_{ln} = e^{(x_{t-avg} + 0.5 \cdot s_t^2 + s_t \cdot H / \sqrt{n-1})}$$

The one tail H-statistic at a 95% level, H, depends on the number of samples, n, and the standard deviation of the log-transformed data, s_t, and comes from Table A12 in Appendix A of Gilbert (1987).

In a more recent paper, USEPA (1997) identifies significant problems with using this equation to calculate the 95% UCL. In this paper, USEPA (1997) suggests calculating the minimum variance unbiased estimate (MVUE) of the mean using the equation in Gilbert (1987) and using the Jackknife and Bootstrap procedures adapted to lognormal distributions to calculate the 95% UCL. In this analysis, the 95% UCL is calculated three ways, using the H-statistic, using the modified Jackknife method and using the modified Bootstrap method. Although the H-statistic based 95% UCL is not recommended by USEPA (1997), this value was used as the 95% UCL for lognormally distributed data, as requested by Illinois EPA.

For data that is neither normally distributed nor lognormally distributed (i.e., nonparametric), USEPA (1997) recommends using the Jackknife, Bootstrap or Bootstrap t method. The 95% UCL was calculated using all three methods and the highest value was used as the 95% UCL for data sets classified as nonparametric.

G. Source Concentration. This category includes the following information:

- number of valid samples
- number of detects
- mean
- distribution type
- 95% UCL based on the distribution type
- maximum detected concentration
- source concentration

If the test of normality indicates the data is normally distributed, it is assumed to be normally distributed even if the test of lognormally indicates it may also be considered lognormally distributed. The source concentration is the 95% UCL or the maximum detected concentration, whichever is lower, which is consistent with USEPA guidance (USEPA, 1989).

H. Distribution of Data. This category provides information on the distribution of the data. The type of distribution is specified (i.e., normal, lognormal or nonparametric), then various percentiles of the data are provided depending on the distribution type. The minimum value, which is approximately the 0^{th} percentile, is given along with the maximum value, which is approximately the 100^{th} percentile. Value for percentiles

between the 0^{th} and 100^{th} percentile are also provided using the methods outlined in Gilbert (1987) for normal and nonparametric data sets. For lognormally distributed data, the data is logarithmically transformed and the methods for normally distributed data are used to determine the values at different percentiles.

I. Distribution of Data for Nonparametric Data. This category provides information on the distribution of the data using the methods outlined in Gilbert (1987) for nonparametric data sets. The information provided in this category is similar to the information provided in category H except that an underlying distribution type (e.g., normal or lognormal) is not assumed for any data set.

3.0 References

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Gilbert, R.O., 1987. Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold, New York, New York.

Shapiro, S.S., and M.B. Wilk, 1965. An Analysis of Variance Test for Normality (Complete Samples), Biometrika, 52: 591-611.

Table 1 **Statistics for Surface Soil in Area 1B**

Chemical	CAS No.	A. Sample Counts					
		Number of Samples	Number of Rejected Samples	Number of Valid Samples	Number of Detects	Number of Nondetects	Percent Nondetects
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	6	0	6	5	1	16.7
Chrysene	218019	6	0	6	5	1	16.7
Benzo(b)fluoranthene	205992	6	0	6	5	1	16.7
Benzo(k)fluoranthene	207089	6	0	6	5	1	16.7
Benzo(a)pyrene	50328	6	0	6	5	1	16.7
Indeno(1,2,3-cd)pyrene	193395	6	0	6	4	2	33.3
Dibenzo(a,h)anthracene	53703	6	0	6	4	2	33.3
Pesticide Compounds (mg/Kg)							
Aldrin	309002	6	0	6	0	6	100
Heptachlor Epoxide	1024573	6	0	6	3	3	50
Dieldrin	60571	6	0	6	1	5	83.3
4,4'-DDT	50293	6	0	6	4	2	33.3
PCBs (mg/Kg)							
Aroclor - 1248	1336363	6	0	6	0	6	100
Aroclor - 1254	1336363	6	0	6	0	6	100
Aroclor - 1260	1336363	6	0	6	0	6	100
Total PCBs		6	0	6	0	6	100
Inorganic Compounds (mg/Kg)							
Antimony	7440360	4	0	4	0	4	100
Arsenic	7440382	6	0	6	6	0	0
Barium	7440393	6	0	6	6	0	0
Beryllium	7440417	4	0	4	2	2	50
Cadmium	7440439	6	0	6	3	3	50
Chromium	16065831	6	0	6	6	0	0
Hexavalent Chromium	18540299						
Lead	7439921	6	0	6	6	0	0
Mercury	7439976	6	0	6	5	1	16.7
Nickel	7440020	4	0	4	4	0	0
Selenium	7782492	6	0	6	2	4	66.7
Silver	7440224	6	0	6	0	6	100

Table 1 Statistics for Surface Soil in Area 1B (Continued)

		B. Basic Statistics				
Chemical	CAS No.	Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Concentration	Maximum Detected Concentration	Sample with Maximum Detect
CPAHs (mg/Kg)						
Benzo(a)anthracene	56553	0.82	0.82	1.2	9.2	SB-61A
Chrysene	218019	0.82	0.82	1.8	8.9	SB-61A
Benzo(b)fluoranthene	205992	0.82	0.82	2.4	8	SB-61A
Benzo(k)fluoranthene	207089	0.82	0.82	0.76	3.3	SB-61A
Benzo(a)pyrene	50328	0.82	0.82	1.2	4.8	SB-61A
Indeno(1,2,3-cd)pyrene	193395	0.82	1.3	0.11	6.8	SB-61A
Dibenzo(a,h)anthracene	53703	0.82	1.3	0.13	1.9	SB-61A
Pesticide Compounds (mg/Kg)						
Aldrin	309002	0.0017	0.0029	NA	NA	NA
Heptachlor Epoxide	1024573	0.0017	0.0029	0.0079	0.023	SB-30A
Dieldrin	60571	0.0017	0.0055	0.016	0.016	SB-33A
4,4'-DDT	50293	0.0045	0.0055	0.023	0.21	SB-61A
PCBs (mg/Kg)						
Aroclor - 1248	1336363	0.033	0.055	NA	NA	NA
Aroclor - 1254	1336363	0.033	0.055	NA	NA	NA
Aroclor - 1260	1336363	0.033	0.055	NA	NA	NA
Total PCBs		NA	NA	NA	NA	NA
Inorganic Compounds (mg/Kg)						
Antimony	7440360	2.8	4.4	NA	NA	NA
Arsenic	7440382	NA	NA	0.77	12.1	SB-30A
Barium	7440393	NA	NA	10.4	520	SB-61A
Beryllium	7440417	0.21	0.34	0.27	1.2	SB-30A
Cadmium	7440439	0.61	0.97	1.2	4.7	SB-61A
Chromium	16065831	NA	NA	14.2	2600	SS-12
Hexavalent Chromium	18540299					
Lead	7439921	NA	NA	16.2	220	SB-61A
Mercury	7439976	0.07	0.07	0.08	1.7	SS-12
Nickel	7440020	NA	NA	3.5	16.7	SB-33A
Selenium	7782492	0.29	1.7	0.62	2	SB-30A
Silver	7440224	0.44	1.1	NA	NA	NA

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		C. General Summary Statistics					
Chemical	CAS No.	Median	Mean	Standard Deviation	Coefficient of Variation	Geometric Mean	Geometric Standard Deviation
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	2.75	3.29	3.11	0.945	2.21	2.86
Chrysene	218019	2.65	3.24	2.93	0.906	2.27	2.71
Benzo(b)fluoranthene	205992	2.55	3.25	2.55	0.784	2.38	2.65
Benzo(k)fluoranthene	207089	1.11	1.38	1.03	0.744	1.12	2.03
Benzo(a)pyrene	50328	1.6	1.95	1.52	0.777	1.52	2.25
Indeno(1,2,3-cd)pyrene	193395	0.69	1.88	2.56	1.36	0.85	4.22
Dibenzo(a,h)anthracene	53703	0.53	0.715	0.662	0.926	0.486	2.72
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.000925	0.00103	0.000236	0.23	0.001	1.24
Heptachlor Epoxide	1024573	0.00468	0.00818	0.00915	1.12	0.00377	4.43
Dieldrin	60571	0.002	0.00408	0.00589	1.45	0.00224	2.95
4,4'-DDT	50293	0.0265	0.0557	0.0791	1.42	0.0197	5.93
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.018	0.0198	0.00437	0.22	0.0195	1.23
Aroclor - 1254	1336363	0.018	0.0198	0.00437	0.22	0.0195	1.23
Aroclor - 1260	1336363	0.018	0.0198	0.00437	0.22	0.0195	1.23
Total PCBs		0	0	0	1E+99	NA	NA
Inorganic Compounds (mg/Kg)							
Antimony	7440360	1.63	1.71	0.371	0.216	1.68	1.23
Arsenic	7440382	5.5	5.78	3.69	0.638	4.46	2.53
Barium	7440393	58.9	141	196	1.39	60.2	4.39
Beryllium	7440417	0.22	0.436	0.514	1.18	0.276	2.87
Cadmium	7440439	0.843	1.41	1.67	1.18	0.877	2.79
Chromium	16065831	142	679	1030	1.51	196	6.63
Hexavalent Chromium	18540299						
Lead	7439921	72.7	96.4	83.1	0.862	64.9	2.83
Mercury	7439976	0.116	0.501	0.684	1.37	0.197	4.6
Nickel	7440020	5.95	8.03	6.15	0.767	6.51	2.08
Selenium	7782492	0.685	0.753	0.68	0.902	0.511	2.8
Silver	7440224	0.318	0.349	0.131	0.374	0.33	1.44

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		D. Testing of Normality of Data					
		Shapiro-Wilk Test of		D'Agostino Test of Normality (N>50)			
Chemical	CAS No.	W-Statistic	W Value at 0.05 Level	Y-Statistic	Y Value at 0.025 Level	Y Value at 0.975 Level	Is Data Normally Distributed at 0.05 Level?
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.822	0.788				Yes
Chrysene	218019	0.79	0.788				Yes
Benzo(b)fluoranthene	205992	0.846	0.788				Yes
Benzo(k)fluoranthene	207089	0.858	0.788				Yes
Benzo(a)pyrene	50328	0.851	0.788				Yes
Indeno(1,2,3-cd)pyrene	193395	0.738	0.788				No
Dibenzo(a,h)anthracene	53703	0.874	0.788				Yes
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.807	0.788				No
Heptachlor Epoxide	1024573	0.842	0.788				Yes
Dieldrin	60571	0.614	0.788				No
4,4'-DDT	50293	0.738	0.788				No
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.821	0.788				No
Aroclor - 1254	1336363	0.821	0.788				No
Aroclor - 1260	1336363	0.821	0.788				No
Total PCBs		0	0.788				No
Inorganic Compounds (mg/Kg)							
Antimony	7440360	0.899	0.748				No
Arsenic	7440382	0.926	0.788				Yes
Barium	7440393	0.743	0.788				No
Beryllium	7440417	0.748	0.748				No
Cadmium	7440439	0.72	0.788				No
Chromium	16065831	0.729	0.788				No
Hexavalent Chromium	18540299						
Lead	7439921	0.896	0.788				Yes
Mercury	7439976	0.747	0.788				No
Nickel	7440020	0.844	0.748				Yes
Selenium	7782492	0.848	0.788				No
Silver	7440224	0.916	0.788				No

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		E. Testing of Log-Normality of Data					
		Shapiro-Wilk Test of Log-		D'Agostino Test of Log-Normality (N>50)			
Chemical	CAS No.	W-Statistic	W Value at 0.05 Level	Y-Statistic	Y Value at 0.025 Level	Y Value at 0.975 Level	Is Data Log-Normally Distributed at 0.05 Level?
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.958	0.788				Yes
Chrysene	218019	0.913	0.788				Yes
Benzo(b)fluoranthene	205992	0.872	0.788				Yes
Benzo(k)fluoranthene	207089	0.993	0.788				Yes
Benzo(a)pyrene	50328	0.96	0.788				Yes
Indeno(1,2,3-cd)pyrene	193395	0.974	0.788				Yes
Dibenzo(a,h)anthracene	53703	0.979	0.788				Yes
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.837	0.788				No
Heptachlor Epoxide	1024573	0.854	0.788				Yes
Dieldrin	60571	0.857	0.788				No
4,4'-DDT	50293	0.927	0.788				Yes
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.846	0.788				No
Aroclor - 1254	1336363	0.846	0.788				No
Aroclor - 1260	1336363	0.846	0.788				No
Total PCBs		0.846	0.788				No
Inorganic Compounds (mg/Kg)							
Antimony	7440360	0.909	0.748				No
Arsenic	7440382	0.83	0.788				Yes
Barium	7440393	0.965	0.788				Yes
Beryllium	7440417	0.922	0.748				Yes
Cadmium	7440439	0.918	0.788				Yes
Chromium	16065831	0.964	0.788				Yes
Hexavalent Chromium	18540299						
Lead	7439921	0.944	0.788				Yes
Mercury	7439976	0.896	0.788				Yes
Nickel	7440020	0.895	0.748				Yes
Selenium	7782492	0.896	0.788				No
Silver	7440224	0.939	0.788				No

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		F. 95% Upper Confidence Limits on the Mean						
		Normal Distribution		Lognormal Distribution				
Chemical	CAS No.	t-Statistic	95% UCL for Normal Distribution	H-Statistic	95% UCL for Lognormal Distribution Using H-Statistic	Minimum Variance Unbiased Estimate of Mean	95% UCL Using Jackknife Method with Log-Normal Theory	95% UCL Using Bootstrap Method with Log-Normal Theory
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	2.015	5.84	4.4902	31.7	3.41	6.06	5.57
Chrysene	218019	2.015	5.65	4.2946	25.4	3.37	5.76	5.32
Benzo(b)fluoranthene	205992	2.015	5.35	4.2123	24	3.47	5.64	5.07
Benzo(k)fluoranthene	207089	2.015	2.23	3.3135	4.12	1.37	2.2	2.06
Benzo(a)pyrene	50328	2.015	3.2	3.6397	7.86	1.97	3.2	2.96
Indeno(1,2,3-cd)pyrene	193395	2.015	3.99	5.9304	110	1.85	4.07	3.85
Dibenzo(a,h)anthracene	53703	2.015	1.26	4.3089	5.54	0.722	1.31	1.16
Pesticide Compounds (mg/Kg)								
Aldrin	309002	2.015	0.00122	2.1146	0.00126	0.00102	0.00122	0.00117
Heptachlor Epoxide	1024573	2.015	0.0157	6.1082	0.665	0.00861	0.0192	0.0163
Dieldrin	60571	2.015	0.00892	4.5982	0.0371	0.00353	0.00715	0.00768
4,4'-DDT	50293	2.015	0.121	7.2216	30.2	0.0616	0.143	0.133
PCBs (mg/Kg)								
Aroclor - 1248	1336363	2.015	0.0234	2.1025	0.0241	0.0198	0.0234	0.0225
Aroclor - 1254	1336363	2.015	0.0234	2.1025	0.0241	0.0198	0.0234	0.0226
Aroclor - 1260	1336363	2.015	0.0234	2.1025	0.0241	0.0198	0.0234	0.0226
Total PCBs		2.015	0	NA	NA	NA	NA	NA
Inorganic Compounds (mg/Kg)								
Antimony	7440360	2.3534	2.15	2.7977	2.42	1.71	2.15	1.99
Arsenic	7440382	2.015	8.81	4.0504	36.9	6.28	9.45	8.37
Barium	7440393	2.015	302	6.0711	9950	136	306	297
Beryllium	7440417	2.3534	1.04	9.4453	150	0.406	0.935	0.819
Cadmium	7440439	2.015	2.79	4.3947	11.1	1.33	2.56	2.5
Chromium	16065831	2.015	1520	7.6472	754000	695	1780	1780
Hexavalent Chromium	18540299							
Lead	7439921	2.015	165	4.4514	886	99.3	181	158
Mercury	7439976	2.015	1.06	6.252	45.1	0.468	1.11	1.07
Nickel	7440020	2.3534	15.3	6.6699	143	7.91	15.1	12.7
Selenium	7782492	2.015	1.31	4.4148	6.66	0.776	1.38	1.25
Silver	7440224	2.015	0.457	2.3969	0.522	0.349	0.457	0.431

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		F. 95% Upper Confidence Limits on the Mean (Cont'd)			
		Nonparametric			
Chemical	CAS No.	95% UCL Using Jackknife Method	95% UCL Using Standard Bootstrap Method	t-statistic for Bootstrap-t	95% UCL Using Bootstrap-t Method
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553	5.84	5.23	-1.38	7.56
Chrysene	218019	5.65	5.04	-1.77	8.41
Benzo(b)fluoranthene	205992	5.35	4.99	-1.37	6.73
Benzo(k)fluoranthene	207089	2.23	1.98	-1.38	2.79
Benzo(a)pyrene	50328	3.2	2.86	-1.45	4.15
Indeno(1,2,3-cd)pyrene	193395	3.99	3.43	-5.48	15.9
Dibenzo(a,h)anthracene	53703	1.26	1.14	-1.55	1.74
Pesticide Compounds (mg/Kg)					
Aldrin	309002	0.00122	0.00116	-2.8	0.00168
Heptachlor Epoxide	1024573	0.0157	0.0139	-2.13	0.0277
Dieldrin	60571	0.00892	0.00793	-4.51	0.0306
4,4'-DDT	50293	0.121	0.106	-3.22	0.31
PCBs (mg/Kg)					
Aroclor - 1248	1336363	0.0234	0.0224	-3.27	0.0341
Aroclor - 1254	1336363	0.0234	0.0226	-3.27	0.0341
Aroclor - 1260	1336363	0.0234	0.0225	-2.88	0.0324
Total PCBs		0	0	0	0
Inorganic Compounds (mg/Kg)					
Antimony	7440360	2.15	1.99	-9.96	5.4
Arsenic	7440382	8.81	8.03	-0.911	9.14
Barium	7440393	302	259	-3.79	885
Beryllium	7440417	1.04	0.781	-4.83	2.91
Cadmium	7440439	2.79	2.41	-2.07	4.87
Chromium	16065831	1520	1280	-10.8	11800
Hexavalent Chromium	18540299				
Lead	7439921	165	148	-1.69	237
Mercury	7439976	1.06	0.927	-10.5	7.66
Nickel	7440020	15.3	12.6	-25.3	163
Selenium	7782492	1.31	1.17	-1.3	1.64
Silver	7440224	0.457	0.428	-1.18	0.503

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		G. Source Concentrations						
Chemical	CAS No.	Number of Valid Samples	Number of Detects	Distribution	Mean	95% Upper Confidence Limit on the Mean	Maximum Detected Concentration	Source Concentration
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	6	5	Normal	3.29	5.84	9.2	5.84
Chrysene	218019	6	5	Normal	3.24	5.65	8.9	5.65
Benzo(b)fluoranthene	205992	6	5	Normal	3.25	5.35	8	5.35
Benzo(k)fluoranthene	207089	6	5	Normal	1.38	2.23	3.3	2.23
Benzo(a)pyrene	50328	6	5	Normal	1.95	3.2	4.8	3.2
Indeno(1,2,3-cd)pyrene	193395	6	4	Lognormal	1.88	110	6.8	6.8
Dibenzo(a,h)anthracene	53703	6	4	Normal	0.715	1.26	1.9	1.26
Pesticide Compounds (mg/Kg)								
Aldrin	309002	6	0	Nonparametric	ND	ND	ND	ND
Heptachlor Epoxide	1024573	6	3	Normal	0.00818	0.0157	0.023	0.0157
Dieldrin	60571	6	1	Nonparametric	0.00408	0.0306	0.016	0.016
4,4'-DDT	50293	6	4	Lognormal	0.0557	30.2	0.21	0.21
PCBs (mg/Kg)								
Aroclor - 1248	1336363	6	0	Nonparametric	ND	ND	ND	ND
Aroclor - 1254	1336363	6	0	Nonparametric	ND	ND	ND	ND
Aroclor - 1260	1336363	6	0	Nonparametric	ND	ND	ND	ND
Total PCBs		6	0	Nonparametric	ND	ND	ND	ND
Inorganic Compounds (mg/Kg)								
Antimony	7440360	4	0	Nonparametric	ND	ND	ND	ND
Arsenic	7440382	6	6	Normal	5.78	8.81	12.1	8.81
Barium	7440393	6	6	Lognormal	141	9950	520	520
Beryllium	7440417	4	2	Lognormal	0.436	150	1.2	1.2
Cadmium	7440439	6	3	Lognormal	1.41	11.1	4.7	4.7
Chromium	16065831	6	6	Lognormal	679	754000	2600	2600
Hexavalent Chromium	18540299							
Lead	7439921	6	6	Normal	96.4	165	220	165
Mercury	7439976	6	5	Lognormal	0.501	45.1	1.7	1.7
Nickel	7440020	4	4	Normal	8.03	15.3	16.7	15.3
Selenium	7782492	6	2	Nonparametric	0.753	1.64	2	1.64
Silver	7440224	6	0	Nonparametric	ND	ND	ND	ND

Table 1 **Statistics for Surface Soil In Area 1B (Continued)**

		H. Distribution of Data								
Chemical	CAS No.	Distribution	Minimum Value (Approx. 0th Percentile)	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile	99th Percentile	Maximum Value (Approx. 100th Percentile)
CPAHs (mg/Kg)										
Benzo(a)anthracene	56553	Normal	0.41	1.19	3.29	5.38	7.27	8.39	10.5	9.2
Chrysene	218019	Normal	0.41	1.26	3.24	5.21	6.99	8.05	10.1	8.9
Benzo(b)fluoranthene	205992	Normal	0.41	1.53	3.25	4.97	6.52	7.45	9.18	8
Benzo(k)fluoranthene	207089	Normal	0.41	0.689	1.38	2.07	2.7	3.07	3.77	3.3
Benzo(a)pyrene	50328	Normal	0.41	0.929	1.95	2.97	3.9	4.45	5.48	4.8
Indeno(1,2,3-cd)pyrene	193395	Lognormal	0.11	0.322	0.85	2.25	5.39	9.1	24.3	6.8
Dibenzo(a,h)anthracene	53703	Normal	0.13	0.269	0.715	1.16	1.56	1.8	2.25	1.9
Pesticide Compounds (mg/Kg)										
Aldrin	309002	Nonparametric	0.00085	0.00085	0.000925	0.00123	0.00145	0.00145	0.00145	0.00145
Heptachlor Epoxide	1024573	Normal	0.00085	0.002	0.00818	0.0143	0.0199	0.0232	0.0295	0.023
Dieldrin	60571	Nonparametric	0.00085	0.00085	0.002	0.00606	0.016	0.016	0.016	0.016
4,4'-DDT	50293	Lognormal	0.00225	0.00594	0.0197	0.0656	0.193	0.369	1.24	0.21
PCBs (mg/Kg)										
Aroclor - 1248	1336363	Nonparametric	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Aroclor - 1254	1336363	Nonparametric	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Aroclor - 1260	1336363	Nonparametric	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Total PCBs		Nonparametric	0	0	0	0	0	0	0	0
Inorganic Compounds (mg/Kg)										
Antimony	7440360	Nonparametric	1.4	1.41	1.63	2.1	2.2	2.2	2.2	2.2
Arsenic	7440382	Normal	0.77	3.29	5.78	8.27	10.5	11.8	14.4	12.1
Barium	7440393	Lognormal	10.4	22.2	60.2	163	401	686	1880	520
Beryllium	7440417	Lognormal	0.105	0.136	0.276	0.561	1.06	1.56	3.2	1.2
Cadmium	7440439	Lognormal	0.305	0.439	0.877	1.75	3.26	4.74	9.53	4.7
Chromium	16065831	Lognormal	14.2	54.8	196	703	2210	4400	16000	2600
Hexavalent Chromium	18540299									
Lead	7439921	Normal	16.2	40.4	96.4	152	203	233	290	220
Mercury	7439976	Lognormal	0.035	0.0705	0.197	0.552	1.39	2.43	6.87	1.7
Nickel	7440020	Normal	3.5	3.87	8.03	12.2	15.9	18.1	22.3	16.7
Selenium	7782492	Nonparametric	0.145	0.153	0.685	1.14	2	2	2	2
Silver	7440224	Nonparametric	0.22	0.231	0.318	0.479	0.55	0.55	0.55	0.55

Table 1 **Statistics for Surface Soil in Area 1B (Continued)**

		I. Distribution of Data for Nonparametric Distribution							
Chemical	CAS No.	Minimum Value (Approx. 0th Percentile)	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile	99th Percentile	Maximum Value (Approx. 100th Percentile)
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	0.41	1	2.75	4.85	9.2	9.2	9.2	9.2
Chrysene	218019	0.41	1.45	2.65	4.48	8.9	8.9	8.9	8.9
Benzo(b)fluoranthene	205992	0.41	1.9	2.55	4.7	8	8	8	8
Benzo(k)fluoranthene	207089	0.41	0.673	1.11	2.03	3.3	3.3	3.3	3.3
Benzo(a)pyrene	50328	0.41	1	1.6	2.78	4.8	4.8	4.8	4.8
Indeno(1,2,3-cd)pyrene	193395	0.11	0.335	0.69	3.65	6.8	6.8	6.8	6.8
Dibenzo(a,h)anthracene	53703	0.13	0.183	0.53	1.23	1.9	1.9	1.9	1.9
Pesticide Compounds (mg/Kg)									
Aldrin	309002	0.00085	0.00085	0.000925	0.00123	0.00145	0.00145	0.00145	0.00145
Heptachlor Epoxide	1024573	0.00085	0.00085	0.00468	0.017	0.023	0.023	0.023	0.023
Dieldrin	60571	0.00085	0.00085	0.002	0.00606	0.016	0.016	0.016	0.016
4,4'-DDT	50293	0.00225	0.00263	0.0265	0.102	0.21	0.21	0.21	0.21
PCBs (mg/Kg)									
Aroclor - 1248	1336363	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Aroclor - 1254	1336363	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Aroclor - 1260	1336363	0.0165	0.0165	0.018	0.0238	0.0275	0.0275	0.0275	0.0275
Total PCBs		0	0	0	0	0	0	0	0
Inorganic Compounds (mg/Kg)									
Antimony	7440360	1.4	1.41	1.63	2.1	2.2	2.2	2.2	2.2
Arsenic	7440382	0.77	3.49	5.5	7.83	12.1	12.1	12.1	12.1
Barium	7440393	10.4	16.3	58.9	265	520	520	520	520
Beryllium	7440417	0.105	0.121	0.22	0.968	1.2	1.2	1.2	1.2
Cadmium	7440439	0.305	0.369	0.843	2.23	4.7	4.7	4.7	4.7
Chromium	16065831	14.2	59.9	142	1480	2600	2600	2600	2600
Hexavalent Chromium	18540299								
Lead	7439921	16.2	24.3	72.7	183	220	220	220	220
Mercury	7439976	0.035	0.0688	0.116	1.15	1.7	1.7	1.7	1.7
Nickel	7440020	3.5	3.58	5.95	14.6	16.7	16.7	16.7	16.7
Selenium	7782492	0.145	0.153	0.685	1.14	2	2	2	2
Silver	7440224	0.22	0.231	0.318	0.479	0.55	0.55	0.55	0.55

Table 2 **Statistics for Subsurface Soil in Area 1B**

Chemical	CAS No.	A. Sample Counts					
		Number of Samples	Number of Rejected Samples	Number of Valid Samples	Number of Detects	Number of Nondetects	Percent Nondetects
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	11	0	11	3	8	72.7
Chrysene	218019	11	0	11	3	8	72.7
Benzo(b)fluoranthene	205992	11	0	11	4	7	63.6
Benzo(k)fluoranthene	207089	11	0	11	3	8	72.7
Benzo(a)pyrene	50328	11	0	11	3	8	72.7
Indeno(1,2,3-cd)pyrene	193395	11	0	11	3	8	72.7
Dibenzo(a,h)anthracene	53703	11	0	11	3	8	72.7
Pesticide Compounds (mg/Kg)							
Aldrin	309002	11	0	11	0	11	100
Heptachlor Epoxide	1024573	11	0	11	3	8	72.7
Dieldrin	60571	11	0	11	2	9	81.8
4,4'-DDT	50293	11	0	11	4	7	63.6
PCBs (mg/Kg)							
Aroclor - 1248	1336363	11	0	11	1	10	90.9
Aroclor - 1254	1336363	11	0	11	1	10	90.9
Aroclor - 1260	1336363	11	0	11	0	11	100
Total PCBs		11	0	11	1	10	90.9
Inorganic Compounds (mg/Kg)							
Antimony	7440360	10	0	10	0	10	100
Arsenic	7440382	11	0	11	11	0	0
Barium	7440393	11	0	11	10	1	9.09
Beryllium	7440417	10	0	10	4	6	60
Cadmium	7440439	11	0	11	3	8	72.7
Chromium	16065831	11	0	11	11	0	0
Hexavalent Chromium	18540299						
Lead	7439921	11	0	11	11	0	0
Mercury	7439976	11	0	11	6	5	45.5
Nickel	7440020	10	0	10	8	2	20
Selenium	7782492	11	0	11	4	7	63.6
Silver	7440224	11	0	11	0	11	100

Table 2 **Statistics for Subsurface Soil in Area 1B (Continued)**

Chemical	CAS No.	B. Basic Statistics				
		Minimum Detection Limit	Maximum Detection Limit	Minimum Detected Concentration	Maximum Detected Concentration	Sample with Maximum Detect
CPAHs (mg/Kg)						
Benzo(a)anthracene	56553	0.33	0.85	0.94	3.6	SB-36B
Chrysene	218019	0.33	0.85	0.74	3.4	SB-36B
Benzo(b)fluoranthene	205992	0.33	0.79	0.74	27	SB-33B
Benzo(k)fluoranthene	207089	0.33	0.93	1.3	9.4	SB-33B
Benzo(a)pyrene	50328	0.33	0.93	0.23	9.9	SB-33B
Indeno(1,2,3-cd)pyrene	193395	0.33	0.93	0.64	5.5	SB-33B
Dibenzo(a,h)anthracene	53703	0.33	0.93	0.12	1	SB-33B
Pesticide Compounds (mg/Kg)						
Aldrin	309002	0.0017	0.0024	NA	NA	NA
Heptachlor Epoxide	1024573	0.0017	0.0024	0.009	0.11	SB-33B
Dieldrin	60571	0.0017	0.0047	0.019	0.18	SB-33B
4,4'-DDT	50293	0.0033	0.0047	0.033	0.4	SB-37B
PCBs (mg/Kg)						
Aroclor - 1248	1336363	0.033	0.047	3.2	3.2	SB-33B
Aroclor - 1254	1336363	0.033	0.047	1.9	1.9	SB-33B
Aroclor - 1260	1336363	0.033	0.047	NA	NA	NA
Total PCBs		NA	NA	5.1	5.1	SB-33B
Inorganic Compounds (mg/Kg)						
Antimony	7440360	2.9	3.8	NA	NA	NA
Arsenic	7440382	NA	NA	0.4	40.6	SB-35B
Barium	7440393	4	4	1.8	229	SB-33B
Beryllium	7440417	0.22	0.25	0.36	1.7	SB-35B
Cadmium	7440439	0.4	0.82	1.4	2	SB-37B
Chromium	16065831	NA	NA	3.2	704	SB-33B
Hexavalent Chromium	18540299					
Lead	7439921	NA	NA	1.7	133	SB-33B
Mercury	7439976	0.06	0.094	0.07	0.39	SB-33B
Nickel	7440020	1.5	1.6	4.6	24	MW-4A
Selenium	7782492	0.3	0.83	0.54	1.2	SB-62B
Silver	7440224	0.08	0.6	NA	NA	NA

Table 2 **Statistics for Subsurface Soil in Area 1B (Continued)**

		C. General Summary Statistics					
Chemical	CAS No.	Median	Mean	Standard Deviation	Coefficient of Variation	Geometric Mean	Geometric Standard Deviation
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.37	0.879	1.22	1.39	0.448	3.05
Chrysene	218019	0.37	0.843	1.18	1.4	0.436	2.97
Benzo(b)fluoranthene	205992	0.37	3.57	7.99	2.24	0.687	5.71
Benzo(k)fluoranthene	207089	0.37	1.3	2.72	2.1	0.474	3.48
Benzo(a)pyrene	50328	0.23	1.27	2.9	2.27	0.414	3.49
Indeno(1,2,3-cd)pyrene	193395	0.37	0.846	1.56	1.85	0.41	2.84
Dibenzo(a,h)anthracene	53703	0.2	0.311	0.256	0.823	0.251	1.9
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.00105	0.00103	0.00011	0.107	0.00102	1.11
Heptachlor Epoxide	1024573	0.00105	0.0148	0.0333	2.24	0.00263	5.58
Dieldrin	60571	0.00205	0.0197	0.0534	2.72	0.00346	4.53
4,4'-DDT	50293	0.0022	0.061	0.122	2.01	0.00855	8.14
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.02	0.309	0.959	3.1	0.0313	4.65
Aroclor - 1254	1336363	0.02	0.191	0.567	2.97	0.0299	3.98
Aroclor - 1260	1336363	0.02	0.02	0.00207	0.103	0.0199	1.11
Total PCBs		0	0.464	1.54	3.32	NA	NA
Inorganic Compounds (mg/Kg)							
Antimony	7440360	1.58	1.59	0.147	0.0923	1.58	1.09
Arsenic	7440382	1.9	6.38	11.7	1.83	2.55	3.77
Barium	7440393	21.9	42.9	66.2	1.54	14.2	5.46
Beryllium	7440417	0.123	0.506	0.649	1.28	0.263	3.13
Cadmium	7440439	0.355	0.688	0.626	0.91	0.506	2.16
Chromium	16065831	22.7	134	220	1.64	31.9	6.67
Hexavalent Chromium	18540299						
Lead	7439921	15.5	23.4	37.6	1.61	10	3.98
Mercury	7439976	0.07	0.132	0.131	0.985	0.0835	2.76
Nickel	7440020	9.5	10.2	7.41	0.729	6.55	3.37
Selenium	7782492	0.38	0.426	0.326	0.766	0.333	2.08
Silver	7440224	0.245	0.235	0.0679	0.289	0.214	1.75

Table 2

Statistics for Subsurface Soil in Area 1B (Continued)

		D. Testing of Normality of Data					
		Shapiro-Wilk Test of		D'Agostino Test of Normality (N>50)			
Chemical	CAS No.	W-Statistic	W Value at 0.05 Level	Y-Statistic	Y Value at 0.025 Level	Y Value at 0.975 Level	Is Data Normally Distributed at 0.05 Level?
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.63	0.85				No
Chrysene	218019	0.61	0.85				No
Benzo(b)fluoranthene	205992	0.496	0.85				No
Benzo(k)fluoranthene	207089	0.466	0.85				No
Benzo(a)pyrene	50328	0.438	0.85				No
Indeno(1,2,3-cd)pyrene	193395	0.476	0.85				No
Dibenzo(a,h)anthracene	53703	0.716	0.85				No
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.959	0.85				No
Heptachlor Epoxide	1024573	0.503	0.85				No
Dieldrin	60571	0.395	0.85				No
4,4'-DDT	50293	0.577	0.85				No
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.347	0.85				No
Aroclor - 1254	1336363	0.348	0.85				No
Aroclor - 1260	1336363	0.985	0.85				No
Total PCBs		0.345	0.85				No
Inorganic Compounds (mg/Kg)							
Antimony	7440360	0.884	0.842				No
Arsenic	7440382	0.536	0.85				No
Barium	7440393	0.647	0.85				No
Beryllium	7440417	0.65	0.842				No
Cadmium	7440439	0.697	0.85				No
Chromium	16065831	0.664	0.85				No
Hexavalent Chromium	18540299						
Lead	7439921	0.578	0.85				No
Mercury	7439976	0.801	0.85				No
Nickel	7440020	0.957	0.842				Yes
Selenium	7782492	0.832	0.85				No
Silver	7440224	0.646	0.85				No

Table 2 **Statistics for Subsurface Soil In Area 1B (Continued)**

		E. Testing of Log-Normality of Data					
		Shapiro-Wilk Test of Log-		D'Agostino Test of Log-Normality (N>50)			
Chemical	CAS No.	W-Statistic	W Value at 0.05 Level	Y-Statistic	Y Value at 0.025 Level	Y Value at 0.975 Level	Is Data Log-Normally Distributed at 0.05 Level?
CPAHs (mg/Kg)							
Benzo(a)anthracene	56553	0.815	0.85				No
Chrysene	218019	0.806	0.85				No
Benzo(b)fluoranthene	205992	0.8	0.85				No
Benzo(k)fluoranthene	207089	0.81	0.85				No
Benzo(a)pyrene	50328	0.732	0.85				No
Indeno(1,2,3-cd)pyrene	193395	0.816	0.85				No
Dibenzo(a,h)anthracene	53703	0.901	0.85				No
Pesticide Compounds (mg/Kg)							
Aldrin	309002	0.96	0.85				No
Heptachlor Epoxide	1024573	0.675	0.85				No
Dieldrin	60571	0.649	0.85				No
4,4'-DDT	50293	0.749	0.85				No
PCBs (mg/Kg)							
Aroclor - 1248	1336363	0.404	0.85				No
Aroclor - 1254	1336363	0.411	0.85				No
Aroclor - 1260	1336363	0.985	0.85				No
Total PCBs		0.985	0.85				No
Inorganic Compounds (mg/Kg)							
Antimony	7440360	0.898	0.842				No
Arsenic	7440382	0.962	0.85				Yes
Barium	7440393	0.893	0.85				Yes
Beryllium	7440417	0.748	0.842				No
Cadmium	7440439	0.786	0.85				No
Chromium	16065831	0.917	0.85				Yes
Hexavalent Chromium	18540299						
Lead	7439921	0.924	0.85				Yes
Mercury	7439976	0.864	0.85				Yes
Nickel	7440020	0.83	0.842				No
Selenium	7782492	0.894	0.85				No
Silver	7440224	0.483	0.85				No

Table 2 **Statistics for Subsurface Soil in Area 1B (Continued)**

		F. 95% Upper Confidence Limits on the Mean						
		Normal Distribution		Lognormal Distribution				
Chemical	CAS No.	t-Statistic	95% UCL for Normal Distribution	H-Statistic	95% UCL for Lognormal Distribution Using H-Statistic	Minimum Variance Unbiased Estimate of Mean	95% UCL Using Jackknife Method with Log Normal Theory	95% UCL Using Bootstrap Method with Log Normal Theory
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	1.8125	1.55	3.2383	2.6	0.768	1.38	1.46
Chrysene	218019	1.8125	1.49	3.1887	2.37	0.731	1.31	1.42
Benzo(b)fluoranthene	205992	1.8125	7.93	4.5914	39.3	2.4	5.32	7.25
Benzo(k)fluoranthene	207089	1.8125	2.79	3.5082	4.11	0.925	1.77	2.28
Benzo(a)pyrene	50328	1.8125	2.85	3.514	3.62	0.811	1.57	2.27
Indeno(1,2,3-cd)pyrene	193395	1.8125	1.7	3.0945	1.96	0.66	1.17	1.36
Dibenzo(a,h)anthracene	53703	1.8125	0.451	2.3799	0.497	0.301	0.429	0.422
Pesticide Compounds (mg/Kg)								
Aldrin	309002	1.8125	0.00109	1.7945	0.00109	0.00103	0.00109	0.00108
Heptachlor Epoxide	1024573	1.8125	0.033	4.5407	0.136	0.00893	0.0199	0.0345
Dieldrin	60571	1.8125	0.0488	4.0741	0.0757	0.00904	0.0188	0.0362
4,4'-DDT	50293	1.8125	0.128	5.4058	2.78	0.0494	0.12	0.183
PCBs (mg/Kg)								
Aroclor - 1248	1336363	1.8125	0.833	4.1353	0.763	0.0846	0.17	0.504
Aroclor - 1254	1336363	1.8125	0.501	3.7952	0.406	0.0673	0.134	0.385
Aroclor - 1260	1336363	1.8125	0.0212	1.7912	0.0213	0.02	0.0212	0.021
Total PCBs		1.8125	1.3	NA	NA	NA	NA	NA
Inorganic Compounds (mg/Kg)								
Antimony	7440360	1.8331	1.68	1.802	1.68	1.59	1.67	1.66
Arsenic	7440382	1.8125	12.7	3.6804	28.8	5.42	10.2	12
Barium	7440393	1.8125	79	4.4933	672	47	94.4	94.3
Beryllium	7440417	1.8331	0.882	3.407	1.84	0.459	0.842	0.867
Cadmium	7440439	1.8125	1.03	2.5915	1.28	0.659	1	0.991
Chromium	16065831	1.8125	254	4.9445	3750	138	306	350
Hexavalent Chromium	18540299							
Lead	7439921	1.8125	44	3.796	137	22.6	41.4	44.1
Mercury	7439976	1.8125	0.204	3.0421	0.372	0.131	0.214	0.203
Nickel	7440020	1.8331	14.4	3.5631	57.9	12.3	18.3	16.2
Selenium	7782492	1.8125	0.605	2.5258	0.781	0.423	0.608	0.586
Silver	7440224	1.8125	0.272	2.2668	0.375	0.247	0.27	0.267

Table 2 **Statistics for Subsurface Soil in Area 1B (Continued)**

		F. 95% Upper Confidence Limits on the Mean (Cont'd)			
		Nonparametric			
Chemical	CAS No.	95% UCL Using Jackknife Method	95% UCL Using Standard Bootstrap Method	t-statistic for Bootstrap-t	95% UCL Using Bootstrap-t Method
CPAHs (mg/Kg)					
Benzo(a)anthracene	56553	1.55	1.47	-2.47	3.91
Chrysene	218019	1.49	1.42	-3.1	4.5
Benzo(b)fluoranthene	205992	7.93	7.25	-2.24	21.5
Benzo(k)fluoranthene	207089	2.79	2.56	-2.85	9.05
Benzo(a)pyrene	50328	2.85	2.58	-9.23	28
Indeno(1,2,3-cd)pyrene	193395	1.7	1.59	-3.47	6.27
Dibenzo(a,h)anthracene	53703	0.451	0.431	-1.13	0.6
Pesticide Compounds (mg/Kg)					
Aldrin	309002	0.00109	0.00108	-0.553	0.00109
Heptachlor Epoxide	1024573	0.033	0.0301	-5.44	0.196
Dieldrin	60571	0.0488	0.0447	-45.9	2.47
4,4'-DDT	50293	0.128	0.118	-2.28	0.341
PCBs (mg/Kg)					
Aroclor - 1248	1336363	0.833	0.777	-204	196
Aroclor - 1254	1336363	0.501	0.461	-121	68.6
Aroclor - 1260	1336363	0.0212	0.021	-0.588	0.0213
Total PCBs		1.3	1.2	0	0.464
Inorganic Compounds (mg/Kg)					
Antimony	7440360	1.68	1.66	-0.805	1.71
Arsenic	7440382	12.7	11.6	-2.22	32.2
Barium	7440393	79	72.3	-1.26	126
Beryllium	7440417	0.882	0.824	-1.73	1.63
Cadmium	7440439	1.03	0.985	-0.805	1.19
Chromium	16065831	254	237	-1.06	366
Hexavalent Chromium	18540299				
Lead	7439921	44	40.7	-1.53	80.9
Mercury	7439976	0.204	0.193	-0.711	0.225
Nickel	7440020	14.4	13.7	-0.631	14.8
Selenium	7782492	0.605	0.584	-0.839	0.7
Silver	7440224	0.272	0.267	-0.391	0.261

Table 2

Statistics for Subsurface Soil in Area 1B (Continued)

		G. Source Concentrations						
Chemical	CAS No.	Number of Valid Samples	Number of Detects	Distribution	Mean	95% Upper Confidence Limit on the Mean	Maximum Detected Concentration	Source Concentration
CPAHs (mg/Kg)								
Benzo(a)anthracene	56553	11	3	Nonparametric	0.879	3.91	3.6	3.6
Chrysene	218019	11	3	Nonparametric	0.843	4.5	3.4	3.4
Benzo(b)fluoranthene	205992	11	4	Nonparametric	3.57	21.5	27	21.5
Benzo(k)fluoranthene	207089	11	3	Nonparametric	1.3	9.05	9.4	9.05
Benzo(a)pyrene	50328	11	3	Nonparametric	1.27	28	9.9	9.9
Indeno(1,2,3-cd)pyrene	193395	11	3	Nonparametric	0.846	6.27	5.5	5.5
Dibenzo(a,h)anthracene	53703	11	3	Nonparametric	0.311	0.6	1	0.6
Pesticide Compounds (mg/Kg)								
Aldrin	309002	11	0	Nonparametric	ND	ND	ND	ND
Heptachlor Epoxide	1024573	11	3	Nonparametric	0.0148	0.196	0.11	0.11
Dieldrin	60571	11	2	Nonparametric	0.0197	2.47	0.18	0.18
4,4'-DDT	50293	11	4	Nonparametric	0.061	0.341	0.4	0.341
PCBs (mg/Kg)								
Aroclor - 1248	1336363	11	1	Nonparametric	0.309	196	3.2	3.2
Aroclor - 1254	1336363	11	1	Nonparametric	0.191	68.6	1.9	1.9
Aroclor - 1260	1336363	11	0	Nonparametric	ND	ND	ND	ND
Total PCBs		11	1	Nonparametric	0.464	1.3	5.1	1.3
Inorganic Compounds (mg/Kg)								
Antimony	7440360	10	0	Nonparametric	ND	ND	ND	ND
Arsenic	7440382	11	11	Lognormal	6.38	28.8	40.6	28.8
Barium	7440393	11	10	Lognormal	42.9	672	229	229
Beryllium	7440417	10	4	Nonparametric	0.506	1.63	1.7	1.63
Cadmium	7440439	11	3	Nonparametric	0.688	1.19	2	1.19
Chromium	16065831	11	11	Lognormal	134	3750	704	704
Hexavalent Chromium	18540299							
Lead	7439921	11	11	Lognormal	23.4	137	133	133
Mercury	7439976	11	6	Lognormal	0.132	0.372	0.39	0.372
Nickel	7440020	10	8	Normal	10.2	14.4	24	14.4
Selenium	7782492	11	4	Nonparametric	0.426	0.7	1.2	0.7
Silver	7440224	11	0	Nonparametric	ND	ND	ND	ND

Table 2 **Statistics for Subsurface Soil in Area 1B (Continued)**

		H. Distribution of Data								
Chemical	CAS No.	Distribution	Minimum Value (Approx. 0th Percentile)	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile	99th Percentile	Maximum Value (Approx. 100th Percentile)
CPAHs (mg/Kg)										
Benzo(a)anthracene	56553	Nonparametric	0.165	0.185	0.37	0.94	3.48	3.6	3.6	3.6
Chrysene	218019	Nonparametric	0.165	0.185	0.37	0.74	3.32	3.4	3.4	3.4
Benzo(b)fluoranthene	205992	Nonparametric	0.165	0.185	0.37	4.5	22.7	27	27	27
Benzo(k)fluoranthene	207089	Nonparametric	0.165	0.185	0.37	1.3	7.8	9.4	9.4	9.4
Benzo(a)pyrene	50328	Nonparametric	0.165	0.185	0.23	0.465	8.26	9.9	9.9	9.9
Indeno(1,2,3-cd)pyrene	193395	Nonparametric	0.165	0.185	0.37	0.64	4.6	5.5	5.5	5.5
Dibenzo(a,h)anthracene	53703	Nonparametric	0.12	0.165	0.2	0.395	0.893	1	1	1
Pesticide Compounds (mg/Kg)										
Aldrin	309002	Nonparametric	0.00085	0.00095	0.00105	0.00115	0.00119	0.0012	0.0012	0.0012
Heptachlor Epoxide	1024573	Nonparametric	0.00085	0.00095	0.00105	0.009	0.0952	0.11	0.11	0.11
Dieldrin	60571	Nonparametric	0.00085	0.0019	0.00205	0.00235	0.148	0.18	0.18	0.18
4,4'-DDT	50293	Nonparametric	0.00165	0.00195	0.0022	0.064	0.352	0.4	0.4	0.4
PCBs (mg/Kg)										
Aroclor - 1248	1336363	Nonparametric	0.0165	0.0185	0.02	0.022	2.56	3.2	3.2	3.2
Aroclor - 1254	1336363	Nonparametric	0.0165	0.0185	0.02	0.022	1.52	1.9	1.9	1.9
Aroclor - 1260	1336363	Nonparametric	0.0165	0.0185	0.02	0.022	0.0233	0.0235	0.0235	0.0235
Total PCBs		Nonparametric	0	0	0	0	4.08	5.1	5.1	5.1
Inorganic Compounds (mg/Kg)										
Antimony	7440360	Nonparametric	1.45	1.45	1.58	1.68	1.89	1.9	1.9	1.9
Arsenic	7440382	Lognormal	0.4	1.04	2.55	6.24	14	22.6	55.9	40.6
Barium	7440393	Lognormal	1.8	4.53	14.2	44.7	125	232	740	229
Beryllium	7440417	Nonparametric	0.11	0.114	0.123	0.875	1.7	1.7	1.7	1.7
Cadmium	7440439	Nonparametric	0.2	0.33	0.355	1.4	1.9	2	2	2
Chromium	16065831	Lognormal	3.2	8.87	31.9	115	363	723	2630	704
Hexavalent Chromium	18540299									
Lead	7439921	Lognormal	1.7	3.95	10	25.4	58.9	97.2	249	133
Mercury	7439976	Lognormal	0.03	0.0421	0.0835	0.166	0.307	0.445	0.889	0.39
Nickel	7440020	Normal	0.75	5.16	10.2	15.1	19.6	22.3	27.4	24
Selenium	7782492	Nonparametric	0.15	0.16	0.38	0.61	1.1	1.2	1.2	1.2
Silver	7440224	Nonparametric	0.04	0.235	0.245	0.26	0.296	0.3	0.3	0.3

Table 2

Statistics for Subsurface Soil in Area 1B (Continued)

Chemical	CAS No.	I. Distribution of Data for Nonparametric Distribution							
		Minimum Value (Approx. 0th Percentile)	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile	99th Percentile	Maximum Value (Approx. 100th Percentile)
CPAHs (mg/Kg)									
Benzo(a)anthracene	56553	0.165	0.185	0.37	0.94	3.48	3.6	3.6	3.6
Chrysene	218019	0.165	0.185	0.37	0.74	3.32	3.4	3.4	3.4
Benzo(b)fluoranthene	205992	0.165	0.185	0.37	4.5	22.7	27	27	27
Benzo(k)fluoranthene	207089	0.165	0.185	0.37	1.3	7.8	9.4	9.4	9.4
Benzo(a)pyrene	50328	0.165	0.185	0.23	0.465	8.26	9.9	9.9	9.9
Indeno(1,2,3-cd)pyrene	193395	0.165	0.185	0.37	0.64	4.6	5.5	5.5	5.5
Dibenzo(a,h)anthracene	53703	0.12	0.165	0.2	0.395	0.893	1	1	1
Pesticide Compounds (mg/Kg)									
Aldrin	309002	0.00085	0.00095	0.00105	0.00115	0.00119	0.0012	0.0012	0.0012
Heptachlor Epoxide	1024573	0.00085	0.00095	0.00105	0.009	0.0952	0.11	0.11	0.11
Dieldrin	60571	0.00085	0.0019	0.00205	0.00235	0.148	0.18	0.18	0.18
4,4'-DDT	50293	0.00165	0.00195	0.0022	0.064	0.352	0.4	0.4	0.4
PCBs (mg/Kg)									
Aroclor - 1248	1336363	0.0165	0.0185	0.02	0.022	2.56	3.2	3.2	3.2
Aroclor - 1254	1336363	0.0165	0.0185	0.02	0.022	1.52	1.9	1.9	1.9
Aroclor - 1260	1336363	0.0165	0.0185	0.02	0.022	0.0233	0.0235	0.0235	0.0235
Total PCBs		0	0	0	0	4.08	5.1	5.1	5.1
Inorganic Compounds (mg/Kg)									
Antimony	7440360	1.45	1.45	1.58	1.68	1.89	1.9	1.9	1.9
Arsenic	7440382	0.4	0.84	1.9	5.9	34.2	40.6	40.6	40.6
Barium	7440393	1.8	2.6	21.9	61.1	196	229	229	229
Beryllium	7440417	0.11	0.114	0.123	0.875	1.7	1.7	1.7	1.7
Cadmium	7440439	0.2	0.33	0.355	1.4	1.9	2	2	2
Chromium	16065831	3.2	5.3	22.7	291	624	704	704	704
Hexavalent Chromium	18540299								
Lead	7439921	1.7	2.5	15.5	24.2	112	133	133	133
Mercury	7439976	0.03	0.03	0.07	0.24	0.378	0.39	0.39	0.39
Nickel	7440020	0.75	3.65	9.5	16.1	23.4	24	24	24
Selenium	7782492	0.15	0.16	0.38	0.61	1.1	1.2	1.2	1.2
Silver	7440224	0.04	0.235	0.245	0.26	0.296	0.3	0.3	0.3

Appendix I

Proposed Engineered Barrier Design for Tannery Site

Proposed Engineered Barrier Design for Tannery Site, Waukegan, Illinois

An engineered barrier is proposed at the Tannery site in Waukegan, Illinois to be placed over site soil impacted by tannery operations. The purpose of the engineered barrier is to prevent direct exposure to impacted soil and provide the structural support for equipment need to construct the cover. The components of the engineered barrier are (from the bottom): in-place soil, woven geotextile, gravel, topsoil, and seed. Figure 1 shows the proposed engineered barrier layout.

The engineered barrier will be placed directly on the existing, in-place soil. The soil has undrained shear strength of approximately 200 pounds per square foot. This is based on field torvane testing conducted at the site on March 12, 2002. This soil has insufficient strength to directly support tire mounted or track mounted construction equipment.

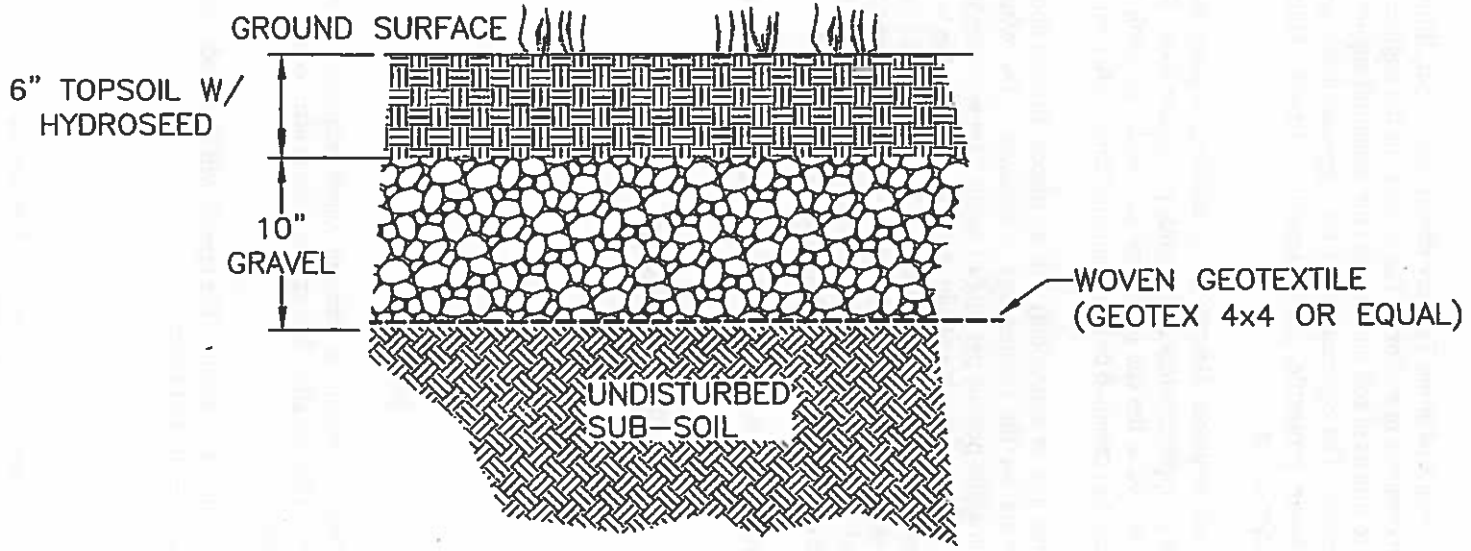
Woven geotextile (Geotex 4x4 or equivalent) will be placed directly above the in-place soil. A specification sheet for the Geotex 4x4 is attached. The wide width tensile strength (ASTM 4595) is 4,800 pounds per foot of width. Tensile strength of geotextile is presented as a force per unit width. To obtain stress units, this value would be divided by the material thickness (55 mils or 0.055 inches). The stress units are not typically presented because the material thickness will vary greatly when stretched to failure. Geotex 4x4 is only manufactured in black. We are contacting other vendors to determine if a colored material with equivalent strength properties can be obtained.

Above the geotextile will be a 10-inch thick layer of gravel. This gravel layer will consist of:

Sieve Size	Percent Finer by Weight
3-inch diameter	100
No. 10	30 – 95
No. 40	10 – 70
No. 200	0 - 15

A minimum of 10-inches is needed to prevent direct exposure according to the remediation objectives report for the site. The gravel layer is also required to provide the necessary structural support.

Above the gravel will be 6 inches of topsoil. The topsoil will be hyrodseeded. This layer is in place to prevent erosion of the soil cover.



RETEC

COMMONWEALTH EDISON CHICAGO, ILLINOIS CED#-15159-000			PROPOSED ENGINEERED BARRIER SECTIONAL VIEW FORMER TANNERY SITE WAUKEGAN, ILLINOIS	
DATE: 4/02/02	DR|N: BcV/CON	FILE: 15159D01	LAYOUT: DET1	FIGURE 1

MWG13-15 46592

SI Geosolutions

Product Data Sheet

GEOTEX® 4 x 4

GEOTEX 4x4 is a woven polypropylene geotextile containing heavy monofilament (warp) and fibrillated (fill) yarns. The individual yarns are woven in a unique twill pattern to form a strong geotextile. These characteristics make the **GEOTEX 4x4** ideal for the construction of embankments over soft soils, steepened slopes, and modular block and/or wrapped-face retaining walls The geotextile is resistant to ultraviolet degradation and to biological and chemical environments for normally found in soils. **GEOTEX 4x4** conforms to the property values listed below[1] which have been derived from quality control testing performed by one of SI Geosolutions' GAI-LAP accredited laboratories:

PROPERTY	TEST METHOD	MARV[2] ENGLISH	METRIC
Physical			
Mass/Unit Area	ASTM D5261	13.0 oz/y^2	440g/m
Thickness	ASTM D5199	55 mils	1.3 mm
Mechanical			
Wide Width Tensile Strength	ASTM D4595	4,800 x 4,800 lb/ft	70 x 70 kN/m
Wide Width Elongation	ASTM D4595	9 x 9%	9 x 9%
Wide Width Tensile @ 2% Strain	ASTM D4595	480 x 840 lb/ft	7.0 x 12.2 kN/m
Wide Width Tensile @ 5% Strain	ASTM D4595	2,400 x 2,400 lb/ft	35.0 x 35.0 kN/m
Wide Width Tensile @ 10% Strain	ASTM D4595	3,900 x 3,900 lb/ft	57.0 x 57.0 kN/m
Tensile Strength (Grab)	ASTM D4632	450 x 410 lbs	2000 x 1820 N
Puncture Strength	ASTM D4833	160 lb	712 N
Mullen Burst	ASTM D3786	1,200 psi	8,270 kPa
Trapezoidal Tear	ASTM D4533	225 x 225 lbs	1,000 x 1,000 N
Endurance			
UV Resistance	ASTM D4355	90%	90%
Hydraulic			
Apparent Opening Size (AOS)	ASTM D4751	30 US Std. Sieve	0.600 mm
Permittivity	ASTM D4491	0.60 sec^{-1}	0.60 sec^{-1}
Water Flow Rate	ASTM D4491	45 gpm/ft^2	1,830 l/min/m^2
Roll Sizes		15.0 ft x 300 ft	4.57 m x 91.46 m

NOTES:

1. **The property values listed above are effective 9/6/2000 and are subject to change without notice.**
2. Values for machine (warp) and cross-machine (fill), respectively, under dry or saturated conditions. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

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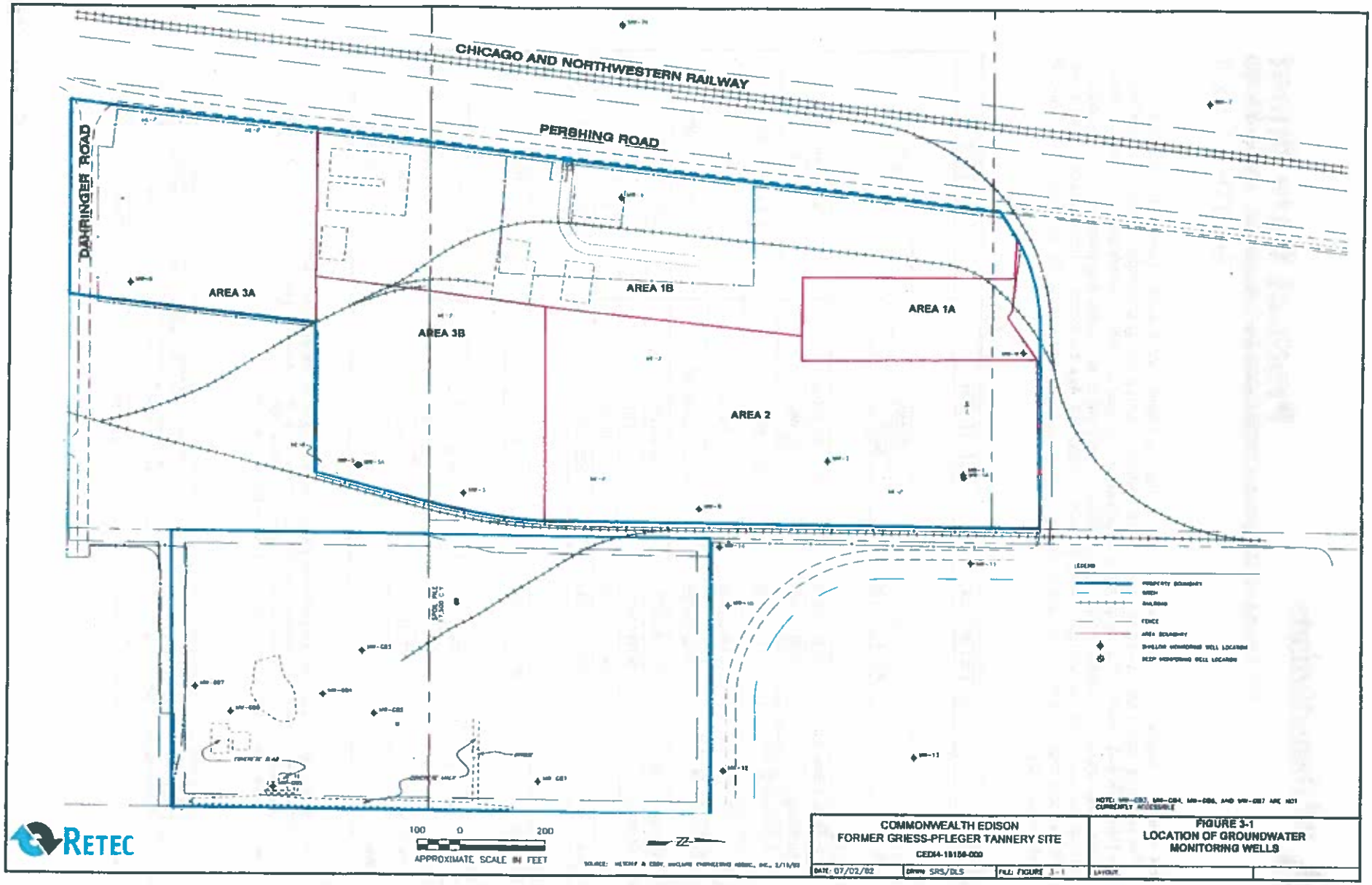

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