EPA Region 5 Records Ctr.
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LFR ENVIRONMENTAL MANAGEMENT & CONSULTING ENGINEERING

March 16, 2006

Mr. Timothy J. Murphy
Project Manager
Illinois Environmental Protection Agency
Division of Remedial Project Management
1021 North Grand Avenue East
Springfield, Illinois 62702

Subject: Letter of Transmittal; Remediation Objectives Report/Remedial Action Plan; LPC #0971905397; Johns Manville, 1871 North Pershing Road, Waukegan, Illinois 60087

Dear Mr. Murphy:

Enclosed are one original and two copies of the Remediation Objectives Report/Remedial Action Plan for the former manufacturing area at the Johns Manville (JM) facility in Waukegan, Illinois.

If you have any questions, please contact me at (847) 695-8855, extension 101.

Sincerely,

William A. Bow C.P.G.
Principal

Enclosure

cc: Denny Clinton/JM

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Remediation Objectives Report and Remedial Action Plan

Johns Manville Manufacturing Facility
1871 North Pershing Road
Waukegan, Illinois 60087

January 20, 2006

Revision 0

Prepared for:
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EXECUTIVE SUMMARY

LFR Inc. (LFR) has prepared this combined Remediation Objectives Report (ROR) and Remedial Action Plan (RAP) for the former Johns Manville (JM) manufacturing facility located at 1871 North Pershing Road in Waukegan, Illinois. This report specifically addresses conditions within the former Building Area, approximately 109 acres in size ("the Site"), located on the western portion of the 353-acre JM property. **Figure 1-1** depicts the location of the Site. As of October 2001, the former manufacturing buildings located within the Site were demolished. A revised Comprehensive Site Investigation Report (CSIR) was submitted separately to the Illinois Environmental Protection Agency (IEPA) for the Site on June 11, 2004. Additional data relevant to the CSIR was submitted as supplemental documents to the IEPA. These documents were dated December 2, 2004 (Chlorinated Compounds in Groundwater), December 8, 2004 (Pit Content Summary), April 27, 2005 (Supplemental Site Investigation Report), May 2, 2005 (Letter of Transmittal for Additional REC 17 Data), and May 11, 2005 (Building T - Tar Pit Letter).

In a letter dated June 27, 2005, the IEPA approved the CSIR and supplemental information and requested the submittal of a ROR/RAP. This combined ROR/RAP for the former Building Area addresses fourteen (14) recognized environmental conditions (RECs) identified in the June 9, 2004 CSIR (Revision 1) and the aforementioned supplemental documents:

- REC 2: 1989 UST Excavation Area 2
- REC 3: 1989 UST Excavation Area 3
- REC 4: 1989 UST Excavation Area 4
- REC 5: 1989 UST Excavation Area 5
- REC 11: 1989 UST Excavation Area 11
- REC 12: Solvent Recovery Room
- REC 16: Building E Kerosene Pits
- REC 27: Coal pit
- REC 28: Subsurface Asbestos-Containing Materials
- REC 30: Tank 033
- REC 31: Locomotive
- REC 32: Tank 031
- REC 38: Deep Monitoring Wells
- REC 39: Building A Pits

The ROR/RAP additionally addresses Area Y, Area Z, and the West Parking Area described in the First Amended Consent Decree (FACD). The U.S. Environmental Protection Agency (U.S. EPA) required that these areas be capped (either with asphalt or soil cover) during remedial activities completed in the early 1990s under the original consent decree. Currently, these areas are subject to the operation and maintenance (O&M) provisions pursuant to both the original decree and the FACD. However, this ROR/RAP will propose a reconfiguration of the current cover over these three areas. The proposed cover will be as protective of human health and the environment as the existing remedy.

The ROR has been developed based on analysis of Site conditions, concentrations of the contaminants of concern (COC), and possible future uses of the Site. The CSIR (Revision 1) and relevant supplemental information documents and summarizes the results of historical site investigations completed to characterize soil and groundwater conditions at the Site, and the extent of COCs within each REC. The ROR addresses each REC identified in the approved CSIR requiring remedial action.

To meet the necessary remediation objectives, JM intends to implement a remedial action plan (RAP) that provides for source soil removal, in situ soil remediation, effective engineered barriers and institutional controls for the Site that prevent exposure to COCs in soil or groundwater. The RAP is intended to be protective of human health and the environment. To achieve effective control, the RAP includes the following activities:

- Source soil removal and active air sparging and soil vapor extraction (SVE) to address volatile organic compound (VOC) and polynuclear aromatic hydrocarbon (PNA) impacts associated with REC 3 (1989 UST Excavation Area 3).
- Groundwater sampling for PNAs in selected REC 3 wells.
- Source soil removal to address benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminants associated with REC 12 (Solvent Recovery Room).
- Covering the Site with either two feet of compacted clay or asphalt paving (as parking) to address impacts from asbestos and contaminants of concern that exceed applicable remediation objectives for the soil ingestion exposure route.
- Where present, removal of free-floating product from the surface of the water table, in areas of total petroleum hydrocarbon (TPH) impacted soil associated with REC 2 (1989 UST Excavation Area 2), REC 5 (1989 UST Excavation Area 5), and REC 16 (Building E Kerosene Pits). Free floating product has not been encountered during 2005 in existing monitoring wells and piezometers, but will be addressed if encountered during RAP construction activities.
- The provisions of the FACD already prohibit any use of the groundwater on the JM property, which includes the Site. These were previously recorded to the Property deed and are incorporated into this RAP, where appropriate.

1.0 INTRODUCTION

LFR Inc. (LFR) has prepared this combined Remediation Objectives Report (ROR) and Remedial Action Plan (RAP) for the former Johns Manville (JM) manufacturing facility located at 1871 North Pershing Road in Waukegan, Illinois. The approximately 353-acre JM facility ("the Property") is located along the shoreline of Lake Michigan primarily in the City of Waukegan, Lake County, Illinois (see **Figure 1-1**, Property Location Map). It is bounded on the west by the Union Pacific Railroad, on the south by Greenwood Avenue, Midwest Energy, Commonwealth Edison, and City of Waukegan property, on the east by Lake Michigan, and on the north by Illinois Beach State Park. **Figure 1-1** depicts the Property location map.

For discussion purposes, the JM Property may be divided into five general areas: Building (roughly 109 acres), Disposal (142 acres), Borrow (roughly 50 acres), Beach (roughly 23 acres) and Canal (roughly 29 acres). **Figure 1-2** (General Property Map) depicts these and other major features, including the Site outline. This report specifically addresses conditions within the former Building Area, approximately 109 acres in area ("the Site"), located in the western portion of the 353-acre Johns Manville property.

As of October 2001, the former manufacturing buildings located within the 109-acre Building Area were demolished. The only buildings that currently remain are a new building (constructed in 2000) to house property maintenance staff and equipment, a small security office located at the Property entrance, and a pump house located at the northern end of the Site, adjacent to the Pumping Lagoon.

An initial Comprehensive Site Investigation Report (CSIR) (Revision 0) was submitted to the Illinois Environmental Protection Agency (IEPA) on October 17, 2002. The IEPA subsequently provided comments to the report in a letter dated January 27, 2003. In response to both those comments and subsequent meetings, a Site Investigation Work Plan was developed and submitted to the IEPA for approval, which was subsequently granted in a letter from the IEPA dated October 27, 2003.

A revised Comprehensive Site Investigation Report (CSIR) was submitted separately to the Illinois Environmental Protection Agency (IEPA) for the Site on June 11, 2004. Additional data relevant to the CSIR was submitted as supplemental documents to the IEPA. These documents were dated December 2, 2004 (Chlorinated Compounds in Groundwater), December 8, 2004 (Pit Content Summary), April 27, 2005 (Supplemental Site Investigation Report), May 2, 2005 (Letter of Transmittal for Additional REC 17 Data), and May 11, 2005 (Building T – Tar Pit Letter). In a letter dated June 27, 2005, the IEPA approved the site assessment and requested submittal of this ROR/RAP. Recognized environmental conditions (RECs) identified in the approved CSIR and supplemental documents are presented in Table 1-1.

Section 2.0 summarizes the endangerment assessment. Section 3.0 describes the development of remediation objectives for the Site. Section 4.0 contains the RAP for achieving the remediation objectives.

2.0 ENDANGERMENT ASSESSMENT SUMMARY

Historical site investigations, summarized in the CSIR and supplemental documents, were completed to characterize soil and groundwater conditions at the Site, including hydraulic conductivity and groundwater flow direction. Soil samples collected during investigation activities were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polynuclear aromatic hydrocarbons (PNAs), polychlorinated biphenyls (PCB), inorganics (metals), Synthetic Precipitation Leachate Procedure (SPLP) metals, total petroleum hydrocarbons (TPH), and asbestos. Analytical results showed that several VOCs, PNAs, SVOCs, inorganics, and SPLP lead were detected at concentrations above their respective Tier I Soil Remediation Objectives (SRO) for Residential Properties with Class I Groundwater.

Groundwater samples collected during investigation activities were analyzed for VOCs, PNAs, SVOCs, PCBs, inorganics (metals), and TPH. Analytical results showed that various VOCs, PNAs, SVOCs, and inorganics were detected at concentrations above their respective Tier I Groundwater Remediation Objectives (GRO) for Class I Groundwater.

2.1 Recognized Environmental Conditions

In a letter dated June 27, 2005, the IEPA approved the CSIR and supplemental information and requested submittal of a ROR/RAP. This combined ROR/RAP for the former Building Area addresses fourteen (14) RECs identified in the June 9, 2004 CSIR (Revision 1) and the aforementioned supplemental documents:

- REC 2: 1989 UST Excavation Area 2
- REC 3: 1989 UST Excavation Area 3
- REC 4: 1989 UST Excavation Area 4
- REC 5: 1989 UST Excavation Area 5
- REC 11: 1989 UST Excavation Area 11
- REC 12: Solvent Recovery Room
- REC 16: Building E Kerosene Pits
- REC 27: Coal Pit
- REC 28: Subsurface Asbestos-Containing Materials
- REC 30: Tank 033
- REC 31: Locomotive
- REC 32: Tank 031
- REC 38: Deep Monitoring Wells

- REC 39: Building A Pits

Many of the RECs involve multiple Contaminants of Concern (COCs) that exceed applicable criteria, including either Tier 1 soil remediation objectives (SROs) or Class I groundwater objectives, or both. All RECs at the Site that exceed applicable criteria are addressed in this ROR/RAP. Table 1-1 lists the RECs, including the COCs within each, along with a brief description of the proposed remedial action. Figure 2-1 shows the location of each REC.

2.2 Physical/Chemical Soil Characteristics

Physical/chemical soil characteristics related to the Site exposure route evaluations and potential contaminant fate and transport are provided in this Section.

2.2.1 Soil Attenuation Capacity

Pursuant to 35 Illinois Administrative Code (IAC) Section 742.215(a), the sum of the concentrations of all organic contaminants of concern (VOC and SVOC target analyte lists using SW-846 methods) in each REC does not exceed the attenuation capacity of the soil. The default values were utilized for the natural organic carbon fraction (f_{oc}) of 6,000 mg/kg for the top meter of soil and 2,000 mg/kg for soils greater than 1 meter below ground surface. Tables verifying that the sum or all VOC and SVOC target analytes were less than default values for f_{oc} are presented in Appendix B.

The analytical results from total petroleum hydrocarbon (TPH) testing conducted at the request of the IEPA on samples collected at or below the surface of the water table in REC 2/16 and REC 5 exceed the default concentrations. However, the TPH scan includes non-TAL analytes that are not considered contaminants of concern. When considering the risk posed by the TPH-impacts, the specific compounds on the TAL VOC and SVOC lists do not exceed their respective Tier 1 or Tier 2 levels, and their sum does not exceed the default concentration for soil attenuation capacity. Thus, these non-TAL analytes were not considered when determining regulatory status with respect to the soil attenuation capacity.

Similar consideration has recently been given by the IEPA at the former Coke Plant in Waukegan, Illinois. The former industrial site was approved for residential re-development using a risk-based approach to the cleanup. In a letter dated June 16, 2005, the IEPA concurred with use of an engineered barrier to mitigate risk from target analytes, rather than consider the total petroleum hydrocarbons that were allowed to remain. Moreover, in that case, the naphthalene concentration alone that is being allowed to remain (2,240 mg/kg) exceeds the default attenuation capacity in and of itself (and possibly the soil saturation limit for naphthalene as well). This does not include other COCs that are present, and certainly does not include the non-target analytes that are part of the overall TPH loading at the Coke Plant site. At the JM site, not even the sum of all the target analytes exceeds the default attenuation capacity.

Thus, the overall approach to remediation of the JM site will be at least as protective of human health and the environment as has already been approved at a nearby site that exhibits identical geology and hydrogeology.

2.2.2 Reactivity Characteristic

Contaminants of concern in soil did not exhibit any of the characteristics of reactivity for hazardous waste as determined under 35 IAC Section 721.123. No reactive waste materials, including cyanide or sulfide-bearing wastes, are present at the Site.

2.2.3 Soil Saturation Limit

The concentration of organic contaminants of concern with a melting point of less than 30°C in the REC do not exceed the soil saturation limit of the soil as determined by default values provided in 35 IAC Part 742 Appendix A, Table A, with the exception of the following:

- Toluene in REC 12 (UMW-42, 1,720 mg/kg; B-8, 1,330 mg/kg; AA-4, 918 mg/kg)

As can be found in Appendix C (Table C-1) and the CSIR (Revision 1), previous soil samples collected from REC 12 also exceeded the soil saturation limit for toluene (*e.g.*, SR-01-132; 3-4 feet below grade). However, previous soil removal actions completed in REC 12 were successful in removing soils previously known to exceed the saturation limit for toluene. As described in this RAP, Additional soil removal will be needed in the area of UMW-42, B-8, and AA-4.

2.2.4 Soil pH

The soil pH within the REC was not less than or equal to 2.0, or greater than or equal to 12.5. Soil pH for the Site (CSIR, Revision 1, June 9, 2004, Table 8) ranged from a minimum of 6.7 to a maximum of 10.3.

2.2.5 Toxicity Characteristic

Soil within the REC did not contain contaminants that were associated with the characteristics of toxicity for hazardous waste as determined by 35 IAC Section 721.124. Tables are provided in Appendix D verifying that the maximum soil concentrations observed in at the site were less than regulatory levels for the toxicity characteristic.

2.2.6 Polychlorinated Biphenyls (PCBs)

No detectable concentrations of PCBs were observed in soil results presented in the approved CSIR (CSIR, Revision 1, June 9, 2004, Table 10).

2.2.7 Free Product

Corrective action measures have previously been taken to remove free product from each REC to the maximum extent practicable. No measurable thickness of free product was associated with any of the RECs at the Site. Field survey results from wells within RECs 2, 5, 12, and 16 are presented in Appendix E.

2.3 Summary of Contaminants Exceeding Tier 1 Criteria

The following sections summarize, by exposure route, those RECs and COCs that exceed Tier 1 SROs or Class I groundwater remediation objectives at the Site.

2.3.1 Soil Ingestion

Seven of the fourteen RECs involve contaminants of concern above Tier 1 SROs for the soil ingestion pathway. The contaminants of concern (COCs) in soil/sediment samples for all RECs at the Site were less than the Tier 1 SRO for residential soil ingestion with the exception of the following:

- REC 2/16: Benzo(a)pyrene
- REC 4: Benzo(a)pyrene
- REC 5: Benzo(a)pyrene
- REC 27: Benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene
- REC 30: arsenic and iron
- REC 31: Benzo(a)pyrene, benzo(b)fluoranthene
- REC 39: copper and lead

All COCs in soil exceeding Tier 1 residential soil ingestion criteria are summarized in Table 2-1. All other COCs were below Tier 1 SROs for residential soil ingestion.

2.3.2 Inhalation

In addition to meeting the requirements of Title 35 IAC Sections 742.300 and 742.305, all VOC and SVOCs were less than the Tier 1 residential inhalation exposure route values for soils with exception of the following:

- REC 12: benzene, toluene, and xylenes

Soil results for REC 12 exceeding Tier 1 inhalation exposure route values are presented in Table 2-2.

The inhalation exposure route for asbestos is a site-wide concern (REC 28) and will be addressed by the proposed site-wide engineered barrier.

2.3.3 Groundwater Ingestion

2.3.3.1 Soil Component of the Groundwater Ingestion

Five of the fourteen RECs involve contaminants of concern present above Tier 1 SROs for the soil component of the groundwater ingestion exposure route:

- REC 2/16: 2-methylnaphthalene (Table 2-3)
- REC 3: Benzene (Table 2-3) and SPLP lead (Table 2-4)
- REC 4: Benzene and ethylbenzene (Table 2-3)
- REC 12: Benzene, ethylbenzene, toluene, xylenes, and 3&4-methylphenol (Table 2-5)
- REC 27: SPLP lead (Table 2-4) (Note: this material was removed from the former Coal Pit in 2001 during demolition)

TPH in soil in RECs 2, 5, and 16 was also found to be greater than 2,000 mg/kg as indicated in Table 2-7. To assess whether any free-floating product was present in these RECs, all monitoring wells and piezometers were gauged using an oil-water interface probe on September 16, 2005. No measurable thickness of free product was observed.

2.2.3.2 Groundwater Ingestion

Four of the fourteen RECs exhibit iron and manganese concentrations above their respective Class I groundwater criteria. Evaluation of site background and groundwater institutional controls will be used in the RAP (Section 4.0) for the following:

- REC 2/16: Manganese in groundwater (Table 2-7)
- REC 4: Iron and manganese in groundwater (Table 2-7)
- REC 5: Iron and manganese in groundwater (Table 2-7)
- REC 12: Iron and manganese in groundwater (Table 2-7)
- REC 38: Iron and manganese in groundwater (Table 2-7)

Nine of the fourteen total RECs exhibit the following COCs at concentrations greater than their respective Class I groundwater criteria:

- RECs 2/16: Benzo(a)anthracene, benzo(a)pyrene, and 2-methylnaphthalene (Table 2-8)

- REC 3: Lead (Table 2-7), benzene, ethylbenzene, toluene, xylenes, trichloroethene (TCE), vinyl chloride, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd) pyrene, and naphthalene (Table 2-9).
- REC 4: Benzene and toluene (Table 2-10).
- REC 5: Benzene, ethylbenzene, toluene, xylenes, trichloroethene, bis-2-ethylhexylphthalate (BEHP), benzo(a)pyrene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and naphthalene (Table 2-11).
- REC 11: Lead (Table 2-7) and benzo(a)anthracene (Table 2-11).
- REC 12: Lead (Table 2-7), benzene, ethylbenzene, toluene, and 3&4-methylphenol (Table 2-12).
- REC 32: Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene (Table 2-13).
- REC 38: Vinyl chloride (Table 2-13).

These COCs will be addressed using institutional controls, exposure route evaluations, and/or remediation, as described in Section 4.0.

2.4 Primary Contaminant Migration Pathway

As described in the CSIR, the primary contaminant migration pathway at the Site is via soil impacts within and migration of groundwater through the shallow sand aquifer present from the surface to the top of the underlying, clay-rich Wadsworth glacial till found between approximately 26 and 40 feet below grade. Sanitary and storm sewer lines were closed during Phase III demolition. In addition, given the sandy nature of the soil underlying the Site, migration would not be expected to move preferentially along utilities via permeable excavation backfill. Therefore, all exposure routes (inhalation, ingestion, soil component of groundwater ingestion, and groundwater ingestion) will be evaluated using the properties of the underlying sandy soil and not via any preferential pathways.

The groundwater elevation contours and hydraulic conductivity were determined for the Site. Groundwater elevations for 10 calendar quarters (April 2003 through June 2005) are presented in Appendix A. As indicated in the CSIR, the average hydraulic conductivity for in the upper portion of the shallow unconfined sand aquifer (up to 14 feet below ground surface) is 1.65×10^{-2} centimeters per second (cm/s). The average hydraulic conductivity near the base of the shallow sand aquifer (21 to 40 feet below ground surface) is 4.09×10^{-3} cm/s. The upgradient groundwater condition is considered to be in the southwest corner of the Site (see Appendix A figures). Upgradient groundwater quality was assessed at well UMW-14 (screened across the top of the shallow aquifer) and UMW-28 (screened at the base of the shallow aquifer).

3.0 PROPOSED REMEDIAL OBJECTIVES

Proposed remedial objectives were developed to allow future residential (or recreational) use of the Site. Based on the review of the COCs, the proposed remediation objectives for the site would prevent exposure to COCs in soil and protect groundwater quality to Class I standards at the site boundary, with the exception of manganese and iron. Moreover, the RAP will exclude the soil ingestion and asbestos inhalation pathways with a proposed site-wide engineered barrier and institutional controls.

Exposure routes for soil ingestion, inhalation, and groundwater ingestion were evaluated for potential exclusion. Groundwater ingestion exposure routes evaluated for exclusion included both the soil and groundwater components. The following exposure routes were evaluated for potential exclusion from consideration at the Site:

1. Soil ingestion
2. Inhalation
3. Groundwater ingestion

The basis for exposure route exclusion is provided in this report and in the approved CSIR. The maximum contaminant concentration, location, source size, and the average site hydraulic conductivity was obtained directly from the CSIR dated June 11, 2004 (Revision 1) for each REC. For each REC, distances from the source to the Site boundary, and specific groundwater hydraulic gradients were determined from site maps and groundwater contours provided in the CSIR.

3.1 *Inhalation Exposure Route*

The inhalation exposure route may not be excluded from consideration at the Site based on the current presence of toluene in soil (REC 12; UMW-42, B-8, and AA-4) at a concentration that exceeds its default saturation limit of 650 mg/kg. Once the soil within this area of REC 12 is removed, the requirements of 35 IAC 742.305(b) will be satisfied.

Once the REC 12 soil removal action is completed, the inhalation exposure route may be excluded from further consideration with the implementation of a Site-wide engineered barrier for the presence of asbestos in soil, as described in Section 4.1.4.

The proposed engineered barrier meets the requirements of 35 IAC 742 Subpart K with the substitution of 2 feet of compacted clay or asphalt paving for the specified minimum thickness of sand, soil, gravel, or other geologic materials. The clay soil used for the engineered barrier will meet Tier 1 remediation objectives, and long-term maintenance and institutional controls associated with the engineered barrier will be implemented at the Site as described in Section 4.1.4 in compliance with 35 IAC 742 Subpart J.

3.2 Soil Ingestion Exposure Route

The soil ingestion exposure route may be excluded from consideration with the implementation of the proposed site-wide engineered barrier described in Section 4.1.4. The exclusion of the soil ingestion exposure route meets the requirements specified in 35 IAC Section 742.315:

- 35 IAC Section 742.300—The extent of the concentration of the COC has been determined as described in the approved CSIR.
- 35 IAC Section 742.305—The Site meets the requirements of the six physical/chemical properties identified in this regulation as described in Section 2.2.

A proposed engineered barrier will be placed across the entire Site area as described in Section 4.1.4. The proposed engineered barrier meets the requirements of 35 IAC 742 Subpart K with the substitution of 2 feet depth of compacted clay or asphalt paving for the specified minimum 3 feet depth of sand, soil, gravel, or other geologic materials. The clay soil used for the engineered barrier will meet Tier 1 remediation objectives, and long-term maintenance and institutional controls associated with the engineered barrier will be implemented at the Site as described in Section 4.1.4 in compliance with 35 IAC 742 Subpart J.

3.3 Groundwater Ingestion Exposure Routes

The groundwater ingestion exposure route consists of two components:

- Migration from soil to groundwater (soil component)
- Direct ingestion of groundwater

Groundwater ingestion exposure routes considered for exclusion met the requirements of 35 IAC Section 742.320:

- 35 IAC Section 742.300—The extent of the concentration of the COC has been determined as described in the approved CSIR (Revision 1) and supplemental documents.
- 35 IAC Section 742.305—The Site meets the requirements of the six physical/chemical properties identified in this regulation as described in Section 2.2.
- Corrective action measures have been completed to remove any free product to the maximum extent practicable. A survey of RECs 2/16, 5, and 12 was conducted on September 16, 2005 for the presence of free floating product in groundwater monitoring wells and piezometers. No measurable layer of free floating product was observed (Appendix E).

- The source of the release is not located within the minimum or designated maximum setback zone or within the regulated recharge area of a potable water supply well.
- A court-recorded deed restriction is in place that prevents the use of groundwater on the JM Property, including the Site, for any purpose.

The groundwater ingestion exposure route exclusion basis for the migration of soil to groundwater and direct ingestion is provided in this Section. Remediation objectives were developed for remaining COCs associated with identified RECs the Site.

3.3.1 Soil Component of Groundwater Ingestion

Direct measurement of groundwater quality near soil source areas was considered to be the best indicator of the potential impact of COCs to groundwater to evaluate the groundwater ingestion pathway at the Site. However, soil leaching models (Equation R14) or soil leachate concentrations (SPLP results) were used to assess the potential for Site soils exceeding Tier 1 soil concentration criteria for the groundwater ingestion exposure route. Proposed remediation objectives were developed for COCs associated with RECs that were not excluded based on ingestion pathway evaluation.

Exposure Route Evaluation

Contaminants associated with two RECs met the criteria listed in Section 2.5.3 for exposure pathway exclusion and was demonstrated, using SPLP leachate concentration and Equation R26 in accordance with 35 IAC Section 742.810, to meet Tier 1 groundwater remedial objectives at the Site boundary. Equation R14 was used to assess the potential impact of REC 4 soil VOCs. The excluded COCs based on exposure pathway exclusion were:

- REC 2/16: 2-Methylnaphthalene (Tables 3-1A, 3-1B, 3-1C, and 3-1D)
- REC 3: SPLP lead (Table 3-2)
- REC 4: Benzene and ethylbenzene (Tables 3-3A and 3-3B)
- REC 12: Benzene, ethylbenzene, toluene, and 3&4-methylphenol outside proposed excavation area in Section 4.0 (Tables 3-4A and 3-4B).

Two distinct areas of REC 2/16 were examined for exposure route exclusions for 2-methylnaphthalene. The two areas were: (1) the area of boring 03-01 (REC 2, Tables 3-1A and 3-1C), and (2) the area of boring 03-P2 (REC 16, Table 3-1B and 3-1D). Physical property values used for 2-methylnaphthalene exposure route evaluations are discussed in Appendix F.

Assumptions and basis information used for the REC 3 and REC 4 groundwater exposure route exclusion for soils is provided in referenced tables and in Appendix F.

Assumptions used for REC 4 soil source for benzene and ethylbenzene were based on soil data provided in the approved CSIR, which indicated a source area of very limited size as noted by non-detected concentrations in adjacent soil borings. It should be noted that VOCs in groundwater do not present a concern in REC 4; therefore, benzene in soil associated with REC 4 is not considered to be concern for the groundwater ingestion pathway.

Remediation Objectives

Proposed remediation objectives for soil were developed for COCs associated with the following two RECs:

- REC 3: Benzene (Table 3-13)
- REC 12: Benzene, ethylbenzene, toluene, xylenes, and 3&4-methylphenol (Table 3-13)

The proposed remediation objective for REC 3 benzene and REC 12 xylenes is the Tier 1 soil component of the Class 1 groundwater remediation objective.

The proposed remediation objectives for REC 12 benzene, ethylbenzene and 3&4-methylphenol were the soil concentrations determined to meet groundwater ingestion exposure route exclusion in Tables 3-4A and 3-4B. These soil concentrations represent the maximum soil concentrations in REC 12 outside the limits of the proposed excavation area described in Section 4.0.

The proposed remediation objectives for REC 12 toluene is the Tier 1 residential inhalation soil criteria.

The proposed remediation objective for total petroleum hydrocarbons in soil in RECs 2, 5, and 16 is the absence of a measurable layer of free floating product.

3.3.2 Groundwater Ingestion

The groundwater ingestion exposure route was evaluated for Site COCs present at concentrations greater than Class I groundwater criteria. Area background was used to determine proposed remediation objectives for iron and manganese. Proposed remediation objectives were developed for COCs associated with RECs that were not excluded based on ingestion pathway evaluation documented in this Section.

Area Background for Manganese and Iron

Area background determination was used to evaluate remedial objectives for iron and manganese associated with the following RECs:

- REC 2/16: Manganese

- REC 4: Iron and manganese
- REC 5: Iron and manganese
- REC 11: Manganese
- REC 12: Iron and manganese
- REC 38: Iron and manganese

Groundwater sample results were obtained for purposes of determining area background concentration for iron and manganese in accordance with the following procedures from 35 IAC Section 742.410:

- Samples were collected from areas of the Site or adjacent to the site that were likely unaffected by releases at the Site.
- The samples obtained from two background monitoring wells (UMW-14 and UMW-28) were sufficient in number to account for the spatial and temporal variability, size, and number of known or suspected offsite releases of contaminants of concern, and the hydrogeologic setting of the Site.
- Samples were collected in consecutive quarters for a minimum of one year for each well. Sample results were obtained during consecutive quarters from March 2004 to June 2005.
- Samples were collected from the same stratigraphic unit(s) as the groundwater contamination at the Site, and
- Background monitoring wells were located hydraulically upgradient from the releases of COCs.

Quarterly sample results for iron and manganese concentrations from March 2004 to June 2005 (n=6) were obtained and used to determine background concentrations at wells UMW-14 and UMW-28. The Shapiro-Wilk test was used to determine the normality of the sample set by comparison to the 5% critical value from 35 IAC Part 742 Appendix A Table D. Normality test results provided in Table 3-11 indicate that the sample data were normally distributed for iron and manganese in background wells UMW-14 and UMW-28.

Mean and maximum background concentrations for iron and manganese are presented in Table 3-12. The Class I standards for iron and manganese are 5 mg/L and 0.15 mg/L, respectively. The mean background concentration of iron (5.97 mg/L) and manganese (0.27 mg/L) in background well UMW-28 exceeded the Class I groundwater standards. In addition, the maximum concentration of manganese (0.28 mg/L) in the shallow background well UMW-14 exceeded the Class I groundwater standard.

The proposed remediation objectives for iron and manganese are area background concentrations from well UMW-28:

- Iron: 5.97 mg/L
- Manganese: 0.27 mg/L

Exposure Route Evaluation

Contaminants associated with nine of fourteen RECs met the criteria listed in Section 2.5.3 for exposure pathway exclusion, and were demonstrated, using equation R26 in accordance with 35 IAC Section 742.810 to meet Tier 1 groundwater remedial objectives at the Site boundary. Contaminant concentration at the Site boundary using equation R26 was performed utilizing the steepest hydraulic gradient observed for the area of concern and a source width bounded by one-half the distance to an adjacent well with a non-detectable concentration, or a concentration less than the applicable Tier 1 value.

The following groundwater exposure routes were excluded for the following RECs:

- RECs 2/16: Benzo(a)anthracene, benzo(a)pyrene (Table 3-5A), and 2-methylnaphthalene (Table 3-5B).
- REC 3: TCE (Table 2-9), vinyl chloride (Table 2-9), dibenzo(a,h)anthracene (Table 3-6A), and naphthalene (Table 3-6B).
- REC 4: Lead (Table 2-8), benzene, and toluene (Table 2-10).
- REC 5: Benzene, ethylbenzene, toluene, trichloroethene (Table 3-7A), bis-2-ethylhexylphthalate (BEHP), benzo(a)pyrene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and naphthalene (Table 3-7B).
- REC 11: Lead (Table 2-7) and benzo(a)anthracene (Table 3-8).
- REC 12: Lead (Table 3-9A), benzene, ethylbenzene, toluene (Table 3-9B), and 3&4-methylphenol (Table 3-9C).
- REC 32: Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd) pyrene (Table 3-10).
- REC 38: Vinyl chloride (Table 3-11).

Assumptions and basis information for each groundwater ingestion exposure route exclusion is provided in the referenced table for each REC and in Appendix G. In several cases, specific COCs exceeding Tier 1 criteria were excluded from further consideration in the approved CSIR based on site investigation results. Physical property values used for the exposure route evaluations for 2-methylnaphthalene are provided in Appendix F.

Remediation Objectives

Proposed remediation objectives for groundwater were based on Class I groundwater criteria, or provisional Class I criteria, for COCs associated with the following REC:

- REC 3: lead, benzene, ethylbenzene, toluene, xylenes, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (Table 3-14).

4.0 REMEDIAL ACTION PLAN

4.1 Scope of Problems Addressed by Remedial Actions and Physical Area to be Addressed

To meet the proposed remediation objectives for the site, JM intends to implement a RAP that provides for selected remedial actions in the areas of RECs 3 and 12, and an engineered barrier over the Site. Additional detailed information regarding the proposed remedial actions is provided in this section for the following proposed remedial actions:

- Soil and groundwater remediation for BTEX in REC 3 (UST 3). The proposed remedial action, contingent upon IEPA LUST section approval, includes source soil removal, air sparging, and soil vapor extraction.
- Groundwater sampling for PNAs in selected REC 3 wells.
- Soil remediation in REC 12 (Solvent Recovery Room). JM proposes to remove soil from an area of approximately 3,000 square feet area east of the former excavation area at the SRR.
- Amended engineered barrier cover for Area Y, Area Z and the West Parking Area (as described in the First Amended Consent Decree).
- An engineered barrier across the entire Site is proposed to address soils exceeding Tier 1 ingestion limits and subsurface asbestos-containing soils.
- Institutional controls for groundwater use.

This section describes plans for each of the remedial actions described above.

4.1.1 Soil and Groundwater Remediation for REC 3 (UST Excavation 3)

Based upon current Site conditions (November 2005), a soil and groundwater remediation plan is proposed in the area of REC 3 (UST Excavation 3). The proposed plan addresses BTEX, lead, and PNA constituents exceeding Class 1 groundwater standards and BTEX exceeding Tier 1 criteria for the soil component of the groundwater ingestion pathway.

The plan addresses excavation of soil from within a 3,300 square foot area containing soil exceeding Tier 1 remedial objectives for BTEX, as well as remediation of a groundwater plume. A Corrective Action Plan (CAP) for REC 3 was submitted to the IEPA (LUST section) on September 17, 2003. Approval of the plan was deferred pending additional investigation tasks that were completed in November 2005. An updated investigation report is pending to the LUST section. Based upon the results, the CAP recommending excavation of soil and air sparging/soil vapor extraction (AS/SVE) will be re-submitted for approval. A summary of that plan is provided below. If the

IEPA LUST section rejects the proposed CAP, an alternative will be submitted for approval and an amendment to this ROR/RAP will be developed for submittal to the SRP. Thus, cleanup of REC 3 is dependant upon LUST section approval of the final remedy, provided that it is consistent with SRP requirements for receipt of a No Further Remediation letter.

REC 3 contains lead and PNAs in groundwater exceeding Class I groundwater standards. The proposed activities in the areas of well UMW-03A and UMW-47 are presented below.

REC 3 Soil Excavation

The REC 3 source soil excavation is proposed due to the presence of formerly active underground utilities, utility vaults, heterogeneous fill materials, and underground piping. The heterogeneity of the subsurface materials and utilities in the REC 3 source soil area is expected to create preferential air flow paths and resulting short-circuiting that would decrease the effectiveness and technical feasibility of in situ soil vapor extraction in this area. Soil excavation is considered to be a more reliable remedial approach to address source soils in REC 3.

Site preparation activities will include the removal of asphalt and concrete cover over the proposed source soil excavation area. Asphalt and concrete will be disposed at a landfill permitted to accept these materials.

The proposed depth of the excavation is approximately 6 to 7 feet below grade. The upper 2 to 3 feet of overburden soil will be screened with a field photoionization detector (PID) to identify probable limits of clean soil overlying the contaminated zone. This clean soil will be stockpiled adjacent to the excavation, and tested for BTEX using SW-846 methods 5035/8260. Provided that BTEX levels in clean stockpiled soil is less than the Tier 1 remediation objective, the clean soil will be used during excavation backfilling.

Contaminated soil will be immediately placed into trucks during excavation activities and transported by a licensed special waste transporter to an off-site landfill permitted to receive special waste impacted by BTEX. Manifests will be prepared and submitted in accordance with Illinois regulations for all waste materials disposed off-site.

Confirmatory sidewall soil samples will be collected from the proposed excavation area at the point where a clean limit is established by field PID screening results (note: PID screening results will only be used a guideline for selecting samples for confirmatory chemical analysis for BTEX). Sidewall samples will be collected every 20 linear feet of the excavation sidewall at approximately 4 feet below grade (immediately above the water table). Each sidewall sample will be submitted for BTEX analysis using SW-846 methods 5035/8260. After receipt of laboratory results, additional excavation may be required in areas where BTEX levels are above Tier I cleanup objectives. In areas

requiring further excavation, additional confirmatory samples will be collected from the excavation sidewall.

Although not anticipated based upon groundwater data, if free-floating product is encountered during excavation activities, it will be properly disposed off-Site in accordance with applicable regulations.

The proposed REC 3 excavation will be backfilled with clean soil when sidewall samples have indicated that remediation objectives have been achieved. Clean soil backfill will be placed in approximately 1-foot lifts and machine-compacted to a density suitable for future Site use. The final grade elevation for backfilling operations will be dictated by future planned grades for the site.

REC 3 Groundwater Remediation

An in-situ air sparging and soil vapor extraction system has been proposed to address groundwater exceeding Class I groundwater standards for BTEX for REC 3 identified in **Figure 4-2**.

The air sparging system will consist of 2-inch PVC sparge wells spaced approximately 50 foot intervals across the impacted saturated zone for REC 3. It is assumed that sparge wells will provide a 30-foot radius of influence to provide in-situ treatment of BTEX in groundwater. Sparge wells will consist of 5 feet of slotted PVC well screen at the bottom of each well. The top elevation of the screen will be approximately 15 to 20 feet below the average groundwater elevation for REC 3.

It is estimated that approximately 21 sparge wells will be required as depicted in **Figure 4-4**. The proposed air flow to each well is approximately 10 to 25 standard cubic feet per minute (scfm). Air will be supplied to each sparge well from a rotary lobe blower capable of producing 320 scfm of air flow at 12 pounds per square inch (psi). Air flow will be pulsed to each well to minimize flow channeling and to maximize VOC stripping from groundwater to overlying soil gas. BTEX volatilized to the air will be collected via the proposed soil vapor extraction system (SVE).

Design of the capture SVE is governed by the relatively shallow groundwater table in the area of REC 3. Approximately 13 horizontal SVE collection wells will be installed in excavation trenches (**Figure 4-4**), approximately 3 feet below grade. Each horizontal SVE collection well will consist of 50 linear feet of 3-inch diameter 0.020-inch slotted PVC well screen or perforated PVC pipe. A reinforced polypropylene liner of at least 10 mil thickness will be placed in the excavation trench to minimize ambient air entry into the SVE collection system.

It is estimated that the SVE system will be operated at a total gas flow of 420 to 700 scfm. The SVE design air flow rate is 1.5 to 2.5 times the air flow rate applied to air sparge wells. Experience with operation of similar systems indicates that the SVE air

flow is sufficient to capture off-gas generated by sparge wells for this system configuration.

A temporary building will be constructed to house the air sparging and SVE blowers and the main system control panel and system monitoring equipment. Each blower will be supplied with an inlet filter, discharge silencer. The air sparging blower will be equipped with an air to air heat exchanger to cool air discharged to the sparge wells. The SVE blower will be equipped with an inlet silencer. Electrical power will be provided to the control building. The air sparging and SVE system will be equipped with temperature, pressure and air flow measurement equipment.

It is anticipated that the air sparging and SVE system will be operated for two years to achieve Class I groundwater remediation objectives for VOCs. During the system operating period the following monitoring schedule will be conducted:

- Weekly monitoring: air flow rates, temperature, pressure and vacuum measurements
- Monthly monitoring: SVE discharge air VOC concentration, subsurface vacuums, pressures, monitoring well dissolved oxygen, monitoring well groundwater elevations.
- Quarterly monitoring: BTEX analysis for selected monitoring wells.
- The sanitary sewer manholes located north and south of the remediation area will be monitoring monthly for combustible gases. Measurements will be obtained using a combustible gas meter. Baseline conditions will be obtained for one month prior to startup of the air sparging/SVE system. The remediation system will be shutdown immediately if sanitary sewer manholes indicate elevated combustible gas levels greater than 10% LEL. Investigation of potential causes of elevated combustible gas will be conducted. Remedial actions may include reducing air sparging flow near the west Site boundary, installation of an addition SVE well, or installation of a ventilation system for the sanitary sewer.

It is not anticipated that VOC emissions from the SVE off-gas will exceed thresholds requiring SVE off-gas treatment. However, an IEPA permit may be required for this point emission source depending on the measured VOC emissions during remediation activities.

REC 3 Lead in Groundwater

Groundwater samples collected from UMW-09 and UMW-10 in November 2005 exceeded Class I groundwater standards for lead (**Figure 4-2B**). These exceedances will be addressed in the revised CAP to be submitted to the IEPA LUST section. The only possible source of lead in groundwater is the leaded gasoline stored in former Tank 003, although the water samples exhibited high turbidity when sampled and may not represent actual groundwater conditions. Additional sampling for total lead in these two

monitoring wells will be proposed to determine the actual lead concentration in this area. Based on the additional characterization data obtained for this area, the revised CAP that will be submitted to the IEPA LUST section (and copied to the SRP group) will address lead impacts to groundwater.

REC 3 Groundwater Sampling for PNAs

Groundwater in the areas of UMW-03A, GT-2 and TA3-8 that exceeded Class I groundwater standards in November 1998 for PNAs (**Figure 4-3**) will be addressed by this RAP. No source area for PNAs is known to exist in the vicinity of these samples. Monitoring wells UMW-3A, UMW-46, UMW-47, and UMW 48 will be sampled during RAP implementation to determine current baseline concentrations of PNAs. Based on the PNA concentration results from the proposed sampling, an appropriate plan will be developed and presented to IEPA for approval during RAP implementation. If PNAs are found to be meet Class I groundwater standards at the Site boundary, no further action would be proposed.

4.1.2 Soil Removal for REC 12 (Solvent Recovery Room)

The former excavation area (December 2002 to January 2003) at the SRR (**Figure 4-5**) is currently open with water exposed at approximately 4-6 feet below grade. Post-excavation soil boring samples indicated that levels of BTEX were above Tier 1 cleanup objectives in an area of approximately 3,000 square feet near borings UMW-42 and 05-12, and smaller area near boring AA-4. The plan below addresses the proposed excavation of soils in the 3,000 square foot area (Area 1, **Figure 4-5**) and the area near AA-4 (Area 2, **Figure 4-5**) exceeding Tier 1 remedial objectives for BTEX.

A grid pattern of test pits will be conducted approximately every 20 feet across the proposed excavation areas. Bottom samples from the test pits will be collected for analysis of BTEX prior to soil removal to define the base of the excavation. As the excavation is anticipated to extend below the surface of the water table, these test-pit samples can be collected to define the base of the proposed excavation prior to the influx of groundwater that is potentially impacted with petroleum, thus cross-contaminating the soil sample. Field PID readings will be collected from test pits in the excavation area prior to soil removal.

After the test pits are completed, soil excavation will completed with a backhoe. The upper 2 to 3 feet of overburden soil will be screened with a PID to identify limits of clean soil overlying the contaminated zone. This clean soil will be stockpiled adjacent to the SRR, primarily to the south of the excavation, and tested for BTEX and SVOCs using SW-846 methods 5035/8260 and 8270. Provided that BTEX levels in clean stockpiled soil is less than Tier 1 remediation objectives, the clean soil will be used during excavation backfilling.

The estimated depth of the excavation is 6-7 feet. Contaminated soil will be transported by a licensed special waste hauler to an off-Site landfill permitted to receive special waste. Manifests will be prepared and submitted in accordance with Illinois regulations for all waste materials disposed off-Site.

Confirmatory sidewall soil samples will be collected from the proposed excavation area at the point where a clean limit is established by field PID screening results (note: PID screening results will only be used a guideline for selecting samples for confirmatory chemical analysis for BTEX). Sidewall samples will be collected every 20 linear feet of the excavation sidewall at approximately 4 feet below grade (immediately above the anticipated depth of the water table). Each sidewall sample will be submitted for analysis of BTEX and SVOC using methods 5035/8260 and 8270. Excavation will continue until all sidewall and bottom samples meet applicable Tier 1 criteria for BTEX and SVOCs.

Although none has been observed in REC 12 thus far, measures will be taken to properly dispose of accumulated water within the excavation that is observed to contain light non-aqueous phase liquid (), if encountered during excavation activities. Liquids will be removed from the excavation via vacuum truck and disposed as an Illinois special waste.

The area of former excavation, completed in January 2003, and the new proposed excavation areas will be backfilled with clean soil when bottom and sidewall samples have indicated that remediation objectives have been achieved. Clean soil backfill will be placed in approximately 1-foot lifts and machine-compacted to a density suitable for future Site use. The final grade elevation for backfilling operations will be dictated by future planned grades for the Site.

4.1.3 Area Y, Area Z, and West Parking Area

The FACD described three areas to be addressed for placement of soil cover over areas of soil with asbestos containing material: Area Y, Area Z, and the West Parking Area. The U.S. Environmental Protection Agency (U.S. EPA) required that Area Y, Area Z, and the West Parking Area be capped (either with asphalt or soil cover) during remedial activities completed in the early 1990s under the original consent decree. Currently, these areas are subject to the operation and maintenance (O&M) provisions pursuant to both the original decree and the FACD.

This RAP proposes to replace the existing cover over these 3 areas with a cover that will be as protective of human health and the environment as the existing remedy, but also compatible with the proposed future use of the Site. Paved areas in Area Z will be punctured every 50 square feet to allow for future drainage and covered with backfill according to the cut-fill plan for the site-wide engineered barrier described in Section 3.1.4. Areas Y and the West Parking Area will be addressed in cut areas that will be placed under the site-wide engineered barrier described in Section 3.1.4.

4.1.4 Site-wide Engineered Barrier

4.1.4.1 Barrier Construction

A Site-wide engineered barrier to prevent contact with underlying soils will be comprised of a combination of asphalt or concrete paving or two (2) feet of compacted clay. In addition, though not considered part of the engineered barrier, a soil layer capable of supporting grassy vegetation will be placed on top of the compacted clay layer.

Two scenarios for future use of the Site are presented; JM is requesting approval from the IEPA to construct either as part of this ROR/RAP. The two scenarios are as follows:

1. Sports Complex construction. The Waukegan Park District (WPD) has indicated their desire to acquire the Site and convert it into a sports complex, generally consisting of outdoor soccer and baseball fields, concession areas, etc... To do so, it will be necessary to re-grade the existing Site topography to reflect the WPD-planned grades prior to placing the engineered barrier and vegetative soil cover. Parking lots or paved areas (*e.g.*, basketball courts, sidewalks, etc...) will consist primarily of existing paved areas generally located on the western end of the Site, as well as new parking areas located on the southern side of the Site. The 2-foot thick compacted clay layer and vegetative layer will be placed on all other areas of the Site. **Figure 4-6A** shows the location of the engineered barrier (paving versus compacted clay layer) for the Sports Complex.

2. Site closure only; no planned future use. Under this scenario, the Site will be closed with no planned future use. Sufficient re-grading will be necessary to reduce existing steep slopes (sides of former buildings), filling of any miscellaneous low-lying areas to reduce stormwater ponding, and construction of a central "swale" to drain clean stormwater that might accumulate (in the future) on top of the engineered barrier towards the former Pumping Lagoon to the north. Existing paved areas, including former parking lots, roads, and intact former building slabs (e.g., former Buildings O and J) will be utilized as part of the engineered barrier to the greatest extent possible. **Figure 4-6B** shows the location of the engineered barrier (existing Site paving/slabs and compacted clay layer) for the closure only scenario.

There are elements common to each scenario. In both scenarios and though the square footage differs somewhat, the entire remediation Site will be covered either with asphalt/concrete pavement or the 2-foot thick compacted clay layer (with a vegetative soil layer on top). Each will also require re-grading (cut-fill) of the existing Site topography in accordance with a Soil Management Zone (described below) prior to placing the engineered barrier and vegetated soil cover.

Under either scenario, the cut-fill and soil cover installation operations will be conducted as follows:

1. Identify regions of soil cut and fill required. Existing Site topography is presented in **Figure 4-7**. Under preliminary analysis for the Sports Complex scenario (subject to the final design from the WPD), cut-fill operations will be performed to achieve the subgrade elevations presented in **Figure 4-8** prior to installation of the compacted clay layer and vegetative soil cover. Accurately establishing the sub-grade topography prior to placement of the engineered barrier is critical to minimizing the amount of clean soil that is needed for the cover and to establish the final grades designed for the top of the compacted clay layer (**Figure 4-10**). Errors made in establishing the grades prior to placement of the engineered barrier will result in substantially increases costs for clean fill and/or topsoil.

   Should the Sports Complex be constructed, proposed wetland areas along the eastern Site boundary will be created. Although existing grades are similar to proposed final grades in the proposed wetland areas, the existing soils in these areas will be cut to a subgrade elevation of 2.5 feet below the proposed final grade for wetland areas. Filling will be completed with 2-feet of compacted clay and a 6-inch layer capable of supporting wetlands vegetation.

   For the closure-only scenario (no Sports Complex), no formal cut-fill plan is needed, as it will be a field decision as to whether areas require re-grading to reduce steep slopes, fill in low-lying areas, or create a general swale for stormwater runoff towards the former Pumping Lagoon.

2. Perform soil cut operations and move soils directly to pre-determined fill areas within the Site, if feasible. Temporary soil stockpiles will be permitted in designated areas where dust control and stormwater pollution prevention measures can be effectively implemented. **Figure 4-9** shows the cut-fill analysis under the Sports Complex scenario. As there is no requirement for accurate sub-grades under the closure-only scenario, no cut-fill plan is needed and thus no figure is presented.

3. Soil fill operations will be conducted in approximately 1-foot lifts and will include intermediate machine compaction.

4. Perform preliminary rough grading requirements to achieve target grade elevations without the two-foot compacted clay and vegetative soil layer.

5. Install underground utilities that may be located at the Site (e.g., storm sewer installation) below the target subgrade elevation.

6. Complete backfill of excavation areas to target subgrade elevation. Perform final grading and compaction to achieve target subgrade elevations (**Figure 4-8**; Sports Complex Scenario) without compacted clay and topsoil cover. A survey of subgrade elevations at a 200-foot spacing will be performed prior to installation of the compacted clay layer. As there is no requirement for accurate sub-grades under the

closure-only scenario, planned sub-grade elevations were not determined and thus no figure is presented.

7. Apply 24 inches of compacted clay in approximately 12-inch lifts and compact to a minimum 85% standard proctor density. The regional sources for the compacted clay barrier will be Ashkum series glacial till found throughout Lake County and northern Illinois, described as mixed grayish-brown and yellowish-brown, compact, very firm, calcareous silty clay loam with trace gravel. A survey of grade elevations at 200-foot spacing after placement of compacted clay cover will be performed to verify barrier thickness to $\pm$ 1 inch. The use of wooden witnesses to verify thickness was considered, but these may present a hazard should the sports complex be completed and the witnesses are not fully removed. Witnesses will be considered for use under the closure-only scenario. **Figure 4-10** shows the final grades planned under the Sports Complex scenario for the top of the compacted clay layer. As there is no final grade requirement for the closure-only scenario, these were not determined and thus no figure is presented.
8. Apply soil layer capable of supporting vegetation. Under the Sports Complex scenario, apply a minimum of 6 inches of a compacted mixture of topsoil, clay, and sand in accordance with the guidelines contained within ASTM F2396-04 (sports turf). Under the closure-only scenario, consistent with the adjacent CERCLA landfill closure, a 3-inch layer capable of supporting vegetation will be applied.
9. Till and seed cover with grass consistent with planned future use (*e.g.*, general vegetated cover, or sports fields turf cover).

4.1.4.2 Proposed Soil Management Zone

Grading of the existing surface prior to placement of the compacted clay will require a Soil Management Zone pursuant to 35 IAC 740.535. The purpose of the soil management zone is to allow for re-grading of the existing sand surface, crushed concrete, and soil (see **Figure 4-7**) that may contain asbestos materials or contaminants that exceed Tier 1 soil remediation objectives for the ingestion pathway to meet grade requirements prior to placement of the final compacted clay cover.

Based upon preliminary cut-fill analysis, if the Sports Complex is constructed, up to approximately 150,000 cubic yards of material will require re-grading to form the sub-grade topographic requirements prior to placing the protective soil cover (**Figure 4-8**). The objective will be to re-grade the Site to the final, finish grade minus the 2.0-foot thick compacted clay layer and 0.5-foot layer capable of supporting vegetation. Placement of the cover will then result in developing the final finish grade planned for the Sports Complex.

If the Sports Complex is not constructed, re-grading will be limited to re-grading the crushed concrete and soil, reducing steep slopes, creating a natural drainage for clean stormwater towards the Pumping Lagoon, and filling low areas to allow for placement of the final cover to reduce the potential for future erosion and thus increased cover

maintenance costs. In this case, total cut-fill operations would not be expected to exceed 50,000 cubic yards.

Pursuant to 35 IAC 740.535(b), the following information is provided:

1. All contaminants of concern within the remediation site have been identified pursuant to the CSIR (Revision 1) and the supplemental documents.

2. The soil management zone shall consist of the remediation Site minus the existing parking area located on the western section of the Site (see **Figure 4-8**).

3. The use of the Soil Management Zone will be to allow re-grading of soil affected either by asbestos or contaminants exceeding Tier 1 soil remediation objectives for the Ingestion Pathway at the Site. Any soil that is re-graded shall be placed beneath the engineered barrier proposed for the Site. The soil removal actions planned for RECs 3 and 12 will be completed prior to Site re-grading.

4. All soil subject to the soil management zone meets the requirements of 35 IAC 742.305(a) through (f).

5. The purpose of the soil management zone is to allow for re-grading of soil within the soil management zone that is potentially affected by asbestos or contaminants exceeding Tier 1 soil remediation objectives for the ingestion pathway prior to placement of an engineered barrier over the entire area of the soil management zone.

   With the prior removal of the toluene-affected soil in REC 12, soil containing organic contaminants exceeding applicable Tier 1 inhalation criteria is not anticipated to be present on Site. Monitoring with a PID during construction will be used for screening purposes in the event an unexpected condition is encountered. Soil sampling will be conducted on a case-by-case basis.

   Grading activities are not planned to affect any soil exceeding the Tier 1 criteria for the soil component of the groundwater ingestion pathway. If any such soil (as noted in Tables 2-3, 2-4, and 2-5) is excavated, it will either be immediately returned without stockpiling to the exact location and depth encountered, or disposed off-Site in accordance with applicable regulations.

   Re-grading and on-Site soil replacement is not planned to extend to the depth of the TPH-affected soil in RECs 2/16 and 5. TPH-affected soil in REC 5 that may be encountered during installation of the main sewer drain line (under the sports complex scenario) will be removed from the Site and disposed in accordance with applicable regulations.

6. The soil management zone will be constructed within the limits of the Site boundary and will not result in generating contaminated runoff. Dust suppression will be conducted to limit any generation of visible emissions pursuant to the Asbestos NESHAP. Lastly, contaminants at the Site that are subject to the soil management zone do not generate odors nor are they capable of providing a breeding place or food source for vectors.

7. No hazardous wastes are present within the soil management zone. If unexpected materials are encountered during re-grading, proper waste characterization in accordance with applicable regulations will be conducted.

8. It is presumed that all areas within the soil management zone are potentially affected by asbestos or compounds exceeding Tier 1 objectives for the soil ingestion pathway. Moreover, an engineered barrier will be placed over the entire soil management zone. Thus, existing exposure scenarios at the Site will be unchanged following re-grading of the Site soil prior to placement of the protective cover. Placement of the engineered barrier is presumed to address all potential impacts from asbestos and contaminants of concern exceeding applicable criteria for the ingestion exposure route.

Pursuant to 35 IAC 740.535(c), the areal limit of the soil management zone is provided on **Figure 4-8**. Vertically, the soil management zone shall extend to the maximum depth of the planned excavation for re-grading activities, as shown on **Figure 4-8** (in the event the sports complex is constructed). If the sports complex is not constructed, only very limited re-grading will be necessary and the depths will not extend as deeply as would occur under the sports complex scenario, thus **Figure 4-8** also applies under this scenario. As discussed above, the depth of the soil management zone does not extend into TPH-affected soil in RECs 2/16 and 5, nor to the depth of any soil exceeding Tier 1 criteria for the soil component of the groundwater ingestion exposure route.

4.1.5 Free Floating Product Monitoring and Removal

REC 2/16 and REC 5 will be observed for the presence of free floating petroleum product during cut-fill operations. . If free-floating petroleum product is encountered, all such product shall be removed from the excavation and disposed off-Site in accordance with applicable regulations.

4.1.6 Groundwater Monitoring Well Closure

Existing groundwater monitoring wells within the Site-wide engineered barrier may be properly closed and abandoned by a licensed Illinois driller prior to commencement of engineered barrier construction, with the exception of wells UMW-14 and UMW-28 and wells required for monitoring or the REC 3 remediation. Background monitoring wells UMW-14 and UMW-28 in the southeast corner of the Site will be retained to

monitor background groundwater quality pursuant to closure of the on-site landfill within the limits of the CERCLA landfill located east of the remediation Site. REC 3 groundwater monitoring requirements are described in Section 4.1.1.

4.1.7 Institutional Controls

Site institutional controls will consist of the following:

1. Groundwater institutional controls
2. Maintenance of engineered barriers

Groundwater institutional controls have already been enacted to prohibit the extraction of groundwater for any use pursuant to the provisions of the FACD prohibiting any use of the groundwater on the JM property, which includes the Site. These were previously recorded to the Property deed and will continue to be enforced during RAP implementation and future Site land use.

Maintenance of the proposed site-wide engineered barrier for the Site will consist of routine maintenance, inspections, and notification of the site owner/operator prior to intrusive activities. Routine engineered barrier maintenance includes sealing of asphalt pavement, mowing of vegetated cover areas, and routine vegetative cover re-seeding, fertilization, and turf maintenance.

Inspections will be conducted to inspect the integrity of the proposed engineered barriers implemented at the Site. Inspections will include the completion of an inspection checklist regarding visually observed conditions of the integrity of the vegetated compacted clay barrier and asphalt pavement barrier. Observations include vegetated areas, drainage ways, drainage structures, and growth of non-landscaping shrubs or brush that may affect the integrity of the engineered barrier. Signs of barrier penetrations, construction activities, erosion, and differential settlement will be documented in a facility maintenance logbook. Areas requiring repair will be addressed in a timely manner to ensure integrity of the engineered barrier.

Maintenance of the proposed site-wide engineered barrier will include notification of the site owner/operator prior to intrusive activities by construction workers and development of appropriate monitoring and action plans. If planned construction work will result in a temporary breach of the engineered barrier, plans will be developed and implemented that will address protective measures for workers regarding soil COCs known to be present, proper disposal of wastes generated during construction activities, and appropriate restoration of the engineered barrier. The site owner/operator will ensure that plans are properly implemented during field construction activities and that the engineered barrier has been properly restored.

4.2 Schedule of Activities

A proposed schedule of activities is provided in Table 4-1. The remediation plans described in Section 4.0 are expected to require a total of 36 months for procurement, construction, remedial operations, and remedial closure verification.

4.3 Statement of Remedial Objectives

The remedial objectives for the subject site are summarized and discussed in detail in the remedial objectives section of this report (see Section 3.0).

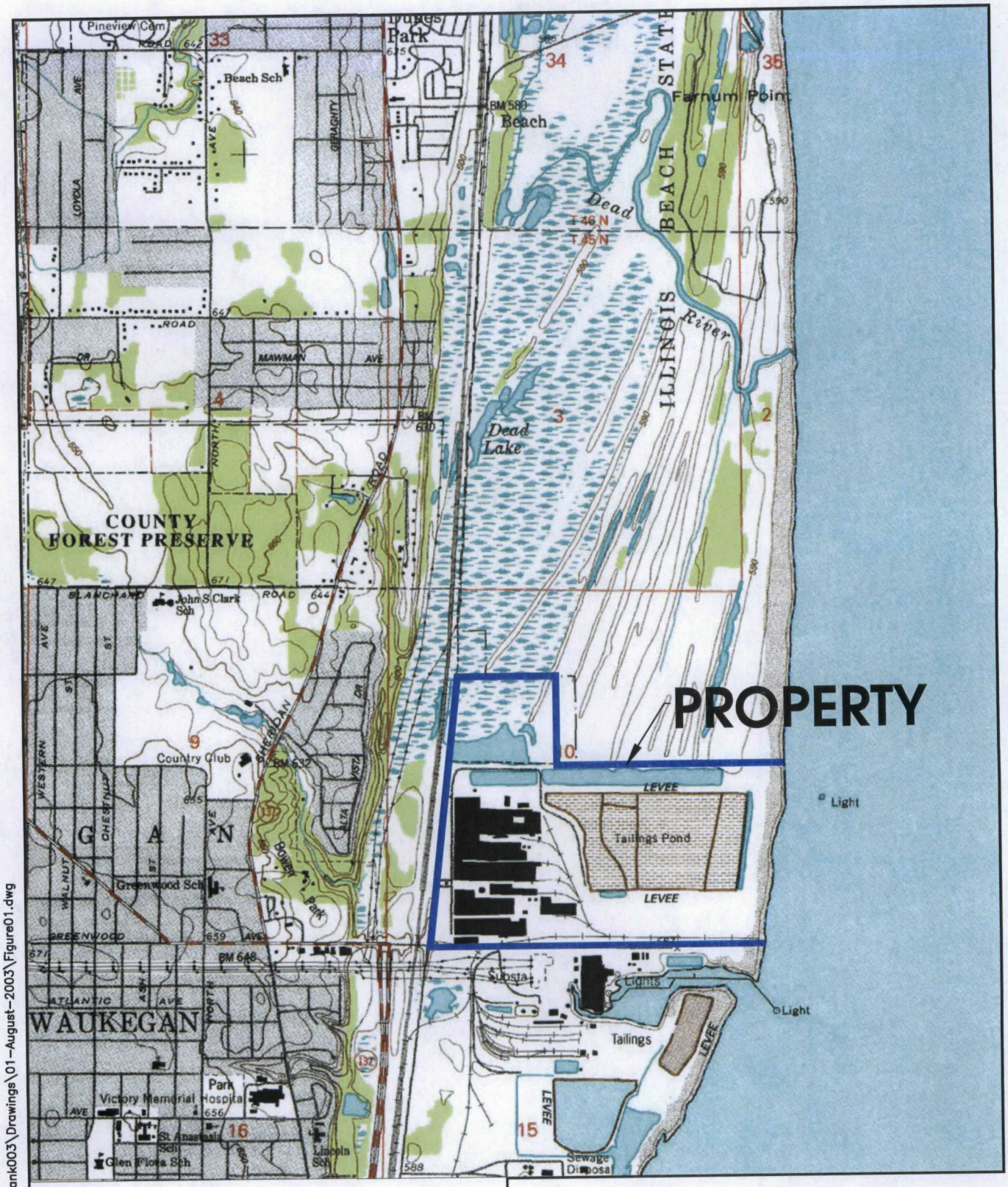
4.4 Remedial Technologies Selected and Engineered Barriers

Field screening of soils, as well as the collection and analysis of confirmatory soil samples will be used to verify that final Site conditions meet the remediation objectives for the Site. Imported backfill and the soil used for the compacted clay layer will meet all criteria previously established for the Site.

5.0 SUMMARY AND CONCLUSIONS

To meet the proposed remediation objectives presented in Section 3.0, JM intends to implement a remedial action plan (RAP) that provides for source soil removal (REC 12), in-situ soil remediation (REC 3), and effective engineered barriers and institutional controls for the entire Site that prevent exposure to COCs in soil or groundwater. The RAP is intended to be protective of human health and the environment and will allow for future Residential (including recreational) use of the Site. To achieve effective control, the RAP includes the following activities:

- Source soil removal and active air sparging and soil vapor extraction (SVE) to address volatile organic compound (VOC) impacts associated with REC 3 (1989 UST Excavation Area 3).
- Groundwater sampling for PNAs in selected REC 3 wells.
- Source soil removal to address benzene, toluene, ethylbenzene, and xylenes (BTEX) contaminants associated with REC 12 (Solvent Recovery Room).
- Covering the Site with either two feet of compacted clay, concrete or asphalt paving to address impacts from asbestos and contaminants of concern that exceed applicable remediation objectives for the soil ingestion exposure route.
- Where present during RAP construction activities, removal of free-floating product from the surface of the water table in areas of total petroleum hydrocarbon (TPH) impacted soil associated with REC 2 (1989 UST Excavation Area 2), REC 5 (1989 UST Excavation Area 5), and REC 16 (Building E Kerosene Pits). Free product has not been encountered during 2005 in existing monitoring wells and piezometers, but will be addressed if encountered during RAP construction activities.
- The provisions of the FACD already prohibit any use of the groundwater on the JM property, which includes the Site. These were previously recorded to the Property deed and are incorporated into this RAP, where appropriate.



T:\Johns Manville\7992.02Tank003\Drawings\01-August-2003\Figure01.dwg

GRAPHIC SCALE
0 1,000' 2,000'

Source:
Zion, Illinois (1993) USGS
7.5 Minute Series
Quadrangle Map

Property Location Map

Johns Manville
1871 North Pershing Road
Waukegan, Illinois

LFR
LEVINE•FRICKE

Figure 1-1

N

250 0 250 500 750
SCALE IN FEET

Property Line

SRP Remediation Site

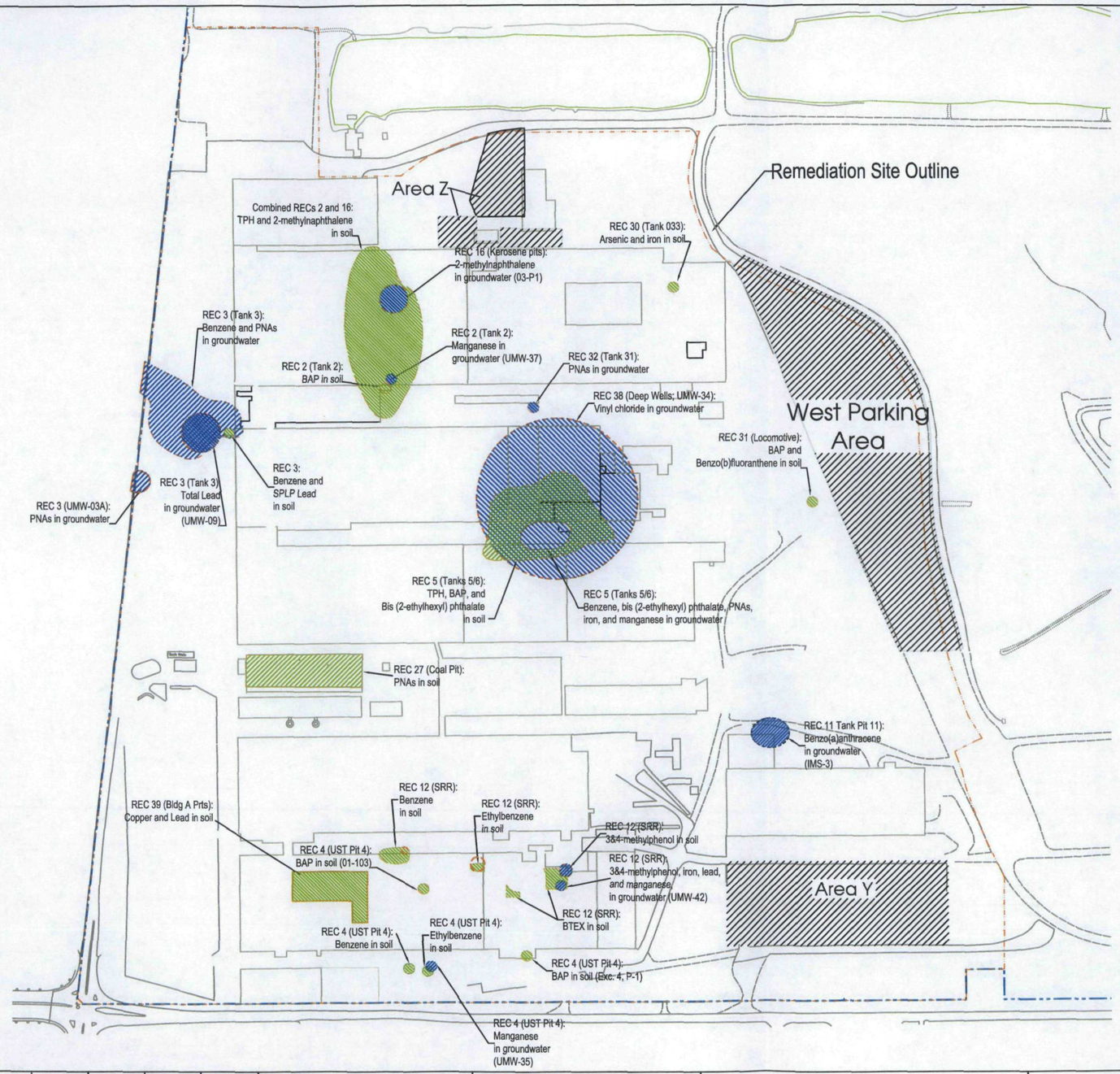
JOHNS MANVILLE, WAUKEGAN, ILLINOIS

General Property Map and SRP Remediation Site

LFR LEVINE•FRICKE

Figure 1-2

T:\JohnsManville\SRP\Drawings\Report29Aug2003\Figure02-General Property Map.dwg



REVISION	DESIGN	DRAWN	CHECKED	DATE

SCALE :
DESIGN :
DRAWN :
CHECKED :

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Elgin, Illinois

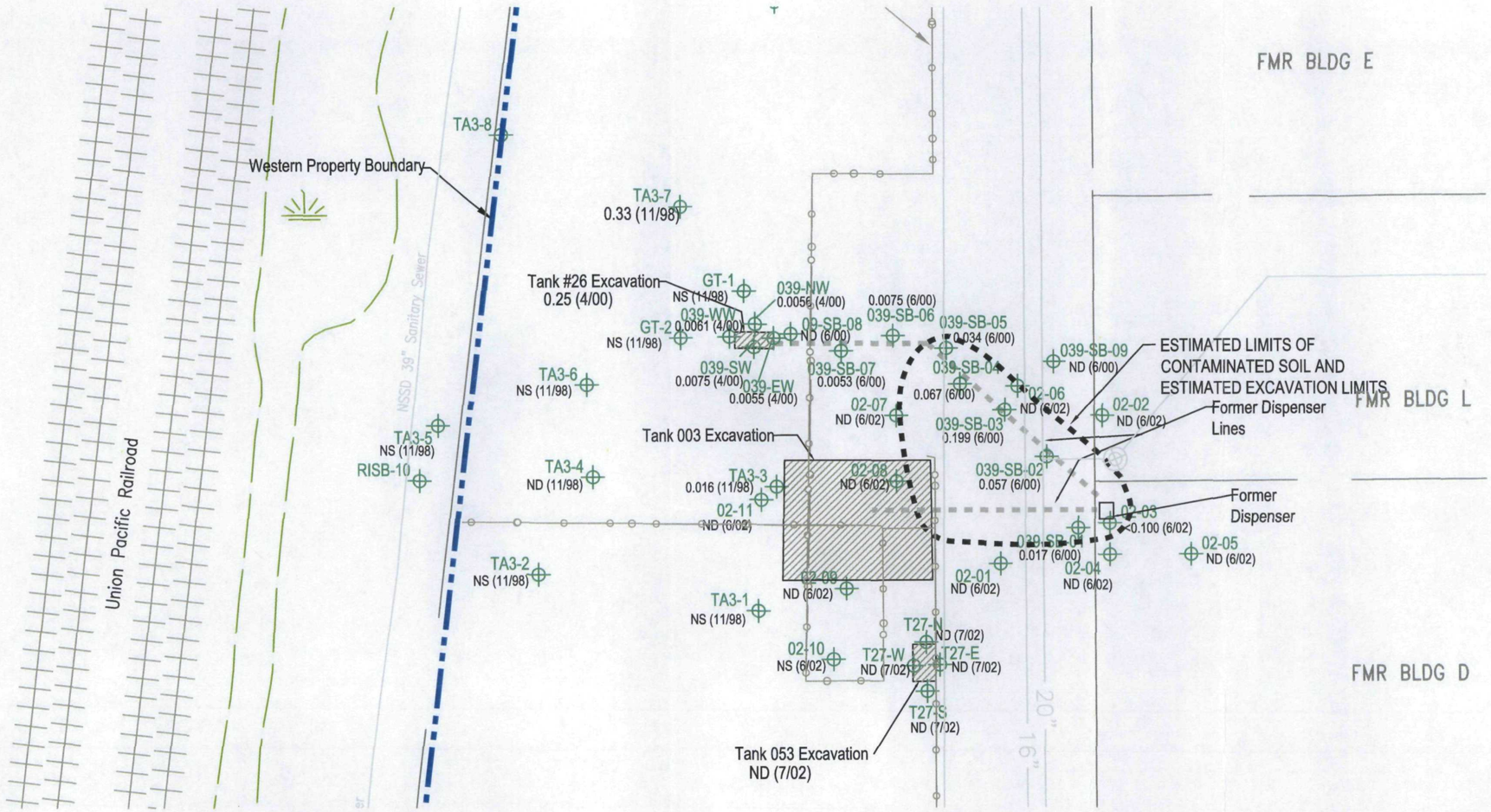
APPROVED :
PROJECT-ENGINEER Date

Johns Manville
1871 North Pershing Road
Waukegan, Illinois 60087

Comprehensive Site Investigation Report

Summary of REC Impacts Requiring ROR/RAP Submittal

Project No : 009-07992-00
Date : June 2004
Figure 2-1



SOIL BORING OR EXCAVATION SIDEWALL SAMPLE
ND - NOT DETECTED ABOVE PQL
NS - NOT SAMPLED ABOVE WATER TABLE

RESULTS IN mg/kg

N
GRAPHIC SCALE
0 50'

Johns Manville, Waukegan, Illinois

REC 3 Benzene in Soil

LFR LEVINE•FRICKE

Figure 4-1

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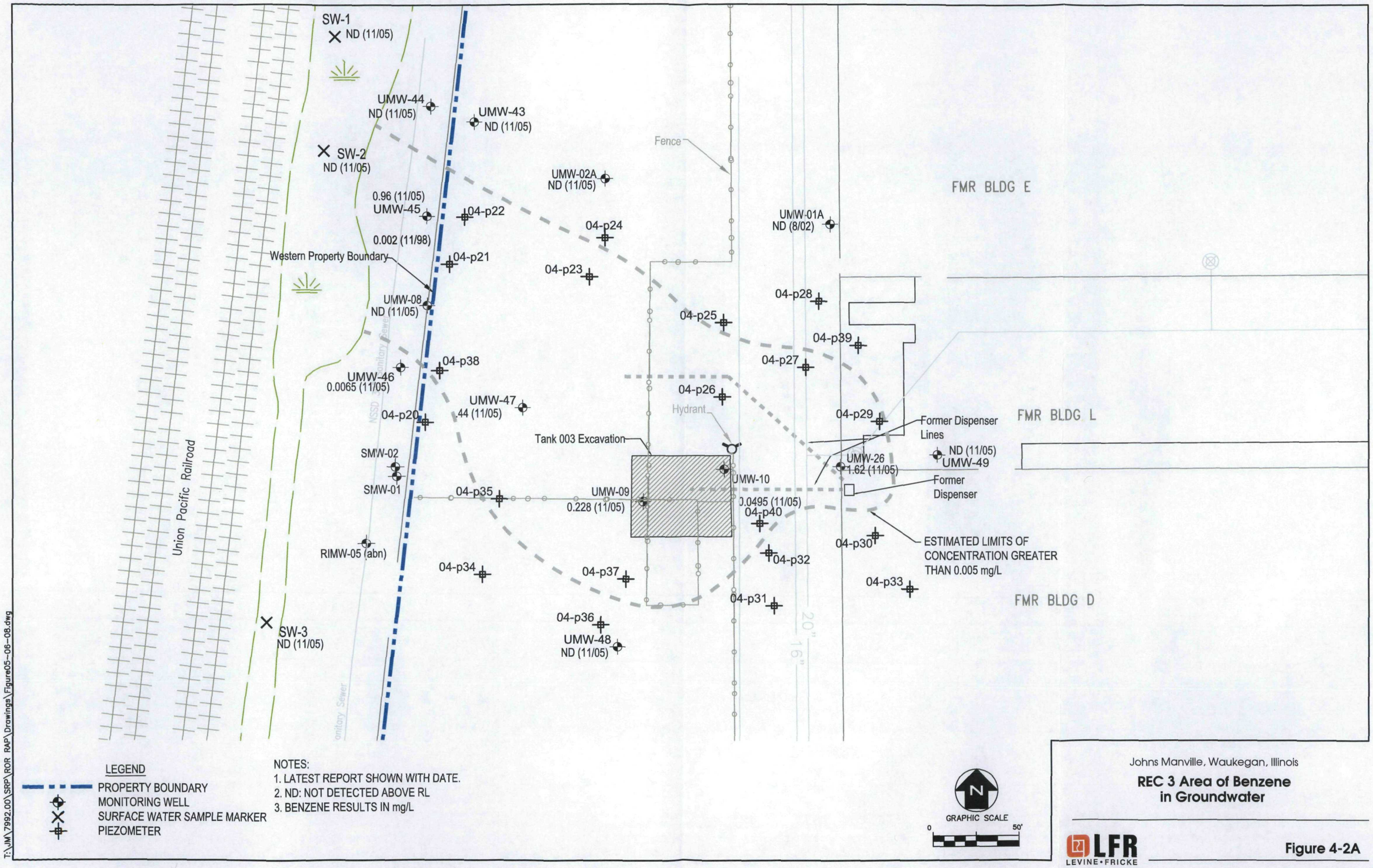
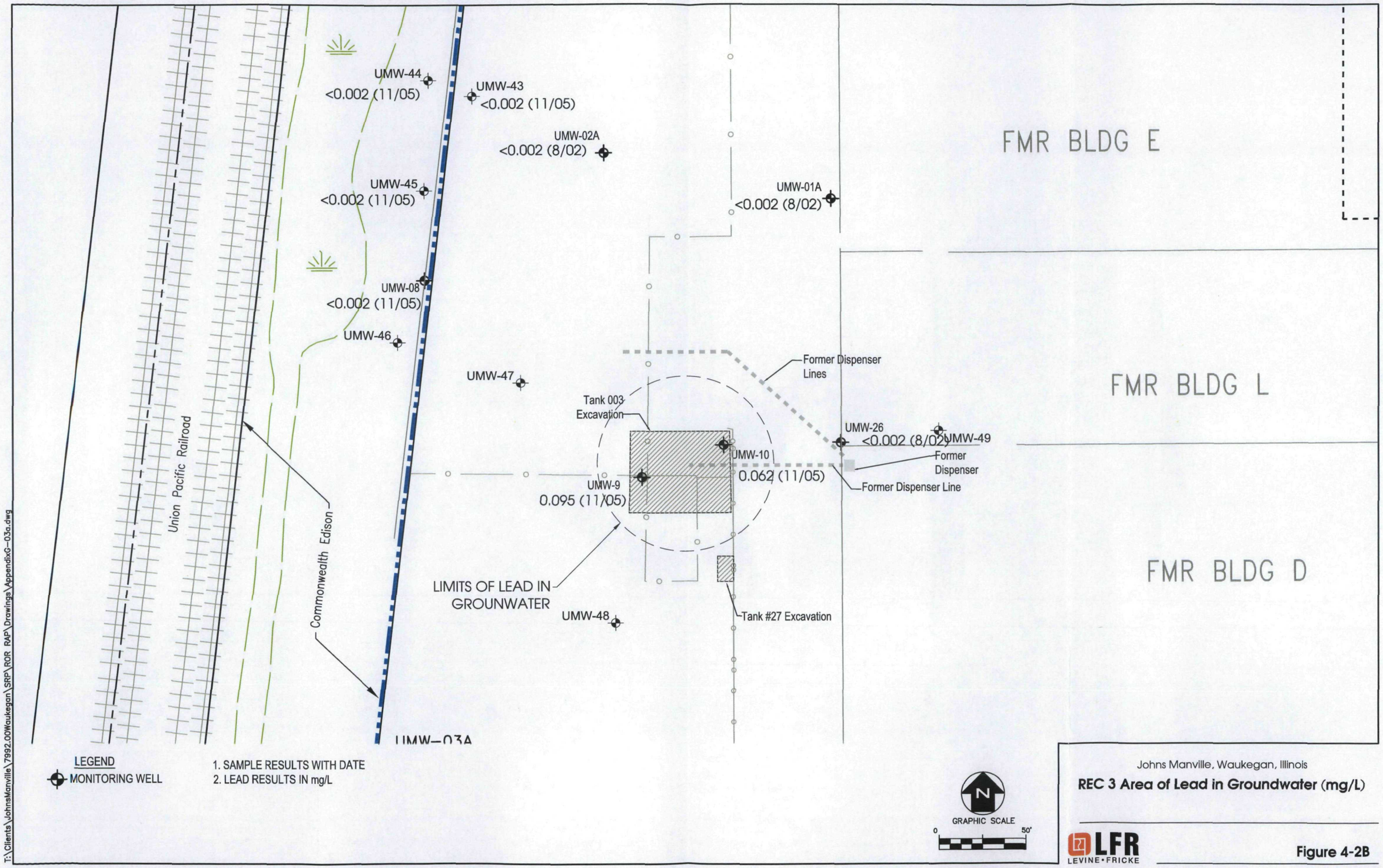


Johns Manville, Waukegan, Illinois

REC 3 Area of Benzene in Groundwater

LFR LEVINE•FRICKE

Figure 4-2A



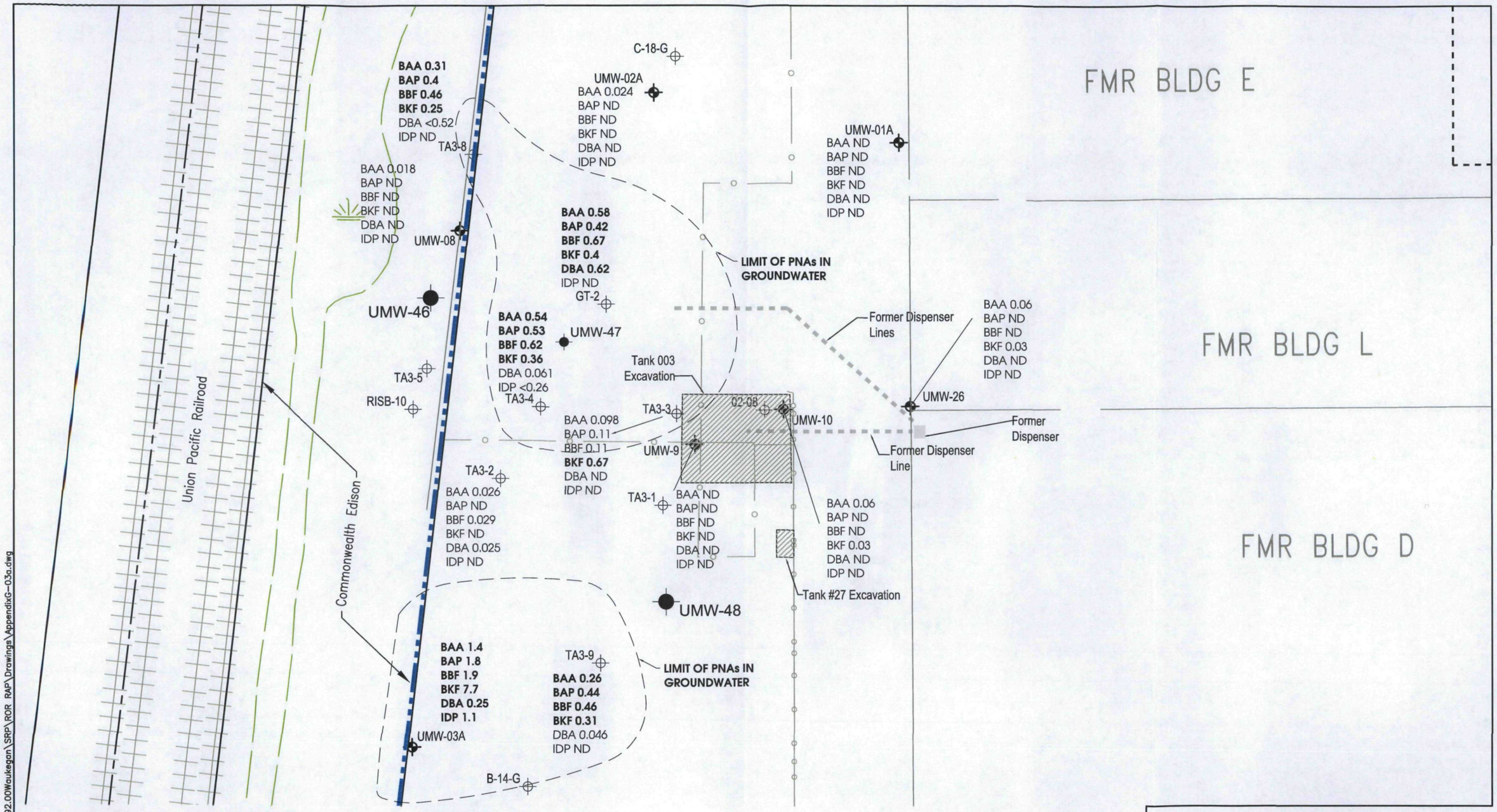
Johns Manville, Waukegan, Illinois

REC 3 Area of Lead in Groundwater (mg/L)

LFR LEVINE•FRICKE

Figure 4-2B

T:\Clients\JohnsManville\7992.00Waukegan\SRP\ROR RAP\Drawings\AppendixG-03a.dwg



LEGEND

- MONITORING WELL
- PIEZOMETER
- SOIL BORING

BAA = benzo(a)anthracene
BAP = benzo(a)pyrene
BBF = benzo(b)fluoranthene
BKF = benzo(k)fluoranthene
DBA = dibenzo(a,h)anthracene
IDP = indeno(1,2,3-cd)pyrene

NOTES:
1. ANALYTICAL DATA FROM 11/98
2. ND: NOT DETECTED ABOVE PQL
3. PNA RESULTS IN ug/L
4. BOLDED VALUES GREATER THAN CLASS I GROUNDWATER STANDARD.

GRAPHIC SCALE
0 50'

Johns Manville, Waukegan, Illinois

REC 3 Area of Groundwater Impact for selected PNAs (ug/L)

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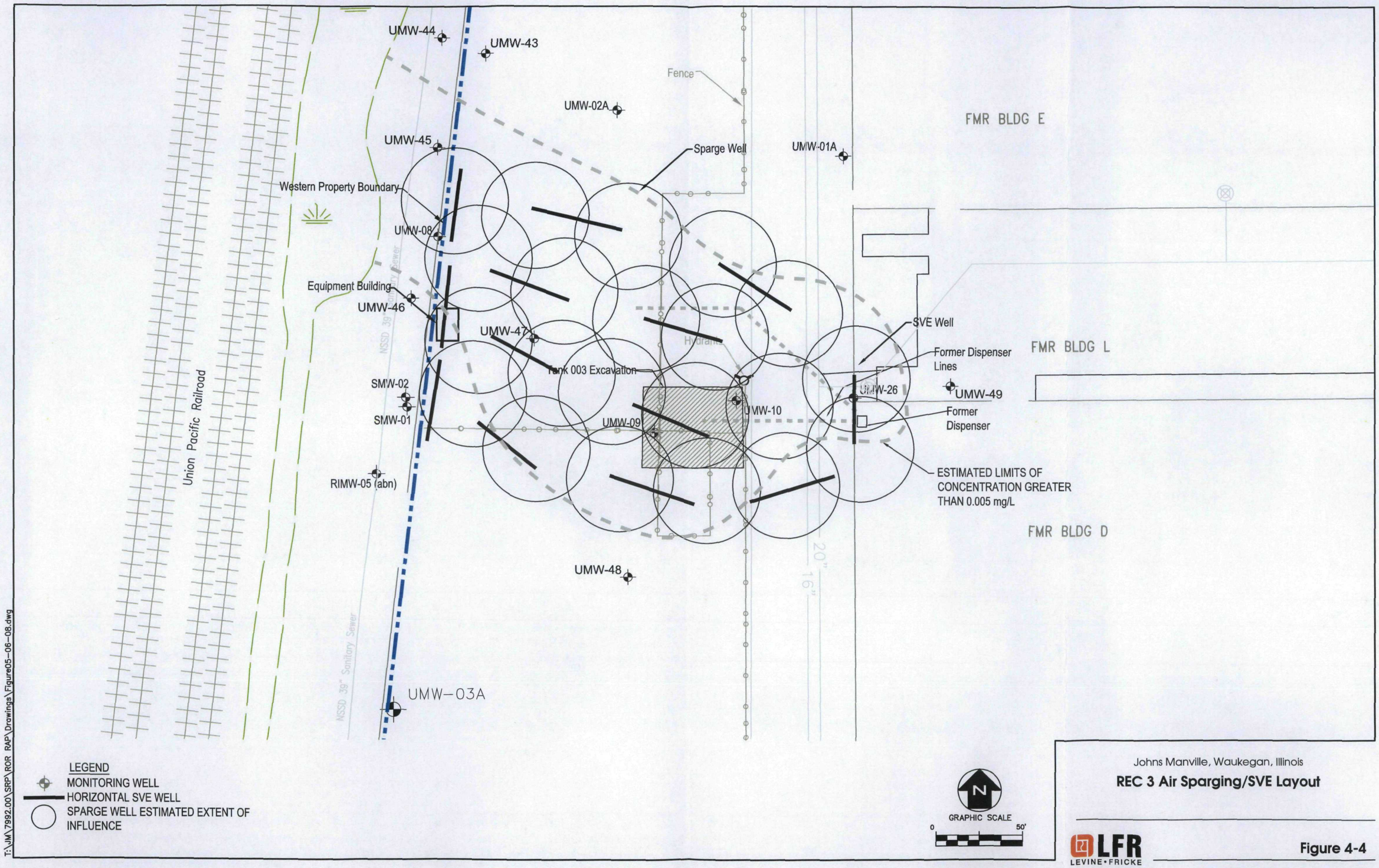
Figure 4-3

T:\Clients\JohnsManville\7992.00Waukegan\SRP\ROR RAP\Drawings\AppendixG-03a.dwg



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Johns Manville, Waukegan, Illinois

REC 3 Air Sparging/SVE Layout

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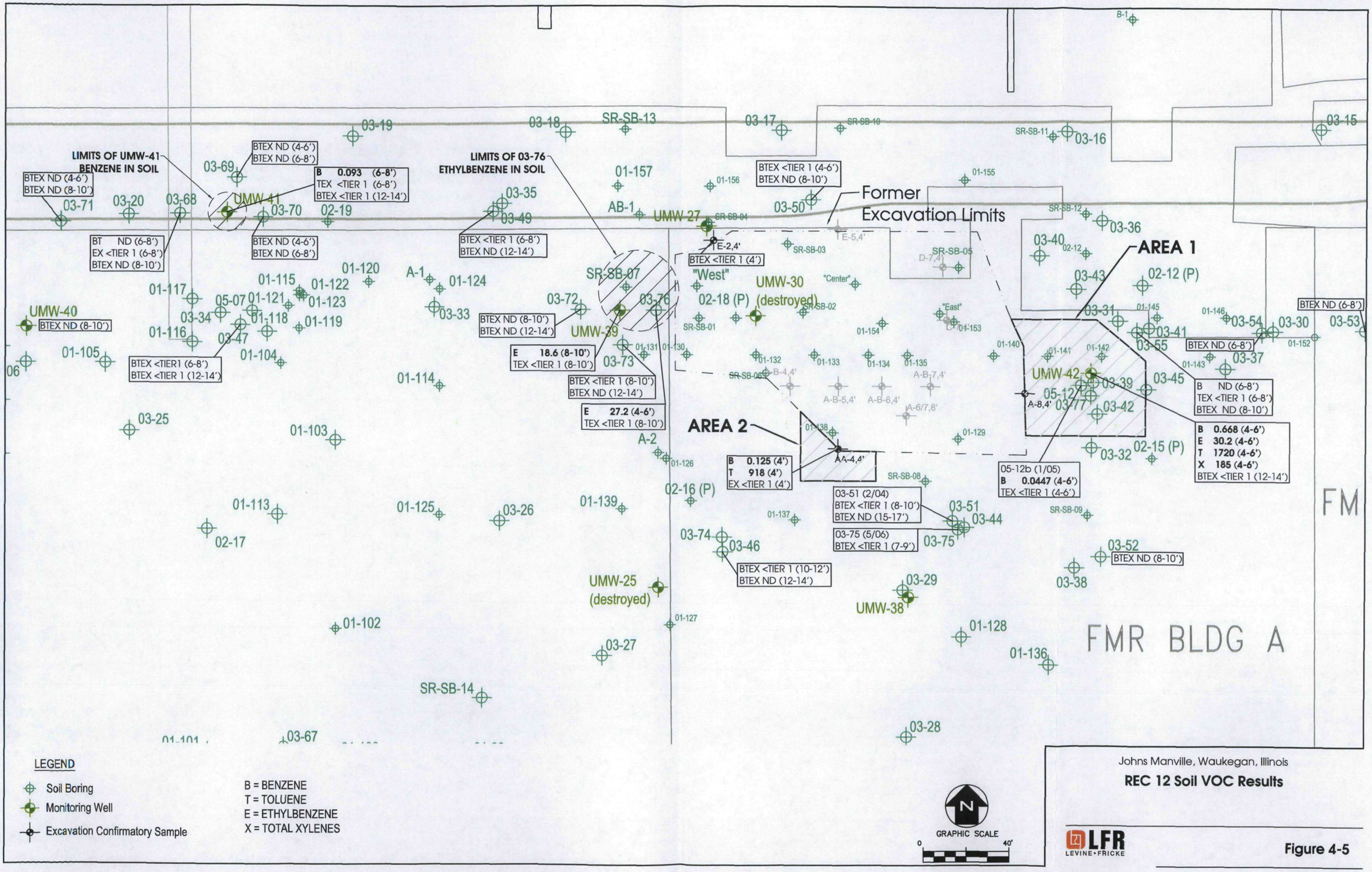
Figure 4-4



LEGEND

- Soil Boring
- Monitoring Well
- Excavation Confirmatory Sample

B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = TOTAL XYLENES

GRAPHIC SCALE
0 40'

Johns Manville, Waukegan, Illinois

REC 12 Soil VOC Results

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Figure 4-5

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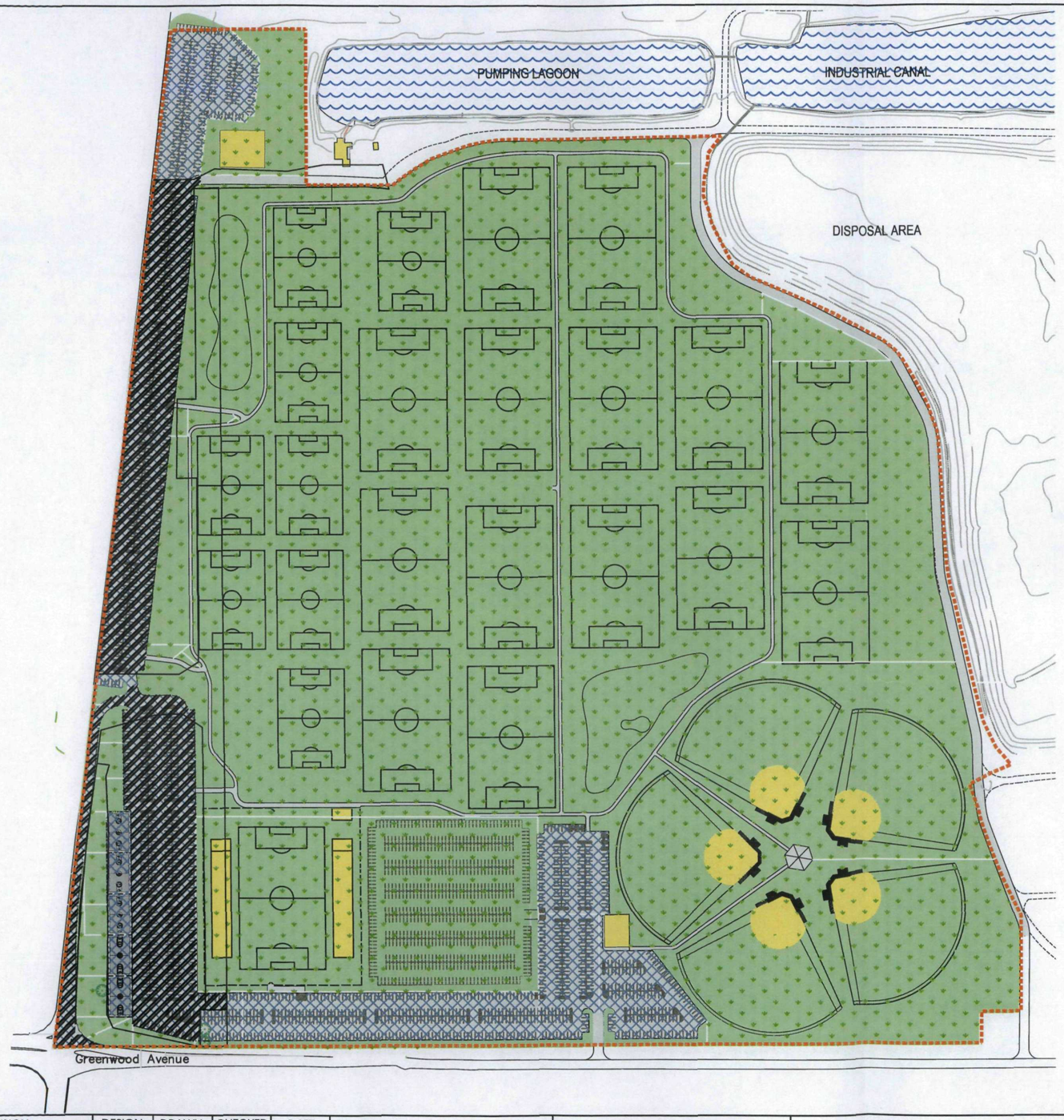
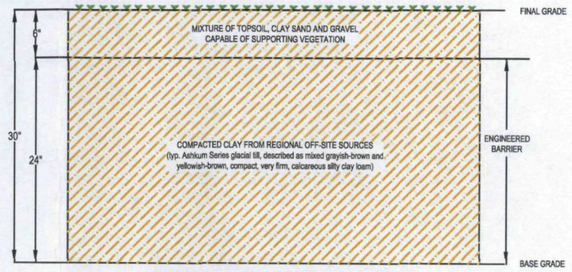


N

GRAPHIC SCALE
150' 0 150'

PRELIMINARY, NOT FOR CONSTRUCTION

NOTE 1:
COVER CROSS SECTION
OPTION A (SPORTS COMPLEX SCENARIO)



JOHNS MANVILLE AND WAUKEGAN PARK DISTRICT COVER
FOR
FORMER MANUFACTURING AREA

NOTE 2: SPORTS COMPLEX SITE PLAN
AS PER GEWALT HAMILTON
ASSOCIATES INC. NOVEMBER 2004.

LEGEND

- PROPOSED CLAY COVER (SEE NOTE 1)
- PROPOSED ASPHALT/CONCRETE PAVEMENT AS COVER
- EXISTING PAVING AS COVER
- REMEDIATION SITE BOUNDARY

△	REVISION	DESIGN	DRAWN	CHECKED	DATE

SCALE :
DESIGN :
DRAWN :
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Elgin, Illinois

APPROVED :

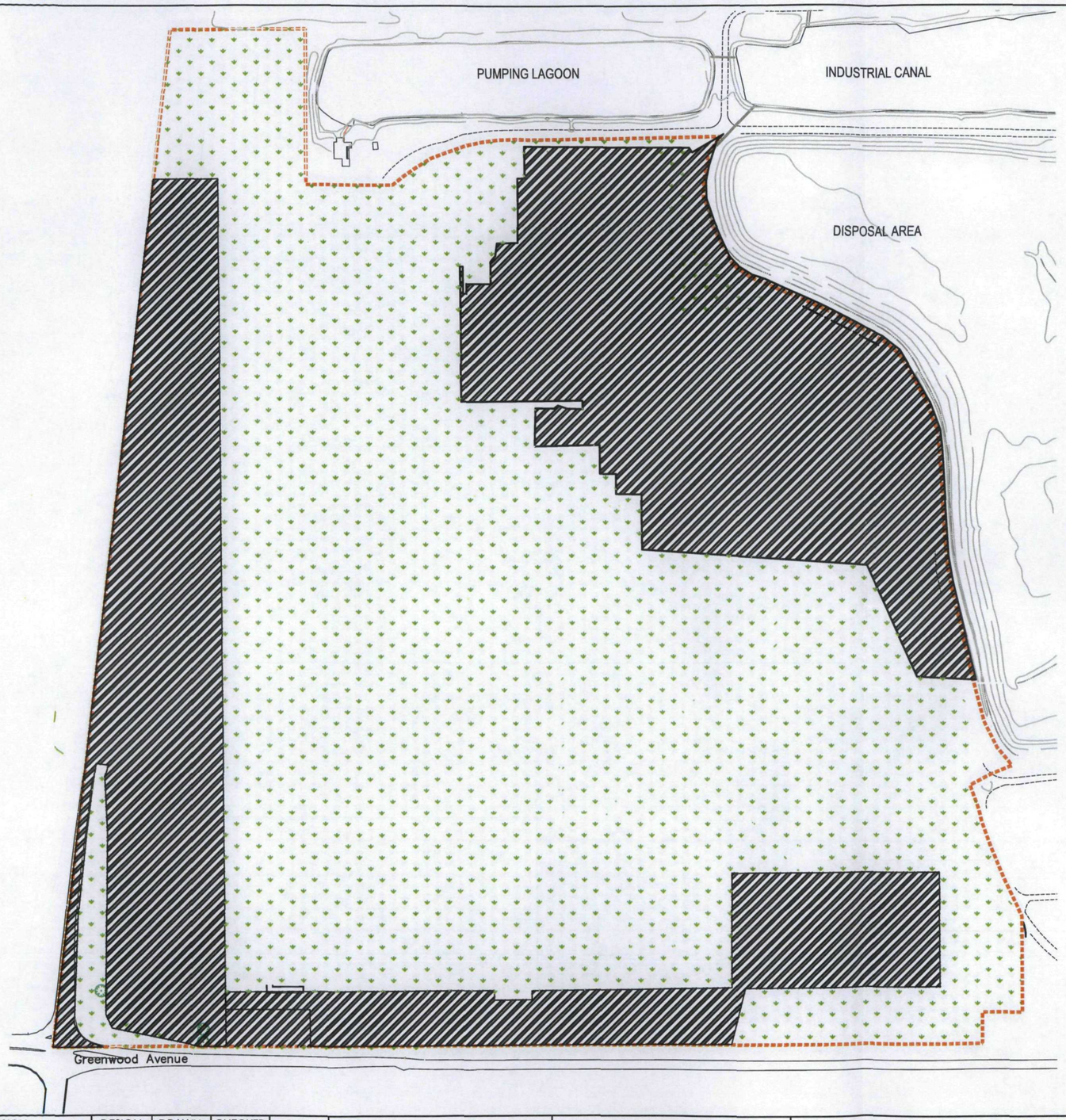
PROJECT-ENGINEER Date

Johns Manville
Waukegan, Illinois

Johns Manville

Site-Wide Engineered Barrier Areas (Sports Complex Scenario)

Project No :
Date :
Figure 4-6A

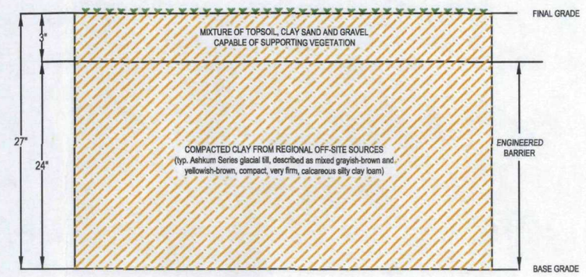


N

GRAPHIC SCALE
150' 0 150'

PRELIMINARY, NOT FOR CONSTRUCTION

NOTE 1:
COVER CROSS SECTION
OPTION B (CLOSURE ONLY SCENARIO)



LEGEND

- PROPOSED CLAY COVER (SEE NOTE 1)
- EXISTING PAVING AS COVER
- REMEDIATION SITE BOUNDARY

REVISION	DESIGN	DRAWN	CHECKED	DATE

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DRAWN :
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PROJECT-ENGINEER Date

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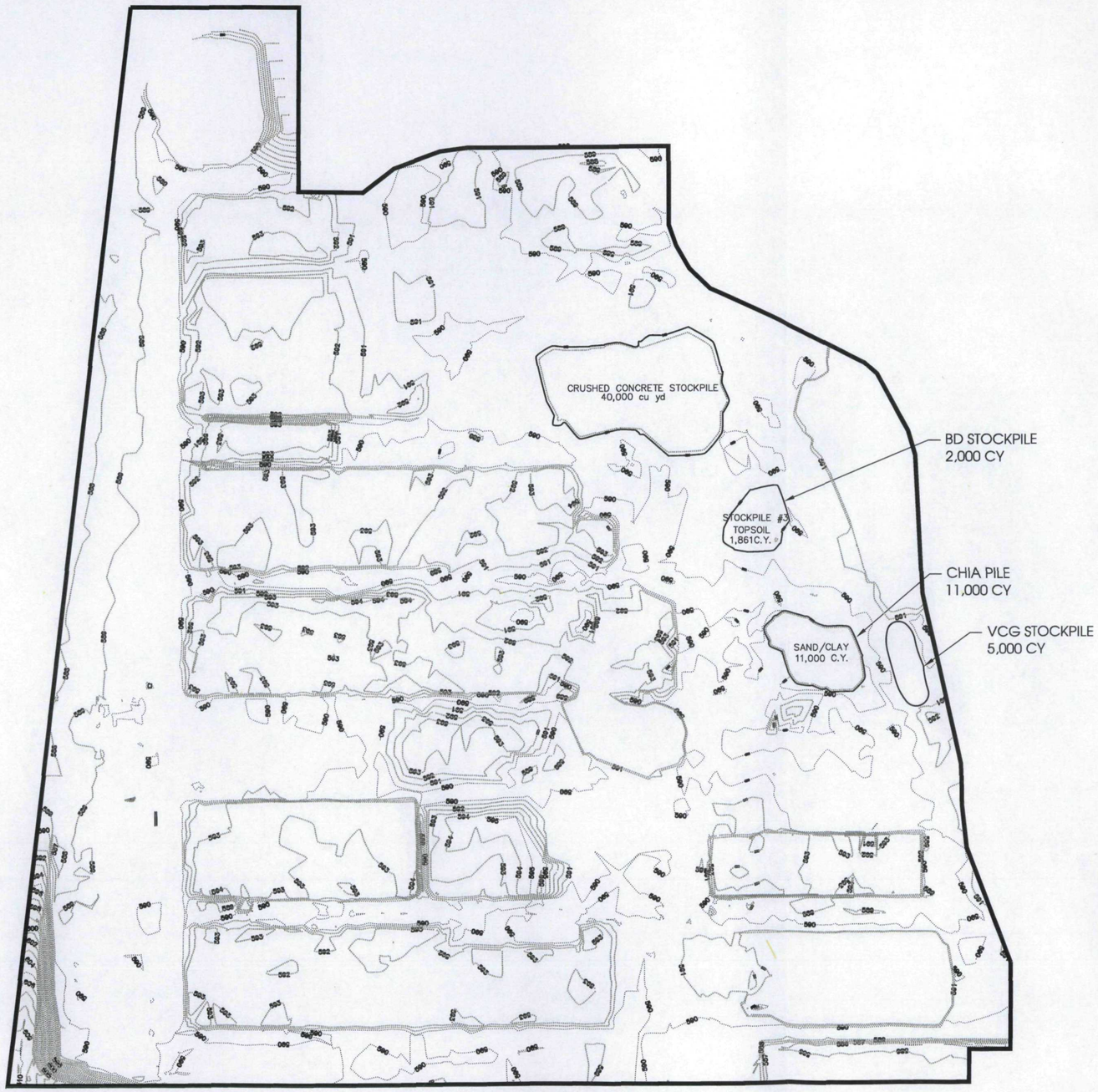
Waukegan, Illinois

Johns Manville

Site-Wide Engineered Barrier Areas (Closure Only Scenario)

Project No :
Date :
Figure 4-6B



N

GRAPHIC SCALE
150' 0 150'

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Johns Manville
Waukegan, Illinois

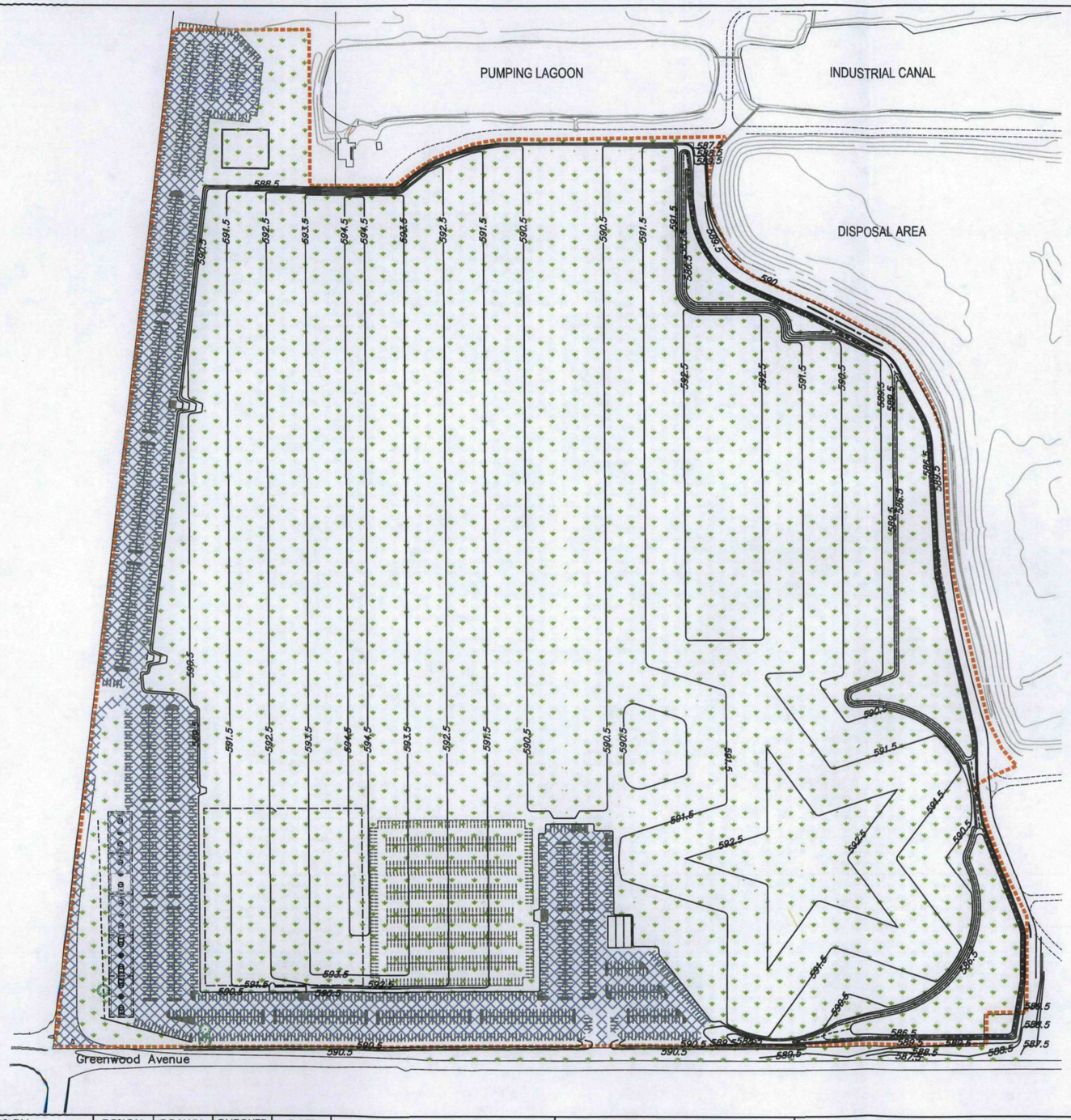
Johns Manville

Existing Site Topography

Project No :

Date :

Figure 4-7



PRELIMINARY, NOT FOR CONSTRUCTION

NOTE:
THIS FIGURE SHOWS ENGINEERED BARRIER SUBGRADE ELEVATIONS FOR OPTION A (SPORTS COMPLEX SCENARIO).

GRADE ELEVATIONS AS PER GEWALT HAMILTON ASSOCIATES INC. NOVEMBER 2004 GRADING PLAN , (PHASE 1 AND 2) MINUS 2.5 FEET.

LEGEND

- PROPOSED CLAY COVER AND SOIL MANAGEMENT ZONE
- PROPOSED ASPHALT/CONCRETE PAVEMENT AS COVER
- EXISTING PAVING AS COVER
- REMEDIATION SITE BOUNDARY

REVISION	DESIGN	DRAWN	CHECKED	DATE

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Waukegan, Illinois

Johns Manville

Engineered Barrier Subgrade Elevations for Sports Complex Scenario

Project No :
Date :

Figure 4-8

PRELIMINARY, NOT FOR CONSTRUCTION

N

GRAPHIC SCALE
150' 0 150'

EXISTING PAVING AS COVER

EARTHWORK SUMMARY

DESCRIPTION	CUT	FILL	NET
ASBESTOS-AFFECTED SOIL	92,700	137,300	-44,600
CRUSHED CONCRETE (ON-SITE)			40,000
BD STOCKPILE			2,000
CHIA PILE			11,000
VCG STOCKPILE			5,000
TOTAL			13,400

LEGEND (FT. OF CUT–FILL, POSITIVE RANGES = AREA OF FILL

Color	*Range Beg.*	*Range End*
	−5.00	*−4.00*
	−4.00	*−3.00*
	−3.00	*−2.00*
	−2.00	*−1.00*
	−1.00	*0.00*
	0.00	*1.00*
	1.00	*2.00*
	2.00	*3.00*
	3.00	*4.00*
	4.00	*5.00*
	5.00	*6.00*
	6.00	*7.00*
	7.00	*8.00*

REVISION	DESIGN	DRAWN	CHECKED	DATE

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PROJECT-ENGINEER Date

Johns Manville

Waukegan, Illinois

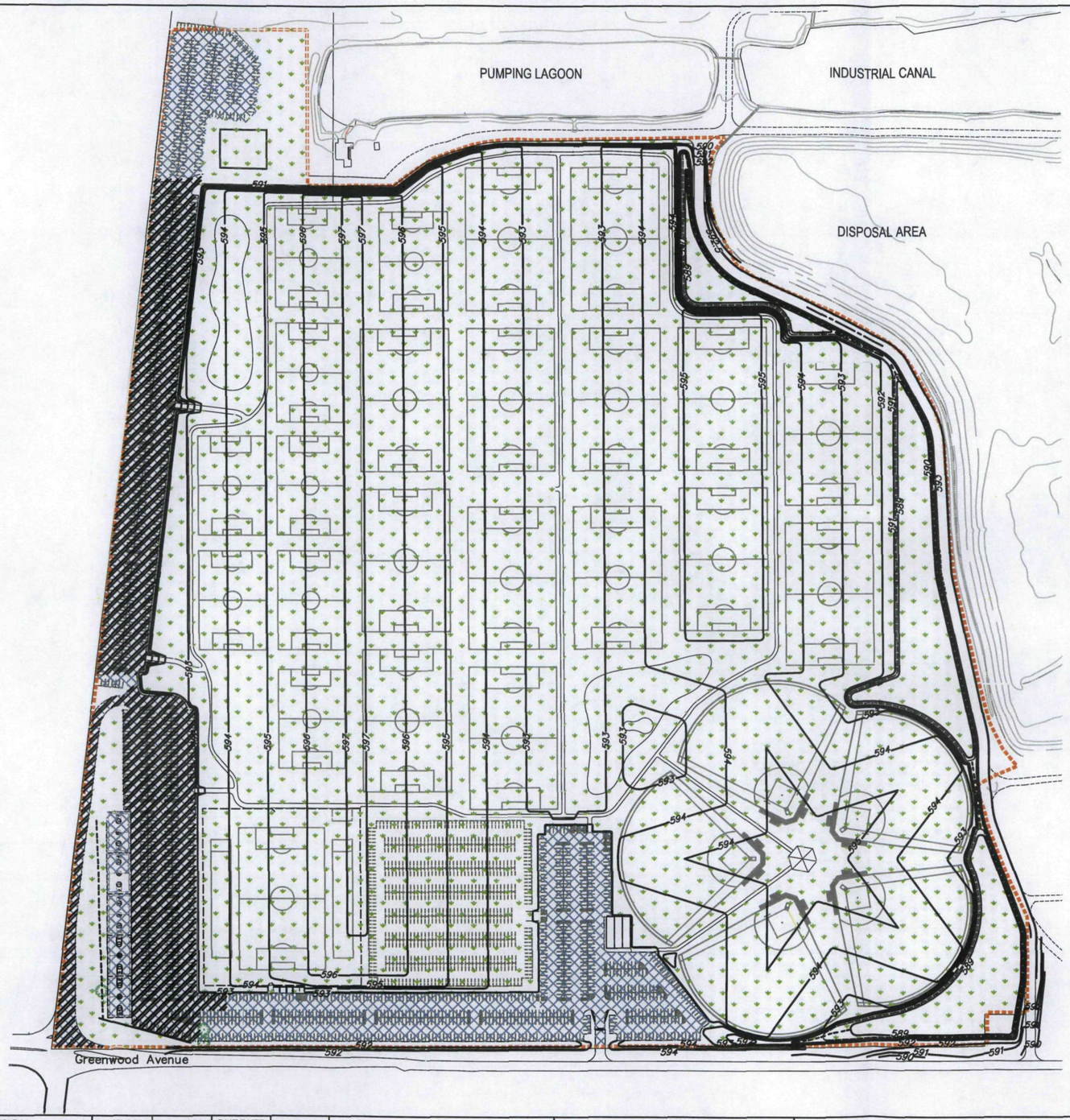
Johns Manville

Cut and Fill Requirements - Sports Complex Scenario

Project No :

Date :

Figure 4-9



N

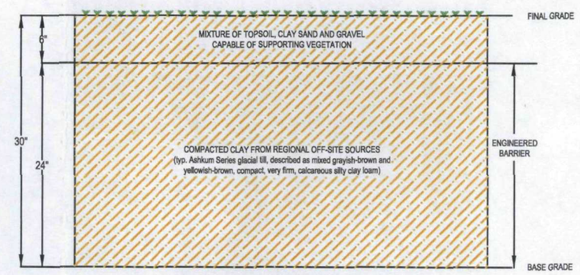
GRAPHIC SCALE
150' 0 150'

PRELIMINARY, NOT FOR CONSTRUCTION

LEGEND

- PROPOSED CLAY COVER (SEE NOTE 1)
- PROPOSED ASPHALT/CONCRETE PAVEMENT AS COVER
- EXISTING PAVING AS COVER
- REMEDIATION SITE BOUNDARY

NOTE 1:
COVER CROSS SECTION
OPTION A (SPORTS COMPLEX SCENARIO)



JOHNS MANVILLE AND WAUKEGAN PARK DISTRICT COVER
FOR
FORMER MANUFACTURING AREA

NOTE 2:
GRADE ELEVATIONS AS PER GEWALT HAMILTON ASSOCIATES
NOV. 2004 GRADING PLAN (PHASE 1 AND 2).

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DRAWN :
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Elgin, Illinois

APPROVED :

PROJECT-ENGINEER Date

Johns Manville
Waukegan, Illinois

Johns Manville

Proposed Final Grade Elevations
(Sports Complex Scenario)

Project No :
Date :
Figure 4-10

Table 1-1
REC Summary and ROR/RAP Recommendations
Johns Manville, Waukegan, Illinois

ID	Recognized Environmental Condition	Status	Current Impacts Above Tier I Residential Soil or Class I Groundwater?		Additional Assessment Required?	ROR/RAP Required?	Description and ROR/RAP Approach
			Soil	Groundwater			
1	1989 UST Excavation 1	Previously closed by IEPA	---	---	---	---	---
2	1989 UST Excavation 2	Ongoing	Yes	Yes	No	Yes	1) BAP in Soil----->Site-wide engineered barrier 2) 2-Methylnaphthalene in soil - combined with REC 16---> Incomplete exposure route 3) TPH in soil - being combined with REC 16---> Free product removal, if necessary 4) Manganese in groundwater----> Groundwater institutional controls or area background
3	1989 UST Excavation 3	Ongoing	Yes	Yes	No	Yes	1) Benzene in soil----> In-situ treatment and source soil removal 2) SPLP lead in soil---> Incomplete exposure route 3) BTEX in groundwater---> In-situ remediation 4) PNAs in groundwater---> GW remediation or incomplete exposure route 5) Total lead in groundwater--Incomplete exposure route
4	1989 UST Excavation 4	Ongoing	Yes	Yes	No	Yes	1) Ethylbenzene and benzene in soil ---> Incomplete exposure route 2) BAP in soil (01-103 and Exc. 4, P-1) ---> Site-wide engineered barrier 3) Benzene and toluene in groundwater ---> Incomplete exposure route 4) Manganese in groundwater (UMW-35) ---> Incomplete exposure route or area background
5	1989 UST Excavation 5	Ongoing	Yes	Yes	No	Yes	1) BAP in soil ---> Site-wide engineered barrier 2) Bis (2-ethylhexyl) phthalate in soil ---> Site-wide engineered barrier 3) TPH in soil ---> Free product removal, if necessary 4) BTEX in groundwater ---> Incomplete exposure route 5) PNAs in groundwater ----> Incomplete exposure route 6) Bis (2-ethylhexyl) phthalate in groundwater ---> Incomplete exposure route 7) Iron and manganese in groundwater ---> Groundwater institutional controls or area background
6	1989 UST Excavation 6	Previously closed by IEPA	---	---	---	---	---
7	1989 UST Excavation 7	Previously closed by IEPA	---	---	---	---	---
8	1989 UST Excavation 8	Previously closed by IEPA	---	---	---	---	---
9	1989 UST Excavation 9	Previously closed by IEPA	---	---	---	---	---
10	1989 UST Excavation 10	Previously closed by IEPA	---	---	---	---	---
11	1989 UST Excavation 11	Ongoing	No	Yes	No	Yes	1) Benzo(a)anthracene in groundwater ---> Incomplete exposure route

Table 1-1
REC Summary and ROR/RAP Recommendations
Johns Manville, Waukegan, Illinois

ID	Recognized Environmental Condition	Status	Current Impacts Above Tier I Residential Soil or Class I Groundwater?		Additional Assessment Required?	ROR/RAP Required?	Description and ROR/RAP Approach
			Soil	Groundwater			
12	Solvent Recovery Room	Ongoing	Yes	Yes	No	Yes	1) Benzene in soil (UMW-41)---> Incomplete exposure route 2) Ethylbenzene in soil (UMW-39)----> Incomplete exposure route 3) BTEX in soil (UMW-42) ---> Soil remediation 4) BTEX in groundwater (UMW-42) ---> Incomplete exposure route 5) 3&4-methylphenol in groundwater (UMW-42)----> Incomplete exposure route 6) Lead in groundwater (UMW-42) ---> Incomplete exposure route 7) Iron and manganese in groundwater ---> Groundwater institutional controls or area background
13	D Transformer- Sanitary Sewer	Complete, as documented in CSIR	No	No	No	No	TPH issues to be closed under REC 5.
14	Tank 30-UST	Complete, as documented in CSIR	No	No	No	No	Benzene in groundwater to be addressed under REC 5.
15	Tank 37-AST	Complete, as documented in CSIR	No	No	No	No	All potential impact from this REC is captured in the data for REC 5.
16	Building E Kerosene Pits	Ongoing	Yes	Yes	No	Yes	1) 2-Methylnaphthalene in soil - combined REC 2 and 16 ---> Incomplete exposure route 2) TPH in soil - combined REC 2 and REC 16--->Free product removal, if necessary 3) 2-Methylnaphthalene in groundwater----> Incomplete exposure route
17	Building H Material	Complete, as documented in CSIR	No	No	No	No	---
18	Building J Transformers	Complete, as documented in CSIR	No	No	No	No	---
19	Tank 57-AST	Complete, as documented in CSIR	No	No	No	No	---
20	Fog Tunnels	Complete, as documented in CSIR	No	No	No	No	---
21	Still Room	Complete, as documented in CSIR	No	No	No	No	---
22	Coal Tar Saturator	Complete, as documented in CSIR	No	No	No	No	---
23	Building B - Tank 26	Complete, as documented in CSIR	No	No	No	No	---
24	Building T Tar Pit	Complete, as documented in CSIR	No	No	No	No	---

Table 1-1
REC Summary and ROR/RAP Recommendations
Johns Manville, Waukegan, Illinois

ID	Recognized Environmental Condition	Status	Current Impacts Above Tier I Residential Soil or Class I Groundwater?		Additional Assessment Required?	ROR/RAP Required?	Description and ROR/RAP Approach
			Soil	Groundwater			
25	Building D Saturators	Complete, as documented in CSIR	No	No	No	No	---
26	Tank 053 UST: Building D Old Gasoline	Complete, as documented in CSIR	No	No	No	No	---
27	Coal Pit	Ongoing	Yes	No	No	Yes	1) PNAs in soil----> Site-wide engineered barrier
28	Subsurface Asbestos-containing Materials	Ongoing	N/A	N/A	No	Yes	1) Asbestos in soil ---> Site-wide engineered barrier
29	C-West Tanks	Complete, as documented in CSIR	No	No	No	No	---
30	Tank 033	Ongoing	Yes	No	No	Yes	1) Arsenic and iron in soil ----> Site-wide engineered barrier
31	Locomotive	Ongoing	Yes	Yes	No	Yes	1) BAP and benzo(b)fluoranthene in soil. ---> Site-wide engineered barrier
32	Tank 031	Ongoing	No	Yes	No	Yes	1) PNAs in groundwater---> Incomplete exposure route
33	Tank 032	Complete, as documented in CSIR	No	No	No	No	---
34	Tank 027	Complete, as documented in CSIR	No	No	No	No	---
35	Building A Transformer	Complete, as documented in CSIR	No	No	No	No	---
36	Building P Transformer	Complete, as documented in CSIR	No	No	No	No	---
37	Tank 039	Complete, as documented in CSIR	No	No	No	No	---

Table 2-1

Soils Greater than Tier 1 Residential Soil Ingestion Criteria

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 2/16	Benzo(a) pyrene	0.1	01-3 (3-4 ft.)	0.09	Exposure route excluded by proposed site-wide engineered barrier in RAP
		0.226	01-4 (3-4 ft.)		
REC 4	Benzo(a) pyrene	0.198	STF-01-103 (5-7 ft.)	0.09	
		0.27	Ex. 4, P-1 (1-2 ft.)		
REC 5	Benzo(a) pyrene	0.173	01-73 (2-4 ft.)	0.09	
		0.22	01-77 (2-4 ft.)		
REC 27	Benzo(a) anthracene	0.968	CP-NW (0-1 ft.)*	0.9	
	Benzo(a) pyrene	0.121	CP-NC (0-1 ft.)	0.09	
	Benzo(a) pyrene	0.143	CP-NE (0-1 ft.)	0.09	
	Dibenzo(a,h)anthracene	0.831	CP-NW (0-1 ft.)*	0.09	
REC 30	Arsenic	13.5	03-12 (0-2 ft.)	13	
	Iron	29,800	03-12 (0-2 ft.)	23,000	
REC 31	Benzo(a) pyrene	0.27	RR-SB-01 (2-3 ft.)	0.09	
	Benzo(a) pyrene	0.83	RR-SB-02 (0-1 ft.)	0.09	
	Benzo(b) fluoranthene	1.0	RR-SB-02 (0-1 ft.)	0.9	
REC 39	Copper	3,550	05-10B (7-8 ft.)	2,900	
	Lead	592	05-10B (7-8 ft.)	400	

Notes: *Sediment removal completed September 2001

Table 2-2

Soils Greater than Tier 1 Inhalation Exposure Route Values

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 12	Benzene	6.66	"West" (3-4 ft.)*	0.8	Historic and proposed soil removal, as described in this ROR/RAP.
	Toluene	1,230	SR-SB-02 (1-2 ft.)*	650	
		2.770	"West" (3-4 ft.)*		
		2,040	SR-01-132 (3-4 ft.)*		
		866	B-6 (2 ft.)*		
		1,100	A-B-6 (4 ft.)*		
		661	A-B-7 (4 ft.)*		
		1,660	C-7 (4 ft.)*		
		918	AA-4 (4 ft.)**		
		1,330	B-8 (8 ft.)**		
		1,720	UMW-42 (4-6 ft.)**		
	Xylenes	666	"West" (3-4 ft.)*	320	

Notes: *Soil removal completed January 2003

**Proposed soil removal in ROR/RAP

Table 2-3

VOCs and SVOCs in Soils Greater than Class 1 Soil Component of Groundwater Ingestion Exposure Route Criteria (RECs 2/16, 3, and 4)

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 2/16	2-Methyl naphthalene	17.8	03-01 (9-10 ft.)	7.7	Exposure route excluded (Tables 3-1A, 3-1B, 3-1C, and 3-1D)
		9.39	03-P2 (8-10 ft.)		
REC 3	Benzene	0.057	T-039-SB-2 (5-6 ft.)	0.03	REC 3 RAP
		0.199	T-039-SB-3 (5-6 ft.)		
		0.067	T-039-SB-4 (5-6 ft.)		
		0.034	T-039-SB-5 (5-6 ft.)		
		0.35	GT-1 (7-8 ft.)		
		0.041	TA3-5 (10-12 ft.)		
		0.33	TA3-7 (10-12 ft.)		
REC 4	Benzene	0.244	03-13 (6-8 ft.)	0.03	Exposure route excluded (Tables 3-3A and 3-3B)
	Ethylbenzene	18	STF-1 (6-7 ft)	13	

Table 2-4

SPLP Metals exceeding Class I Soil Component of the Groundwater Exposure Route (All RECs)

Area	Substance	Concentration (mg/L)	Soil boring (Sample Depth, ft.)	Remediation Objective (mg/L)	Remedial Action to Address Exposure
REC 3	SPLP Lead	0.022	04-HA2 (3 ft.)	0.0075	Exposure route excluded (Table 3-2)
REC 27	SPLP Lead	0.034	CP-20S (0-1 ft.)*	0.0075	Sediments removed from Site as described in approved CSIR
		0.0282	CP-40S/20E (0-1 ft.)*		
		0.0106	CP-40S/40E (0-1 ft.)*		
		0.00905	CP-60S/20E (0-1 ft.)*		
		0.0107	CP-60S/40E (0-1 ft.)*		
		0.0168	CP-60S/60E (0-1 ft.)*		
		0.00836	CP-60S/80E (0-1 ft.)*		
		0.0127	CP-80S/60E (0-1 ft.)*		
		0.0297	CP-NW (0-1 ft.)*		

Notes: *Sediment removal completed September 2001

Table 2-5

VOCs and SVOCs in Soils Greater than Class 1 Soil Component of Groundwater Ingestion Exposure Route Criteria (REC 12)

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 12	Benzene	U (0.124)	SR-SB-01 (1-2 ft.)*	0.093	Exposure route exclusion (Tables 3-4A and 3-4B) and REC 12 RAP and soil previously removed for off-Site disposal
		U (1.34)	SR-SB-02 (1-2 ft.)*		
		U (0.164)	SR-SB-05 (2-3 ft.)*		
		6.66	"West" (3-4 ft.)*		
		0.093	UMW-41 (6-8 ft.)		
		0.0686	UMW-42 (4-6 ft.)**		
		U (0.1)	03-68 (6-8 ft.)		
		U (0.1)	05-07B (8-10 ft.)		
		0.0447	05-12B (4-6 ft.)		
		3.72	C-2 (1.5 ft.)*		
		2.54	B-6 (2 ft.)*		
		0.1	A-B-4 (4 ft.)*		
		0.1	A-B-5 (4 ft.)*		
		0.0904	A-B-6 (4 ft.)*		
		1.0	C-7 (4 ft.)*		
		0.1	D-7 (4 ft.)*		
		0.125	AA-4 (4 ft.)**		
		0.1	B-8 (4 ft.)**		
	Ethylbenzene	22.4	"West" (3-4 ft.)*	27.2	
		55.5	SR-01-132 (3-4 ft.)*		
		18.6	UMW-39 (8-10 ft.)		
		30.2	UMW-42 (4-6 ft.)**		
		27.2	03-76 (4-6 ft.)		
		24	C-7 (4 ft.)*		

Notes: *Soil removal completed January 2003

**Proposed soil removal in ROR/RAP.

Table 2-5 (cont'd)

VOCs and SVOCs in Soils Greater than Class 1 Soil Component of Groundwater Ingestion Exposure Route Criteria (REC 12)

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 12	Toluene	382	SR-SB-01 (1-2 ft.)*	650	
		1,230	SR-SB-02 (1-2 ft.)*		
		175	SR-SB-05 (2-3 ft.)*		
		2,770	"West" (3-4 ft.)*		
		20.1	"East" (3-4 ft.)*		
		27.4	"Center" (3-4 ft.)*		
		2,040	SR-01-132 (3-4 ft.)*		
		353	C-2 (1.5 ft.)*		
		866	B-6 (2 ft.)*		
		102	A-B-5 (4 ft.)*		
		1,100	A-B-6 (4 ft.)*		
		661	A-B-7 (4 ft.)*		
		1,660	C-7 (4 ft.)*		
		918	AA-4 (4 ft.)**		
		424	B-8 (4 ft.)**		
		1,330	B-8 (8 ft.)**		
		1,720	UMW-42 (4-6 ft.)**		
	Xylenes, total	666	"West" (3-4 ft.)*	150	
		238	SR-01-132 (3-4 ft.)*		
		185	UMW-42 (4-6 ft.)**		
	3&4-Methyl Phenol	0.531	UMW-42 (4-6 ft.)**	0.508	
		0.508	03-55 (6-8 ft.)		

Notes: *Soil removal completed January 2003

**Proposed soil removal in ROR/RAP.

Table 2-6

Soil Total Petroleum Hydrocarbons (TPH) exceeding 2,000 mg/kg (All RECs).

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 2/16	TPH Total	20,600	03-01 (9-10 ft.)	No Free Product	If present, free product removal
		11,300	04-63 (3-4 ft.)		
		7,350	04-69 (4-5 ft.)		
		12,200	04-71 (9-10 ft.)		
		3,530	04-72 (10-11 ft.)		
		7,880	04-96 (10-11 ft.)		
		18,900	04-97 (10-11 ft.)		
		12,900	04-98 (10-11 ft.)		
		3,480	03-04 (10-12 ft.)		
		13,600	03-P2 (8-10 ft.)		
		51,800	04-32 (10-12 ft.)		
		9,670	05-01B (8-10 ft.)		
		5,300	05-02B (7-9 ft.)		
REC 5	TPH Total	9,930	03-05 (2-4 ft.)	No Free Product	If present, free product removal
		12,000	03-05 (4-6 ft.)		
		11,200	03-06 (2-4 ft.)		
		13,700	04-11 (6-8 ft.)		
		7,010	04-54 (2-3 ft.)		
		21,100	04-57 (2-3 ft.)		
		25,600	04-60 (1-2 ft.)		
		6,420	04-60 (5-6 ft.)		
		4,530	04-78 (9-10 ft.)		
		47,700	04-79 (8-9 ft.)		
		21,400	04-80 (8-9 ft.)		
		33,700	04-84 (8-9 ft.)		
		21,400	04-100 (6-8 ft.)		
		10,800	04-101 (9-10 ft.)		
		24,100	04-103 (8-9 ft.)		

Table 2-6 (cont'd)

Soil Total Petroleum Hydrocarbons (TPH) exceeding 2,000 mg/kg (All RECs)

Area	Substance	Concentration (mg/kg)	Boring & Sample Depth (feet)	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 5 (cont'd)	TPH Total	30,200	03-09 (4-6 ft.)	No Free Product	If present, free product removal
REC 12	TPH Total	2,280	05-12B (4-6 ft.)	No Free Product	Excavation as part of this RAP
REC 13 (assumed to part of REC 5 TPH impact)	TPH Total	32,800	03-08 (4-6 ft.)	No Free Product	If present, free product removal
		30,200	03-09 (4-6 ft.)		

Table 2-7

Total Metals greater than Class I Groundwater Criteria (all RECs)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 2/16	Manganese	0.337	UMW-37 (12/1/03)	0.15	Groundwater institutional controls in RAP
REC 3	Lead	0.027	UMW-09 (8/1/02)	0.0075	REC 3 RAP
REC 4	Iron	5.28	UMW-35 (12/2/03)	5	Excluded as per approved CSIR
	Lead	0.249	UMW-35 (12/2/03)	0.0075	Excluded as per approved CSIR
	Manganese	0.413	UMW-35 (12/2/03)	0.15	Groundwater institutional controls in RAP
		0.328	UMW-35 (4/19/04)	0.15	
REC 5	Iron	7.66	03-P11 (12/3/04)	5	Groundwater institutional controls in RAP
	Manganese	0.975	03-P11 (12/3/04)	0.15	
REC 11	Lead	0.015	UMW-36 (12/2/03)	0.0075	Excluded as per approved CSIR
	Manganese	0.19	UMW-36 (12/2/03)	0.15	
REC 12	Iron	16.7	UMW-42 (12/2/03)	5	Institutional controls in RAP
	Lead	0.026	UMW-42 (12/2/03)	0.0075	Exposure route excluded (Table 3-9A)
	Manganese	0.411	UMW-42 (12/2/03)	0.15	Groundwater institutional controls in RAP
	Iron	6.34	UMW-34 (12/3/03)	5	
REC 38	Iron	7.22	UMW-28 (12/1/03)	5	Area background (Table 3-12)
		6.34	UMW-34 (12/3/03)	5	
	Manganese	0.353	UMW-28 (12/1/03)	0.15	

Table 2-8

VOCs and SVOCs greater than Class I groundwater criteria (RECs 2/16)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 2/16	Benzo(a) anthracene	0.0005	E-5 (12/21/98)	0.00013	Exposure route excluded (Table 3-5A)
	Benzo(a)pyrene	0.0025	E-5 (12/21/98)	0.0025	
	2-Methylnaphthalene	0.049	03-P1 (12/3/03)	0.028	Exposure route excluded (Table 3-5B)
		0.213	03-P1 (1/15/04)		

Table 2-9
VOCs and SVOCs Greater than Class I Groundwater Criteria (REC 3)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Benzene	0.05	UMW-08 (4/15/97)	0.005	REC 3 RAP
		0.016	UMW-08 (5/6/97)		
		0.0094	UMW-08 (11/12/98)		
		2.28	UMW-08 (8/1/02)		
		0.275	UMW-08 (8/29/02)		
		5.5	UMW-09 (1/12/90)		
		10	UMW-09 (3/7/90)		
		4.4	UMW-09 (8/29/90)		
		4.96	UMW-09 (6/28/91)		
		2.5	UMW-09 (4/14/93)		
		4.575	UMW-09 (8/11/93)		
		3.8	UMW-09 (6/24/94)		
		2.8	UMW-09 (11/12/98)		
		2.82	UMW-09 (8/1/02)		
		2.2	UMW-10 (1/12/90)		
		6.6	UMW-10 (3/7/90)		
		1.9	UMW-10 (8/29/90)		
		9.03	UMW-10 (6/28/91)		
		0.285	UMW-10 (10/28/92)		
		2.6	UMW-10 (4/14/93)		
		3.25	UMW-10 (9/16/93)		
		1.4	UMW-10 (6/24/94)		
		0.73	UMW-10 (11/12/98)		
		0.511	UMW-10 (8/1/02)		

Table 2-9

VOCs and SVOCs greater than Class I groundwater criteria (REC 3)-cont'd

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Benzene	0.05	UMW-08 (4/15/97)	0.005	REC 3 RAP
		0.016	UMW-08 (5/6/97)		
		0.0094	UMW-08 (11/12/98)		
		2.28	UMW-08 (8/1/02)		
		0.275	UMW-08 (8/29/02)		
		5.5	UMW-09 (1/12/90)		
		10	UMW-09 (3/7/90)		
		4.4	UMW-09 (8/29/90)		
		4.96	UMW-09 (6/28/91)		
		2.5	UMW-09 (4/14/93)		
		4.575	UMW-09 (8/11/93)		
		3.8	UMW-09 (6/24/94)		
		2.8	UMW-09 (11/12/98)		
		2.82	UMW-09 (8/1/02)		
		2.2	UMW-10 (1/12/90)		
		6.6	UMW-10 (3/7/90)		
		1.9	UMW-10 (8/29/90)		
		9.03	UMW-10 (6/28/91)		
		0.285	UMW-10 (10/28/92)		
		2.6	UMW-10 (4/14/93)		
		3.25	UMW-10 (9/16/93)		
		1.4	UMW-10 (6/24/94)		
		0.73	UMW-10 (11/12/98)		
		0.511	UMW-10 (8/1/02)		

Table 2-9

VOCs and SVOCs greater than Class I groundwater criteria (REC 3)-cont'd

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Benzene	4.4	UMW-26 (1/12/99)	0.005	REC 3 RAP
		3.2	UMW-26 (3/5/99)		
		1.22	UMW-26 (10/3/00)		
		3.48	UMW-26 (8/1/02)		
		1.7	GT-2 (11/9/98)		
		0.25	JM-039-GW (4/27/00)		
		1.8	TA3-1 (11/4/98)		
		0.097	TA3-2 (11/4/98)		
		0.67	TA3-3 (11/4/98)		
		0.084	TA3-4 (11/4/98)		
		0.741	04-P22 (2/4/04)		
		0.289	04-P23 (2/5/04)		
	Ethylbenzene	5.7	UMW-09 (1/12/90)	0.7	
		3.6	UMW-09 (3/7/90)		
		1.6	UMW-09 (8/29/90)		
		1.2	UMW-09 (6/28/91)		
		0.775	UMW-09 (8/11/93)		
		0.88	UMW-10 (1/12/90)		
		3.1	UMW-10 (3/7/90)		
		5.05	UMW-10 (6/28/91)		
		1.3	UMW-10 (4/14/93)		
		1.56	UMW-10 (9/16/93)		
		0.81	UMW-10 (11/12/98)		
		1.15	UMW-10 (8/1/02)		
		0.82	UMW-26 (1/12/99)		
		0.88	UMW-26 (3/5/99)		
		7.6	TA3-1 (11/4/98)		

Table 2-9

VOCs and SVOCs greater than Class I groundwater criteria (REC 3)-cont'd

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Toluene	30	UMW-09 (1/12/90)	1	REC 3 RAP
		25	UMW-09 (3/7/90)		
		9	UMW-09 (8/29/90)		
		8.967	UMW-09 (6/28/91)		
		2.9	UMW-09 (4/14/93)		
		5.055	UMW-09 (8/11/93)		
		1.5	UMW-09 (6/24/94)		
		3.8	UMW-09 (11/12/98)		
		8.96	UMW-09 (8/1/02)		
		3.5	UMW-10 (1/12/90)		
		24	UMW-10 (3/7/90)		
		27.41	UMW-10 (6/28/91)		
		7.3	UMW-10 (4/14/93)		
		5.17	UMW-10 (9/16/93)		
		1.9	UMW-10 (6/24/94)		
		3.1	UMW-10 (11/12/98)		
		2.13	UMW-10 (8/1/02)		
		3.2	UMW-26 (1/12/99)		
		3.5	UMW-26 (3/5/99)		
		3.5	TA3-1 (11/4/98)		
	Trichloroethene	0.079	UMW-26 (1/12/99)	0.005	Excluded as per approved CSIR
	Vinyl Chloride	0.0027	TA3-8 (11/4/98)	0.002	
	Xylenes, total	62	UMW-09 (1/12/90)	10	REC 3 RAP
		25.8	UMW-09 (3/7/90)		
		10.9	UMW-09 (8/29/90)		
		10.8	UMW-10 (1/12/90)		
		18.1	UMW-10 (3/7/90)		

Table 2-9

VOCs and SVOCs greater than Class I groundwater criteria (REC 3)-cont'd

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Benzo(a)anthracene	0.00058	GT-2 (11/9/98)	0.00013	REC 3 RAP
		0.00054	TA3-4 (11/6/98)		
		0.00031	TA3-8 (11/9/98)		
		0.00026	TA3-9 (11/9/98)		
	Benzo(a)pyrene	0.0025	E-5 (12/21/98)	0.0002	REC 3 RAP
		0.00042	GT-2 (11/9/98)		
		0.00053	TA3-4 (11/6/98)		
		0.0004	TA3-8 (11/9/98)		
		0.00044	TA3-9 (11/9/98)		
		0.0018	UMW-03A (11/12/98)		
	Benzo(b)fluoranthene	0.00067	GT-2 (11/9/98)	0.00018	REC 3 RAP
		0.00062	TA3-4 (11/6/98)		
		0.00046	TA3-8 (11/9/98)		
		0.00046	TA3-9 (11/9/98)		
		0.0019	UMW-03A (11/12/98)		
	Benzo(k)fluoranthene	0.0004	GT-2 (11/9/98)	0.00067	REC 3 RAP
		0.00067	TA3-3 (11/6/98)		
		0.00036	TA3-4 (11/6/98)		
		0.00025	TA3-8 (11/9/98)		
		0.00031	TA3-9 (11/9/98)		
		0.0077	UMW-03A (11/12/98)		

Table 2-9

VOCs and SVOCs greater than Class I groundwater criteria (REC 3)-cont'd

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 3	Dibenzo(a,h)anthracene	0.00062	GT-2 (11/9/98)	0.0003	Exposure route excluded (Table 3-6A)
		0.00025	UMW-03A (11/12/98)	0.0003	REC 3 RAP
	Indeno(1,2,3-cd)pyrene	0.0011	UMW-03A (11/12/98)	0.00043	REC 3 RAP
	Naphthalene	0.14	UMW-09 (11/12/98)	0.14	Exposure route excluded (Table 3-6B)
		0.28	UMW-10 (11/12/98)		
		0.22	UMW-26 (1/12/99)		

Table 2-10

VOCs and SVOCs greater than Class I groundwater criteria (REC 4)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 4	Benzene	0.025	UMW-04 (1/12/90)	0.005	Excluded as per approved CSIR
	Toluene	12	UMW-06 (3/7/90)	1	
		2.4	UMW-06 (6/28/91)		
		17.627	UMW-06 (10/28/92)		
		2.51	UMW-06 (8/11/93)		
		2.51	UMW-06 (9/16/93)		
		200	UMW-07 (3/7/90)		

Table 2-11

VOCs and SVOCs Greater than Class I Groundwater Criteria (RECs 5, 11)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 5	Benzene	0.011	C-1 (11/17/98)	0.005	Exposure route excluded (Table 3-7A)
		0.0069	TP-7 (11/11/98)		
		0.036	UMW-11 (1/12/90)		
		0.009	UMW-11 (11/1/95)		
		0.0077	03-P11 (12/3/03)		
	Ethylbenzene	0.79	UMW-11 (1/12/90)	0.7	
		1.9	UMW-11 (6/28/91)		
		1.276	UMW-11 (10/28/92)		
		0.84	UMW-12 (1/12/90)		
	Toluene	2.1	UMW-11 (6/28/91)	1	
	Trichloroethene	0.17	UMW-11 (6/28/91)	0.005	
	Xylenes, total	16.138	UMW-11 (10/28/92)	10	
	Benzo(a)pyrene	0.0018	TP-1 (11/11/98)	0.0002	Exposure route excluded (Table 3-7B)
	Benzo(k)fluoranthene	0.00084	TP-1 (11/11/98)	0.00017	
	Dibenzo(a,h)anthracene	0.00075	TP-1 (11/11/98)	0.00075	
	Naphthalene	0.23	TP-7 (11/11/98)	0.14	
	Bis(2-ethylhexyl) phthalate	0.016	03-P9 (12/3/03)	0.006	
		0.02	03-P11 (12/3/03)		
REC 11	Benzo(a)anthracene	0.00083	IMS-3 (11/9/93)	0.00013	Exposure route excluded (Table 3-8)

Table 2-12

VOCs and SVOCs greater than Class I groundwater Criteria (REC 12)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 12	Benzene	0.0424	02-18 (6/28/02)	0.005	Exposure route excluded (Table 3-9B)
		0.013	A-2 (11/17/98)		
		0.0098	UMW-27 (8/1/02)		
		0.115	UMW-30 (8/1/02)		
		0.0626	UMW-42 (12/2/03)		
	Ethylbenzene	0.84	A-2 (11/17/98)	0.7	
		1.08	UMW-30 (8/1/02)		
		0.77	03-39(P) (11/18/03)		
	Toluene	63.9	02-18 (6/28/02)	1	
		207	UMW-30 (8/1/02)		
		16.6	UMW-42 (12/2/03)		
		2.3	03-31(P) (11/18/03)		
		11	03-39(P) (11/18/03)		
	3&4-Methylphenol	0.084	UMW-42 (12/2/03)	0.035	Exposure route excluded (Table 3-9C)

Table 2-13

VOCs and SVOCs greater than Class I Groundwater Criteria (REC 31, 32, 38)

Area	Substance	Concentration (mg/L)	Monitoring Well (Sample Date)	Class I GW Criteria (mg/L)	Remedial Action to Address Exposure
REC 32	Benzo(a)anthracene	0.0046	TP-3 (11/11/98)	0.00013	Exposure route excluded (Table 3-10)
	Benzo(a)pyrene	0.0044	TP-3 (11/11/98)	0.0002	
	Benzo(b)fluoranthene	0.0042	TP-3 (11/11/98)	0.00018	
	Benzo(k)fluoranthene	0.0027	TP-3 (11/11/98)	0.00017	
	Chrysene	0.0026	TP-3 (11/11/98)	0.0015	
	Dibenzo(a,h)anthracene	0.00068	TP-3 (11/11/98)	0.0003	
	Indeno(1,2,3-cd)pyrene	0.0038	TP-3 (11/11/98)	0.00043	
REC 38	Vinyl Chloride	0.0027	UMW-34 (12/3/03)	0.002	Exposure route excluded (Table 3-11)
		0.0031	UMW-34 (4/19/04)		

Table 3-1A
R-14 Analysis: 2-Methylnaphthalene in REC 2/16 (Soil Boring 03-01)
Predicted Concentrations of COCs in Groundwater from Soil to Groundwater Partitioning

Site: Johns Manville, Waukegan, IL
REC ID: REC 2/16
COC: 2-Methylnaphthalene (Boring 03-01)

Equation R14:
Leaching Factor Equation for Soil Component of the Groundwater Ingestion Route

$$LF_{sw} = \frac{\rho_s \bullet \frac{cm^3 \cdot kg}{L \cdot g}}{\left[\theta_{ws} + (k_s \bullet \rho_s) + (H' \bullet \theta_{as})\right] \bullet \left[1 + \frac{(U_{gw} \bullet \delta_{gw})}{(I \bullet W)}\right]}$$

Site Specific Parameters:

Soil Bulk Density	ρ_s	g/cm^3	1.500	Default value
Volumetric water content in vadose zone soils	θ_{ws}	cm^3_{water}/cm^3_{soil}	0.300	$(w.\rho_s/\rho_w)$ - R22; Default for subsurface soils
Volumetric air content in vadose zone soils	θ_{as}	cm^3_{air}/cm^3_{soil}	0.020	$\theta_T - \theta_{ws}$ - R21
Soil Water Sorption Coefficient	k_s	cm^3_{water}/g_{soil}		Product of K_{oc} & f_{oc} - (Chemical-specific)
Avg. Soil Moisture content	w	g_w/g_s	0.200	Default for subsurface soil
Water Density	ρ_w	g/cm^3	1.000	
Organic carbon content of soil	f_{oc}	g/g	0.0020	Default for subsurface soil
Total soil porosity	θ_T	cm^3/cm^3_{soil}	0.3200	$(\theta_{ws} + \theta_{as})$ - R23; also default value for sand
Aquifer Hydraulic Conductivity	K	cm/yr	504576	site specific value of 1.6E-2 cm/s converted to cm/yr
Hydraulic Gradient	i	cm/cm	0.00904	Site Specific value for REC 2/16 to North site boundary
Groundwater Darcy Velocity	U_{gw}	cm/yr	4561.36704	Product of K & i
Infiltration Rate	I	cm/yr	30.0000	Default
Source Area width parallel to GW direction	W	cm	1219.200	40 ft. based on distance to ND borings (Appendix F, Fig. F-1)
Groundwater Mixing Zone Thickness	δ_{gw}	cm	200.000	Default

Chemical-Specific Parameters and Results

Chemical	Soil Concentration (mg/kg)	Org C Partition Coeff., K_{oc} (L/kg)	Henry's Law Constant, H' (cm^3_{water}/cm^3_{air})	R14 Leaching Factor (mg/l)/(mg/kg)	Leaching Concentration (mg/l)	Retardation Factor $[1+(K_{oc}\, f_{oc}\, \rho_s)/\theta_T]$
2-Methylnaphthalene	17.800	2450.000	0.0204	0.007557977	**0.13453**	23.96875

Table 3-1B
R-14 Analysis: 2-Methylnaphthalene in REC 2/16 (Soil Boring 03-P2)
Predicted Concentrations of COCs in Groundwater from Soil to Groundwater Partitioning

Site: *Johns Manville, Waukegan, IL*
REC ID: REC 2/16
COC: 2-Methylnaphthalene (Boring 03-P2)

Equation R14:
Leaching Factor Equation for Soil Component of the Groundwater Ingestion Route

$$LF_{sw} = \frac{\rho_s \bullet \frac{cm^3 \cdot kg}{L \cdot g}}{\left[\theta_{ws} + (k_s \bullet \rho_s) + (H' \bullet \theta_{as})\right] \bullet \left[1 + \frac{(U_{gw} \bullet \delta_{gw})}{(I \bullet W)}\right]}$$

Site Specific Parameters:

Soil Bulk Density	ρ_s	g/cm^3	1.500	Default value
Volumetric water content in vadose zone soils	θ_{ws}	cm^3_{water}/cm^3_{soil}	0.300	$(w.\rho_s/\rho_w)$ - R22; Default for subsurface soils
Volumetric air content in vadose zone soils	θ_{as}	cm^3_{air}/cm^3_{soil}	0.020	$\theta_T - \theta_{ws}$ - R21
Soil Water Sorption Coefficient	k_s	cm^3_{water}/g_{soil}		Product of K_{oc} & f_{oc} - (Chemical-specific)
Avg. Soil Moisture content	w	g_w/g_s	0.200	Default for subsurface soil
Water Density	ρ_w	g/cm^3	1.000	
Organic carbon content of soil	f_{oc}	g/g	0.0020	Default for subsurface soil
Total soil porosity	θ_T	cm^3/cm^3_{soil}	0.3200	$(\theta_{ws} + \theta_{as})$ - R23; also default value for sand
Aquifer Hydraulic Conductivity	K	cm/yr	504576	site specific value of 1.6E-2 cm/s converted to cm/yr
Hydraulic Gradient	i	cm/cm	0.00904	Site Specific value for REC 2/16 to North site boundary
Groundwater Darcy Velocity	U_{gw}	cm/yr	4561.36704	Product of K & i
Infiltration Rate	I	cm/yr	30.0000	Default
Source Area width parallel to GW direction	W	cm	3657.600	120 ft. based on distance to ND borings (Appendix F, Fig. F-1)
Groundwater Mixing Zone Thickness	δ_{gw}	cm	200.000	Default

Chemical-Specific Parameters and Results

Chemical	Soil Concentration (mg/kg)	Org C Partition Coeff., K_{oc} (L/kg)	Henry's Law Constant, H' (cm^3_{water}/cm^3_{air})	R14 Leaching Factor (mg/l)/(mg/kg)	Leaching Concentration (mg/l)	Retardation Factor $[1+(K_{oc}\, f_{oc}\, \rho_s)/\theta_T]$
2-Methylnaphthalene	9.390	2450.000	0.0204	0.021050995	**0.19767**	23.96875

Table 3-1C
R-26 Analysis: 2-Methylnaphthalene in REC 2 (Boring 03-01)

Site: Johns Manville, Waukegan, IL
REC ID: REC 2/16
COC: 2-Methylnaphthalene (Boring 03-01)
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	450	ft.	Distance from planar source to target of concern
	13716	cm	
S_w	40	ft.	width of planar groundwater source
	1219	cm	
S_d	12	ft.	depth of planar groundwater source
	366	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.009	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Calculated Values

Parameter	Value	Units	Description
α_x	1371.6	cm	dispersivity in x direction (Eqn R16)
α_y	457.2	cm	dispersivity in y direction (Eqn R17)
α_z	68.6	cm	dispersivity in z direction (Eqn R18)
U	39.4	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from 03-P1 north to North Site Boundary
Sw	Source radius is set to half the distance to nearest ND value (Appendix F, Fig. F-1)
Sd	Source depth is set to 11.5 feet, the well is screened from 1.5 to 11.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.009

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ*	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
2-methylnaphthalene (Table 3-1A)	**0.135**	0.0005	**3.3E-03**	2.8E-02	1.4E-01

*First order degradation constant for 2-methylnaphthalene determined as described in Appendix F

Table 3-1D
R-26 Analysis: 2-Methylnaphthalene in REC 2 (Boring 03-P2)

Site: Johns Manville, Waukegan, IL
REC ID: REC 2/16
COC: 2-Methylnaphthalene (Boring 03-P2)
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	120	ft.	width of planar groundwater source
	3658	cm	
S_d	9	ft.	depth of planar groundwater source
	274	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.009	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ*	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
2-methylnaphthalene (Table 3-1B)	**0.198**	0.0005	**2.3E-02**	2.8E-02	1.4E-01

*First order degradation constant for 2-methylnaphthalene determined as described in Appendix F

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	39.4	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from 03-P1 north to North Site Boundary
Sw	Source radius is set to half the distance to nearest ND value (Appendix F, Fig. F-1)
Sd	Source depth is set to 11.5 feet, the well is screened from 1.5 to 11.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.009

Table 3-2
R-26 Analysis: SPLP Lead in REC 3 (04-HA2)

Site: Johns Manville, Waukegan, IL
REC ID: REC 3
COC: Lead (Soil SPLP)
Receptor: West Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	210	ft.	Distance from planar source to target of concern
	6401	cm	
S_w	68	ft.	width of planar groundwater source
	2073	cm	
S_d	13	ft.	depth of planar groundwater source
	396	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0038	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Lead (Soil SPLP leachate) (04-ha2)	**0.022**	0	**4.8E-03**	7.5E-03	1.0E-01

Calculated Values

Parameter	Value	Units	Description
α_x	640.1	cm	dispersivity in x direction (Eqn R16)
α_y	213.4	cm	dispersivity in y direction (Eqn R17)
α_z	32.0	cm	dispersivity in z direction (Eqn R18)
U	16.6	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Downgradient distance is equal to the distance between 04-ha2 and the property line northwest of 04-ha2.
Sw	Source width is based upon the estimated width of the soil impacts in the vicinity of 04-ha2 (Appendix F, Figure F-2).
Sd	Source depth is equal to 1/2 the maximum sand thickness in SMW-02 (31.5 ft. depth to clay - 5.5 ft. depth to water = 26 ft. * 1/2 = 13 ft.). Assumes the highest concentractions of lead are in the upper half of the aquifer.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): (UMW-10 - UMW-08 elevation)/210=585.7-584.9/210=0.0038 ft/ft
λ	For inorganics, λ=0, since inorganics do not have a first order degradation constant

Table 3-3A
R-14 Analysis: REC 4 VOCs in Soil
Predicted Concentrations of COCs in Groundwater from Soil to Groundwater Partitioning

Site: Johns Manville, Waukegan, IL
REC ID: REC 4
COC: VOCs in Soil

Equation R14:
Leaching Factor Equation for Soil Component of the Groundwater Ingestion Route

$$LF_{sw} = \frac{\rho_s \bullet \frac{cm^3 \cdot kg}{L \cdot g}}{\left[\theta_{ws} + (k_s \bullet \rho_s) + (H' \bullet \theta_{as})\right] \bullet \left[1 + \frac{(U_{gw} \bullet \delta_{gw})}{(I \bullet W)}\right]}$$

Site Specific Parameters:

Soil Bulk Density	ρ_s	g/cm^3	1.500	Default value
Volumetric water content in vadose zone soils	θ_{ws}	cm^3_{water}/cm^3_{soil}	0.300	$(w.\rho_s/\rho_w)$ - R22; Default for subsurface soils
Volumetric air content in vadose zone soils	θ_{as}	cm^3_{air}/cm^3_{soil}	0.020	$\theta_T - \theta_{ws}$ - R21
Soil Water Sorption Coefficient	k_s	cm^3_{water}/g_{soil}	see below	Product of K_{oc} & f_{oc} - (Chemical-specific)
Avg. Soil Moisture content	w	g_w/g_s	0.200	Default for subsurface soil
Water Density	ρ_w	g/cm^3	1.000	
Organic carbon content of soil	f_{oc}	g/g	0.0020	Default for subsurface soil
Total soil porosity	θ_T	cm^3/cm^3_{soil}	0.3200	$(\theta_{ws} + \theta_{as})$ - R23; also default value for sand
Aquifer Hydraulic Conductivity	K	cm/yr	126144	site specific value of 4.0E-3 cm/s converted to cm/yr
Hydraulic Gradient	i	cm/cm	0.006	Site Specific value
Groundwater Darcy Velocity	U_{gw}	cm/yr	756.864	Product of K & i
Infiltration Rate	I	cm/yr	30.0000	Default
Source Area width parallel to GW direction	W	cm	457.200	1/2 distance to nearest ND value (Boring 03-58) = 15 ft.
Groundwater Mixing Zone Thickness	δ_{gw}	cm	200.000	Default

Chemical-Specific Parameters and Results

Chemical	Soil Concentration (mg/kg)	Org C Partition Coeff., K_{oc} (L/kg)	Henry's Law Constant, H' (cm^3_{water}/cm^3_{air})	R14 Leaching Factor (mg/l)/(mg/kg)	Leaching Concentration (mg/l)	Retardation Factor $[1+(K_{oc}\, f_{oc}\, \rho_s)/\theta_T]$
Ethylbenzene	18	363	0.323	0.0893	**1.608**	4.40
Benzene	0.244	58.9	0.228	0.2590	**0.063**	1.55

Table 3-3B
R-26 Analysis: REC 4 VOCs

Site: Johns Manville, Waukegan, IL
REC ID: REC 4
COC: VOCs in Soil
Receptor: South Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	120	ft.	Distance from planar source to target of concern
	3658	cm	
S_w	15	ft.	width of planar groundwater source
	457	cm	
S_d	5	ft.	depth of planar groundwater source
	152	cm	
K	4.0E-03	cm/s	Average hydraulic conductivity for site (CSIR report)
	345.6	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 sampling event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Calculated Values

Parameter	Value	Units	Description
α_x	365.8	cm	dispersivity in x direction (Eqn R16)
α_y	121.9	cm	dispersivity in y direction (Eqn R17)
α_z	18.3	cm	dispersivity in z direction (Eqn R18)
U	6.5	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from STF-1 to south property boundary
Sw	Source width is set to half the distance to ND value (Appendix F, Figure F-3).
Sd	Source depth is set to the estimated depth of the excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Ethylbenzene (Boring STF-1, Eqn R14)	**1.61**	0.003	**2.3E-02**	7.0E-01	1.0E+00
Benzene (Boring 03-13, Eqn R14)	**0.063**	0.0009	**2.4E-03**	2.5E-03	5.0E-03

Table 3-4A
R-14 Analysis: REC 12 Organics
Predicted Concentrations of COCs in Groundwater from Soil to Groundwater Partitioning

Site: Johns Manville, Waukegan, IL
REC ID: REC 12
COC: VOCs in Soil (outside proposed excavation area in RAP)

Equation R14:
Leaching Factor Equation for Soil Component of the Groundwater Ingestion Route

$$LF_{sw} = \frac{\rho_s \bullet \frac{cm^3 \cdot kg}{L \cdot g}}{\left[\theta_{ws} + (k_s \bullet \rho_s) + (H' \bullet \theta_{as})\right] \bullet \left[1 + \frac{(U_{gw} \bullet \delta_{gw})}{(I \bullet W)}\right]}$$

Site Specific Parameters:

Soil Bulk Density	ρ_s	g/cm^3	1.500	Default value
Volumetric water content in vadose zone soils	θ_{ws}	cm^3_{water}/cm^3_{soil}	0.300	$(w.\rho_s/\rho_w)$ - R22; Default for subsurface soils
Volumetric air content in vadose zone soils	θ_{as}	cm^3_{air}/cm^3_{soil}	0.020	$\theta_T - \theta_{ws}$ - R21
Soil Water Sorption Coefficient	k_s	cm^3_{water}/g_{soil}		Product of K_{oc} & f_{oc} - (Chemical-specific)
Avg. Soil Moisture content	w	g_w/g_s	0.200	Default for subsurface soil
Water Density	ρ_w	g/cm^3	1.000	
Organic carbon content of soil	f_{oc}	g/g	0.0020	Default for subsurface soil
Total soil porosity	θ_T	cm^3/cm^3_{soil}	0.3200	$(\theta_{ws} + \theta_{as})$ - R23; also default value for sand
Aquifer Hydraulic Conductivity	K	cm/yr	504576	site specific value of 1.6E-2 cm/s converted to cm/yr
Hydraulic Gradient	i	cm/cm	0.0033	Site Specific value
Groundwater Darcy Velocity	U_{gw}	cm/yr	1665.1008	Product of K & i
Infiltration Rate	I	cm/yr	30.0000	Default
Source Area width parallel to GW direction	W	cm	1828.800	Assumed 60 ft. source width for REC 12 VOC areas
Groundwater Mixing Zone Thickness	δ_{gw}	cm	200.000	Default

Chemical-Specific Parameters and Results

Chemical	Soil Concentration (mg/kg)	Org C Partition Coeff., K_{oc} (L/kg)	Henry's Law Constant, H' (cm^3_{water}/cm^3_{air})	R14 Leaching Factor (mg/l)/(mg/kg)	Leaching Concentration (mg/l)	Retardation Factor $[1+(K_{oc}\, f_{oc}\, \rho_s)/\theta_T]$
Benzene	0.093	58.900	0.228	0.440856162	**0.04100**	1.5521875
Ethylbenzene	27.200	363.000	0.323	0.1520405	**4.13550**	4.403125
Toluene	650.000	182.000	0.272	0.249185423	**161.97052**	2.70625
2-methylphenol	0.508	91.200	0.0000492	0.369885064	**0.18790**	1.855

Table 3-4B
R-26 Analysis: REC 12 Organics

Site: Johns Manville, Waukegan, IL
REC ID: REC 12
COC: Soil VOCs
Receptor: South Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	60	ft.	width of planar groundwater source
	1829	cm	
S_d	12	ft.	depth of planar groundwater source
	366	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0033	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzene (UMW-41 Soil by R14)	**0.041**	0.0009	**2.2E-03**	3.5E-02	3.5E-02
Ethylbenzene (03-76 soil by R14)	**4.14**	0.003	**7.6E-02**	7.0E-01	1.0E+00
Toluene(Tier 1 inhalation soil std. by R14)	**162**	0.011	**1.3E-01**	1.0E+00	2.5E+00
3&4-methylphenol (03-55 soil by R14)	**0.188**	0.0495	**2.7E-08**	3.5E-01	3.5E-01

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	14.43	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-42 south-southeast to property boundary.
Sw	Source width is set to half the distance to the nearest ND value (Fig. 4-5).
Sd	Source depth is set to 12 feet, the well is screened from 2 to 12 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.0033

Table 3-5A
R-26 Analysis: REC 2/16 PNAs detected in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 2
COC: PNA
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	525	ft.	Distance from planar source to target of concern
	16002	cm	
S_w	9	ft.	width of planar groundwater source
	274	cm	
S_d	10	ft.	depth of planar groundwater source
	305	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.007	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzo(a)anthracene (E-5)	**0.005**	0.00051	**1.5E-05**	1.3E-04	6.5E-04
Benzo(a)pyrene (E-5)	**0.0025**	0.00065	**7.2E-06**	2.0E-04	2.0E-03
			0.0E+00		
			0.0E+00		

Calculated Values

Parameter	Value	Units	Description
α_x	1600.2	cm	dispersivity in x direction (Eqn R16)
α_y	533.4	cm	dispersivity in y direction (Eqn R17)
α_z	80.0	cm	dispersivity in z direction (Eqn R18)
U	30.6	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from E-5 north to North Site Boundary
Sw	Source width is set to half the distance to nearest ND value (UMW-37)
Sd	Source depth is set to 10 feet, estimated depth of excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.007

Table 3-5B
R-26 Analysis: REC 2/16 2-Methylnaphthalene detected in Groundwater (03-P1)

Site: Johns Manville, Waukegan, IL
REC ID: REC 2/16
COC: 2-Methylnaphthalene
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	76	ft.	width of planar groundwater source
	2316	cm	
S_d	11.5	ft.	depth of planar groundwater source
	351	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.009	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	39.4	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from 03-P1 north to North Site Boundary
Sw	Source radius is set to half the distance to nearest ND value (03-P1) or 38 ft.
Sd	Source depth is set to 11.5 feet, the well is screened from 1.5 to 11.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.009

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ*	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
2-methylnaphthalene (03-P1, 1/04)	**0.213**	0.0005	**2.1E-02**	2.8E-02	1.4E-01
2-methylnaphthalene (03-P1, 12/03)	**0.049**	0.0005	**4.9E-03**	2.8E-02	1.4E-01

*First order degradation constant for 2-methylnaphthalene determined as described in Appendix F

Table 3-6A
R-26 Analysis: REC 3 Dibenzo(a,h)anthracene in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 3
COC: Dibenzo(a,h)anthracene (GT-2)
Receptor: West Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	80	ft.	Distance from planar source to target of concern
	2438	cm	
S_w	35	ft.	width of planar groundwater source
	1067	cm	
S_d	8.5	ft.	depth of planar groundwater source
	259	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Dibenzo(a,h)anthracene (GT-2)	**0.00062**	0.00037	**2.6E-04**	3.0E-04	1.5E-03

Calculated Values

Parameter	Value	Units	Description
α_x	243.8	cm	dispersivity in x direction (Eqn R16)
α_y	81.3	cm	dispersivity in y direction (Eqn R17)
α_z	12.2	cm	dispersivity in z direction (Eqn R18)
U	26.2	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance of GT-2 to west property line.
Sw	Source width is set to estimated plume width (Appendix G, Figure G-3)
Sd	Source depth is set to 8.5 feet, the well is screened from 3.5 to 8.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Table 3-6B
R-26 Analysis: REC 3 Naphthalene in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 3
COC: Napthalene (UMW-10, UMW-26)
Receptor: West Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	175	ft.	Distance from planar source to target of concern
	5334	cm	
S_w	100	ft.	width of planar groundwater source
	3048	cm	
S_d	8.5	ft.	depth of planar groundwater source
	259	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Naphthalene (UMW-10)	**0.28**	0.0027	**4.6E-02**	1.4E-01	2.2E-01
Naphthalene (UMW-26)	**0.22**	0.0027	**3.6E-02**	1.4E-01	2.2E-01

Calculated Values

Parameter	Value	Units	Description
α_x	533.4	cm	dispersivity in x direction (Eqn R16)
α_y	177.8	cm	dispersivity in y direction (Eqn R17)
α_z	26.7	cm	dispersivity in z direction (Eqn R18)
U	26.2	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance of UMW-10 to west property line.
Sw	Source width is set to estimated plume width (Appendix G, Figure G-3)
Sd	Source depth is set to 8.5 feet, the well is screened from 3.5 to 8.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Table 3-6C
R-26 Analysis: REC 3 Naphthalene in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 3
COC: Napthalene (UMW-10, UMW-26)
Receptor: West Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	175	ft.	Distance from planar source to target of concern
	5334	cm	
S_w	100	ft.	width of planar groundwater source
	3048	cm	
S_d	8.5	ft.	depth of planar groundwater source
	259	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Naphthalene (UMW-10)	**0.28**	0.0027	**4.6E-02**	1.4E-01	2.2E-01
Naphthalene (UMW-26)	**0.22**	0.0027	**3.6E-02**	1.4E-01	2.2E-01

Calculated Values

Parameter	Value	Units	Description
α_x	533.4	cm	dispersivity in x direction (Eqn R16)
α_y	177.8	cm	dispersivity in y direction (Eqn R17)
α_z	26.7	cm	dispersivity in z direction (Eqn R18)
U	26.2	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance of UMW-10 to west property line.
Sw	Source width is set to estimated plume width (Appendix G, Figure G-3)
Sd	Source depth is set to 8.5 feet, the well is screened from 3.5 to 8.5 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Table 3-7A
R-26 Analysis: REC 5 VOCs in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 5
COC: VOCs
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	1100	ft.	Distance from planar source to target of concern
	33528	cm	
S_w	140	ft.	width of planar groundwater source
	4267	cm	
S_d	10	ft.	depth of planar groundwater source
	305	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 sampling event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Calculated Values

Parameter	Value	Units	Description
α_x	3352.8	cm	dispersivity in x direction (Eqn R16)
α_y	1117.6	cm	dispersivity in y direction (Eqn R17)
α_z	167.6	cm	dispersivity in z direction (Eqn R18)
U	26.2	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-11 north to North Site Boundary
Sw	Source width is set to half the distance to the nearest ND value (UMW-12).
Sd	Source depth is set to the estimated depth of the excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzene (UMW-11, 1/90)	**0.036**	0.0009	**1.8E-04**	5.0E-03	2.5E-02
Benzene (UMW-11, 11/95)	**0.009**	0.0009	**4.5E-05**	5.0E-03	2.5E-02
Benzene (C-1, 11/98)	**0.011**	0.0009	**5.5E-05**	5.0E-03	2.5E-02
Benzene (TP-7, 11/98)	**0.0069**	0.0009	**3.4E-05**	5.0E-03	2.5E-02
Ethylbenzene (UMW-11, 1/90)	**0.79**	0.003	**5.8E-04**	7.0E-01	1.0E+00
Ethylbenzene (UMW-11, 6/91)	**1.9**	0.003	**1.4E-03**	7.0E-01	1.0E+00
Ethylbenzene (UMW-11, 10/92)	**1.276**	0.003	**9.3E-04**	7.0E-01	1.0E+00
Ethylbenzene (UMW-12, 1/90)	**0.84**	0.003	**6.2E-04**	7.0E-01	1.0E+00
Toluene (UMW-11, 6/91)	**1.84**	0.011	**6.2E-04**	1.0E+00	2.5
Trichloroethene (UMW-11, 6/91)	**0.17**	0.00042	**6.2E-04**	5.0E-03	0.025
Xylenes, Total (UMW-11, 10/92)	**16.138**	0.0019	**6.2E-04**	1.0E+01	10
Benzene (03-P11, 12/03)	**0.0077**	0.009	**6.2E-04**	5.0E-03	2.5E-02

Table 3-7B
R-26 Analysis: REC 5 SVOCs in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 5
COC: Bis-2-ethylhexylphthalate and PNAs
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	1100	ft.	Distance from planar source to target of concern
	33528	cm	
S_w	100	ft.	width of planar groundwater source
	3048	cm	
S_d	10	ft.	depth of planar groundwater source
	305	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.006	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
bis-2-ethylhexylphthalate (03-P11)	**0.020**	0.0018	**2.9E-05**	6.0E-03	6.0E-02
Benzo(a)pyrene (TP-1)	**0.0018**	0.00065	**8.4E-06**	2.0E-04	2.0E-03
Benzo(k)fluoranthene(TP-1)	**0.00084**	0.00016	**7.0E-06**	1.7E-04	8.5E-04
Dibenzo(a,h)anthracene (TP-1)	**0.00075**	0.00037	**4.8E-06**	3.0E-04	1.5E-03
Naphthalene (TP-7)	**0.23**	0.0027	**1.5E-04**	1.4E-01	2.2E-01

Calculated Values

Parameter	Value	Units	Description
α_x	3352.8	cm	dispersivity in x direction (Eqn R16)
α_y	1117.6	cm	dispersivity in y direction (Eqn R17)
α_z	167.6	cm	dispersivity in z direction (Eqn R18)
U	26.2	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from 03-P11, TP-1 and TP-7 north to to North Site Boundary.
Sw	Source width is set to estimated width of excavation.
Sd	Source depth is set to the estimated depth of the excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Table 3-8
R-26 Analysis: REC 11 PNAs in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 11
COC: Benzo(a)anthracene
Receptor: East Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	750	ft.	Distance from planar source to target of concern
	22860	cm	
S_w	105	ft.	width of planar groundwater source
	3200	cm	
S_d	10	ft.	depth of planar groundwater source
	305	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0033	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzo(a)anthracene	***0.00083***	*0.00051*	***8.9E-06***	1.3E-04	6.5E-04

Calculated Values

Parameter	Value	Units	Description
α_x	2286.0	cm	dispersivity in x direction (Eqn R16)
α_y	762.0	cm	dispersivity in y direction (Eqn R17)
α_z	114.3	cm	dispersivity in z direction (Eqn R18)
U	14.4	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-36 southeast to property boundary.
Sw	Source width is set to estimated width of excavation.
Sd	Source depth is set to the estimated depth of the excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.0033

Table 3-9A
R-26 Analysis: REC 12 Lead in Groundwater (UMW-42)

Site: Johns Manville, Waukegan, IL
REC ID: REC 12
COC: Lead
Receptor: South Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	100	ft.	width of planar groundwater source
	3048	cm	
S_d	12	ft.	depth of planar groundwater source
	366	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0033	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Lead (UMW-42)	**0.026**	0	**3.9E-03**	7.5E-03	1.0E-01

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	14.4	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-42 south-southeast to property boundary.
Sw	Source width is set to estimated width of plume.
Sd	Source depth is set to 12 feet, the well is screened from 2 to 12 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.0033
λ	For inorganics, λ=0, since inorganics do not have a first order degradation constant

Table 3-9B
R-26 Analysis: REC 12 VOCs in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 12
COC: VOCs
Receptor: South Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	68	ft.	width of planar groundwater source
	2073	cm	
S_d	12	ft.	depth of planar groundwater source
	366	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0033	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzene (UMW-42, 12/2/03)	**0.0626**	0.0009	**3.9E-03**	3.5E-02	3.5E-02
Toluene(UMW-42, 12/2/03)	**16.6**	0.011	**1.5E-02**	1.0E+00	2.5
					2.5

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	14.43	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-42 south-southeast to property boundary.
Sw	Source width is set to half the distance to the nearest ND value (UMW-38).
Sd	Source depth is set to 12 feet, the well is screened from 2 to 12 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.0033

Table 3-9C
R-26 Analysis: REC 12 3&4-Methylphenol in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 12
COC: 3&4-Methylphenol (UMW-42)
Receptor: South Property Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	300	ft.	Distance from planar source to target of concern
	9144	cm	
S_w	68	ft.	width of planar groundwater source
	2073	cm	
S_d	12	ft.	depth of planar groundwater source
	366	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.0033	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
3&4-methylphenol (UMW-42)	**0.084**	0.0495	**1.3E-08**	3.5E-02	3.5E-02

Calculated Values

Parameter	Value	Units	Description
α_x	914.4	cm	dispersivity in x direction (Eqn R16)
α_y	304.8	cm	dispersivity in y direction (Eqn R17)
α_z	45.7	cm	dispersivity in z direction (Eqn R18)
U	14.43	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-42 south-southeast to property boundary.
Sw	Source width is set to half the distance to the nearest ND value (UMW-38).
Sd	Source depth is set to 12 feet, the well is screened from 2 to 12 feet.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.0033

Table 3-10
R-26 Analysis: REC 32 PNAs in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 32
COC: PNA
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	790	ft.	Distance from planar source to target of concern
	24079	cm	
S_w	75	ft.	width of planar groundwater source
	2286	cm	
S_d	15	ft.	depth of planar groundwater source
	457	cm	
K	1.6E-02	cm/s	Average hydraulic conductivity for site (CSIR report)
	1399.68	cm/d	
I	0.007	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Benzo(a)anthracene (TP-3)	**0.0046**	0.00051	**6.9E-05**	1.3E-04	6.5E-04
Benzo(a)pyrene (TP-3)	**0.0044**	0.00065	**5.9E-05**	2.0E-04	2.0E-03
Benzo(b)fluoranthene(TP-3)	**0.0042**	0.00057	**6.0E-05**	1.8E-04	9.0E-04
Benzo(k)fluoranthene(TP-3)	**0.0027**	0.00016	**5.2E-05**	1.7E-04	8.5E-04
Chrysene (TP-3)	**0.0026**	0.00035	**4.4E-05**	1.5E-03	7.5E-03
Dibenzo(a,h)anthracene (TP-3)	**0.00068**	0.00037	**1.1E-05**	3.0E-04	1.5E-03
Indeno(1,2,3-cd)pyrene (TP-3)	**0.0038**	0.00047	**5.8E-05**	4.3E-04	2.2E-03

Calculated Values

Parameter	Value	Units	Description
α_x	2407.9	cm	dispersivity in x direction (Eqn R16)
α_y	802.6	cm	dispersivity in y direction (Eqn R17)
α_z	120.4	cm	dispersivity in z direction (Eqn R18)
U	30.6	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from REC 32 north to to North Site Boundary.
Sw	Source width is set to half the distance to the nearest ND value (UMW-03).
Sd	Source depth is set to the estimated depth of the excavation.
K	Average hydraulic conductivity for shallow wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.007

Table 3-11
R-26 Analysis: REC 38 Vinyl Chloride in Groundwater

Site: Johns Manville, Waukegan, IL
REC ID: REC 38
COC: Vinyl chloride
Receptor: North Site Boundary

Equation R26:

$$C_{(x)} = C_{source} \bullet \exp\left[\left(\frac{X}{2\alpha_x}\right) \bullet \left(1 - \sqrt{1 + \frac{4\lambda \bullet \alpha_x}{U}}\right)\right] \bullet erf\left[\frac{S_w}{4 \bullet \sqrt{\alpha_y \bullet X}}\right] \bullet erf\left[\frac{S_d}{2 \bullet \sqrt{\alpha_z \bullet X}}\right]$$

Where,
$C_{(x)}$ = concentration of contaminant in groundwater at distance X from the source
C_{source} = greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, in mg/L (ppm)
X = distance from planar source to the location of concern, along the centerline of the plume in the direction of groundwater flow
$\alpha_{(x)}$ = dispersivity in the x direction
$\alpha_{(y)}$ = dispersivity in the y direction
$\alpha_{(z)}$ = dispersivity in the z direction
U = Specific discharge (cm/d)
$S_{(w)}$ = horizontal source width (cm)
$S_{(d)}$ = vertical source width (cm)
λ = chemical-specific first order degradation constant (d^{-1})

Input Parameters

Parameter	Value	Units	Description
X	940	ft.	Distance from planar source to target of concern
	28651	cm	
S_w	400	ft.	width of planar groundwater source
	12192	cm	
S_d	34	ft.	depth of planar groundwater source
	1036	cm	
K	4.0E-03	cm/s	Average hydraulic conductivity for site (CSIR report)
	346.464	cm/d	
I	0.0065	ft/ft	hydraulic gradient from July 2004 monitoring event
θ_T	0.32	cm^3/cm^3_{soil}	Total soil porosity

Contaminant Concentrations in Groundwater

Contaminant (Location)	C_{source}	λ	$C_{(x)}$	GW-Class I	GW-Class II
	mg/L	d^{-1}	mg/L	mg/L	mg/L
Vinyl Chloride (UMW-34)	**0.0031**	0.00024	**2.1E-04**	2.0E-03	1.0E-02

Calculated Values

Parameter	Value	Units	Description
α_x	2865.1	cm	dispersivity in x direction (Eqn R16)
α_y	955.0	cm	dispersivity in y direction (Eqn R17)
α_z	143.3	cm	dispersivity in z direction (Eqn R18)
U	7.04	cm/d	specific discharge (R19)

Assumptions

Parameter	Description
X	Distance from UMW-34 north to the North Site Boundary.
Sw	Source width is set to half the distance to the nearest deep well ND value (UMW-31).
Sd	Source depth is set to 34 feet, the well is screened from 24 to 34 feet.
K	Average hydraulic conductivity for deep wells at site (CSIR report)
I	Hydraulic gradient from July 2004 monitoring event (steepest gradient): 0.006

Table 3-12

Background Groundwater Quality

Monitoring Well	Substance	Sample size (n)	Mean Concentration (mg/L)	Maximum Concentration (mg/L)	Shapiro-Wilk test statistic	5% Critical value*
UMW-14	Iron	6	0.28	0.57	0.864	0.788
	Manganese	6	0.12	0.23	0.928	0.788
UMW-28	Iron	6	5.97	7.18	0.958	0.788
	Manganese	6	0.27	0.307	0.966	0.788

Note: *From 35 IAC 742, Appendix A, Table D

Table 3-13
Soil Remediation Objectives

Area	Substance	Remediation Objective (mg/kg)	Remedial Action to Address Exposure
REC 2/16	Total Petroleum Hydrocarbon	No free product	Site-wide engineering barrier construction plan in RAP
REC 3	Benzene	0.03	REC 3 RAP
REC 5	Total Petroleum Hydrocarbon	No free product	Site-wide engineering barrier construction plan in RAP
REC 12	Benzene	0.093	REC 12 RAP
	Ethylbenzene	27.2	
	Toluene	650	
	Xylenes, total	150	
	3&4-Methylphenol	0.508	

Table 3-14

Groundwater Remediation Objectives

Area	Substance	Remediation Objective (mg/L)	Remedial Action to Address Exposure
All RECs	Iron	5.97	Groundwater institutional controls in RAP
	Manganese	0.27	
REC 3	Lead	0.0075	REC 3 RAP
	Benzene	0.005	
	Ethylbenzene	0.7	
	Toluene	1	
	Xylenes, total	10	
	Benzo(a)anthracene	0.00013	
	Benzo(a)pyrene	0.0002	
	Benzo(b)fluoranthene	0.00018	
	Benzo(k)fluoranthene	0.00017	
	Dibenzo(a,h)anthracene	0.0003	
	Indeno(1,2,3-cd)pyrene	0.00043	

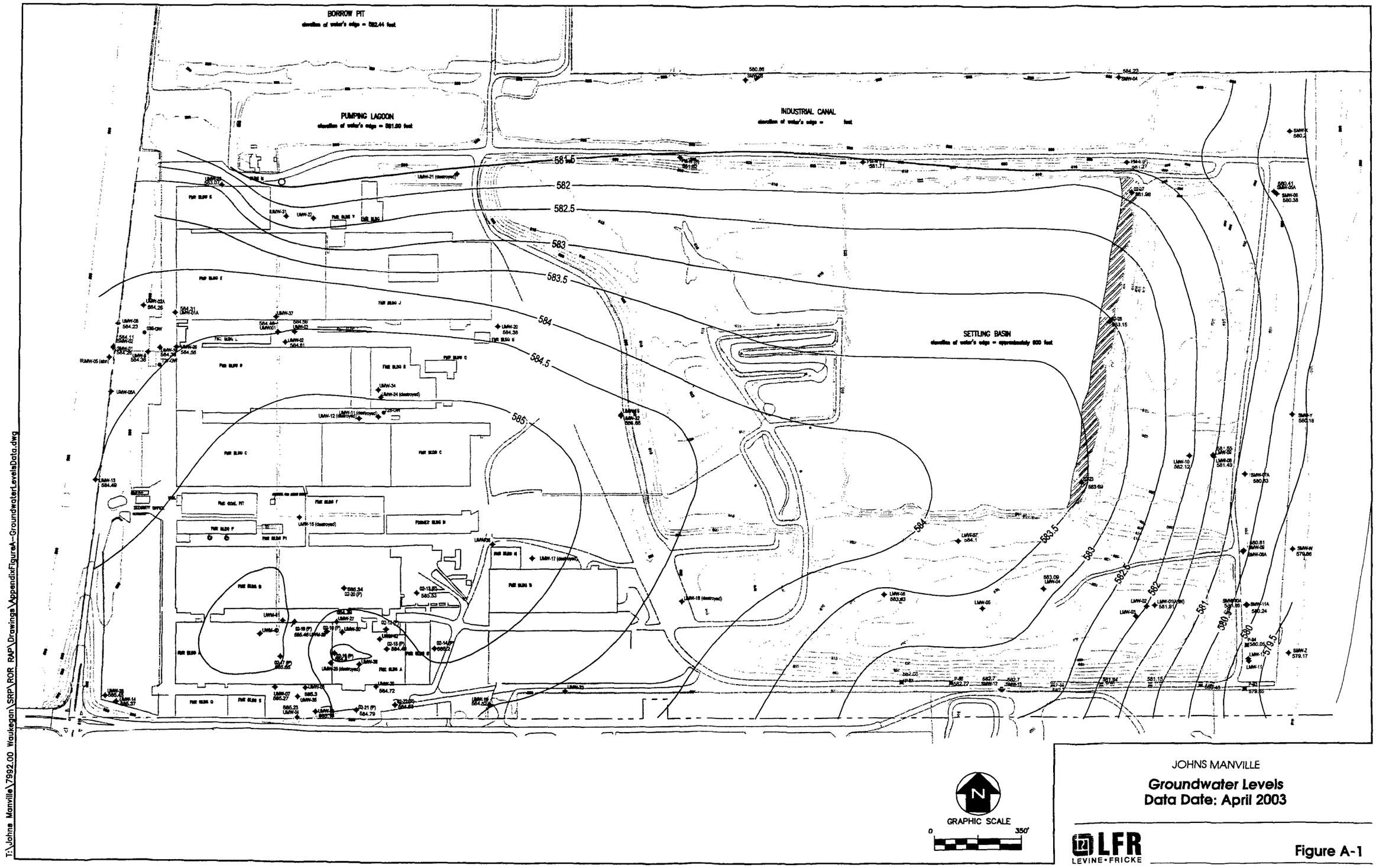
Table 4-1
Preliminary Remedial Action Plan Schedule[1]

Site Area	Description	Estimated Completion Date
All	ROR/RAP submittal to IEPA SRP	January 2006
All	IEPA SRP review and approval of ROR/RAP	April 2006
REC 3	Submit supplement investigation to IEPA LUST group	January 2006
REC 3	Re-submittal of AS/SVE Correction Action Plan to IEPA LUST group	February 2006
REC 3	IEPA LUST approval of Corrective Action Plan	April 2006
RECs 3 and 12	Bid specifications/procurement for RECs 3 and 12	May/June/July 2006
REC 3 and REC 12	Soil removal	August/September 2006
REC 3	Air sparge/SVE system installation	September - November 2006
REC 3	Air sparge/SVE system operation	November 2006 - November 2008
Engineered barrier	Bid specifications/procurement for engineered barrier installation	August - December 2006
Engineered barrier	Phased subgrade and utility installation	January - March 2007
Engineered barrier	Phased cut-fill operation, including preparation in areas Y, Z, and the West Parking Area	March - September 2007
Engineered barrier	Phased compacted clay and topsoil mixture placement, seeding	July - October 2007
Engineered barrier	Asphalt and concrete barrier construction	July - October 2007
REC 3	Air Sparge/SVE system decommissioning	November 2008
All	Develop and submit Remedial Action Completion Report to IEPA	December 2008

[1] - Schedule is contingent upon IEPA approval of ROR/RAP in April 2006

Appendix A

Groundwater Elevation Maps



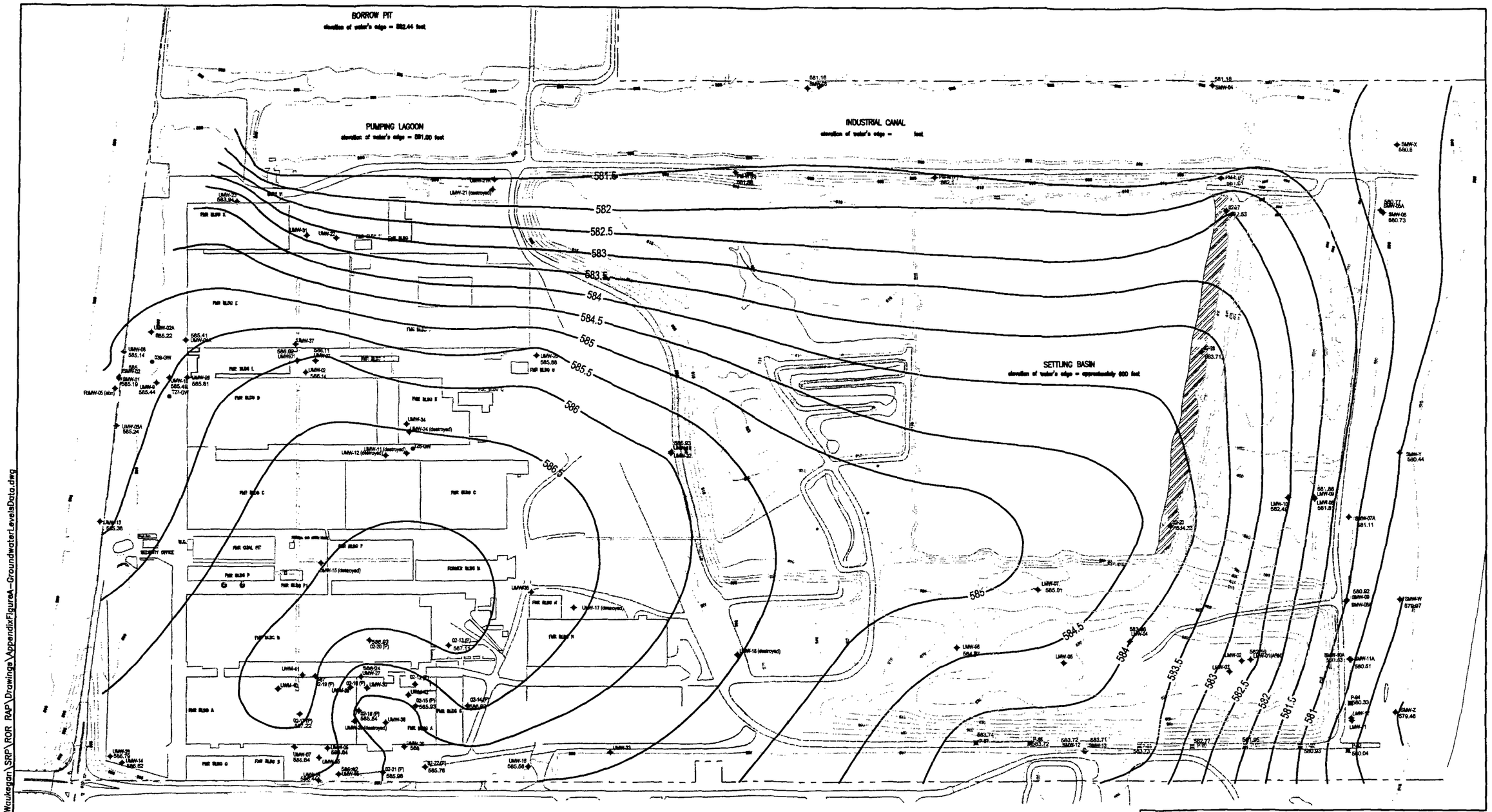
JOHNS MANVILLE

Groundwater Levels
Data Date: April 2003

LFR LEVINE•FRICKE

Figure A-1

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



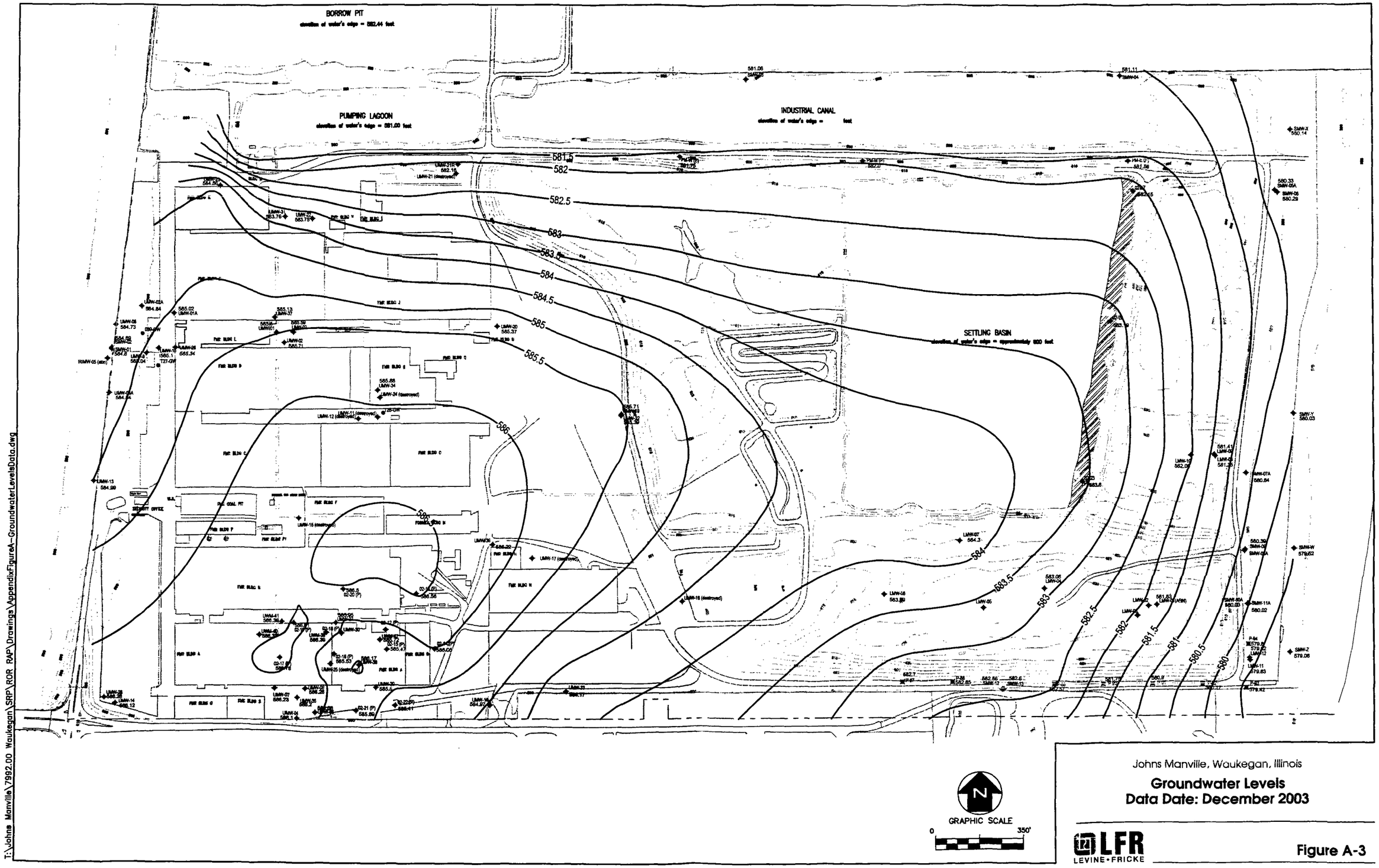
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: July 2003

LFR LEVINE•FRICKE

Figure A-2

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



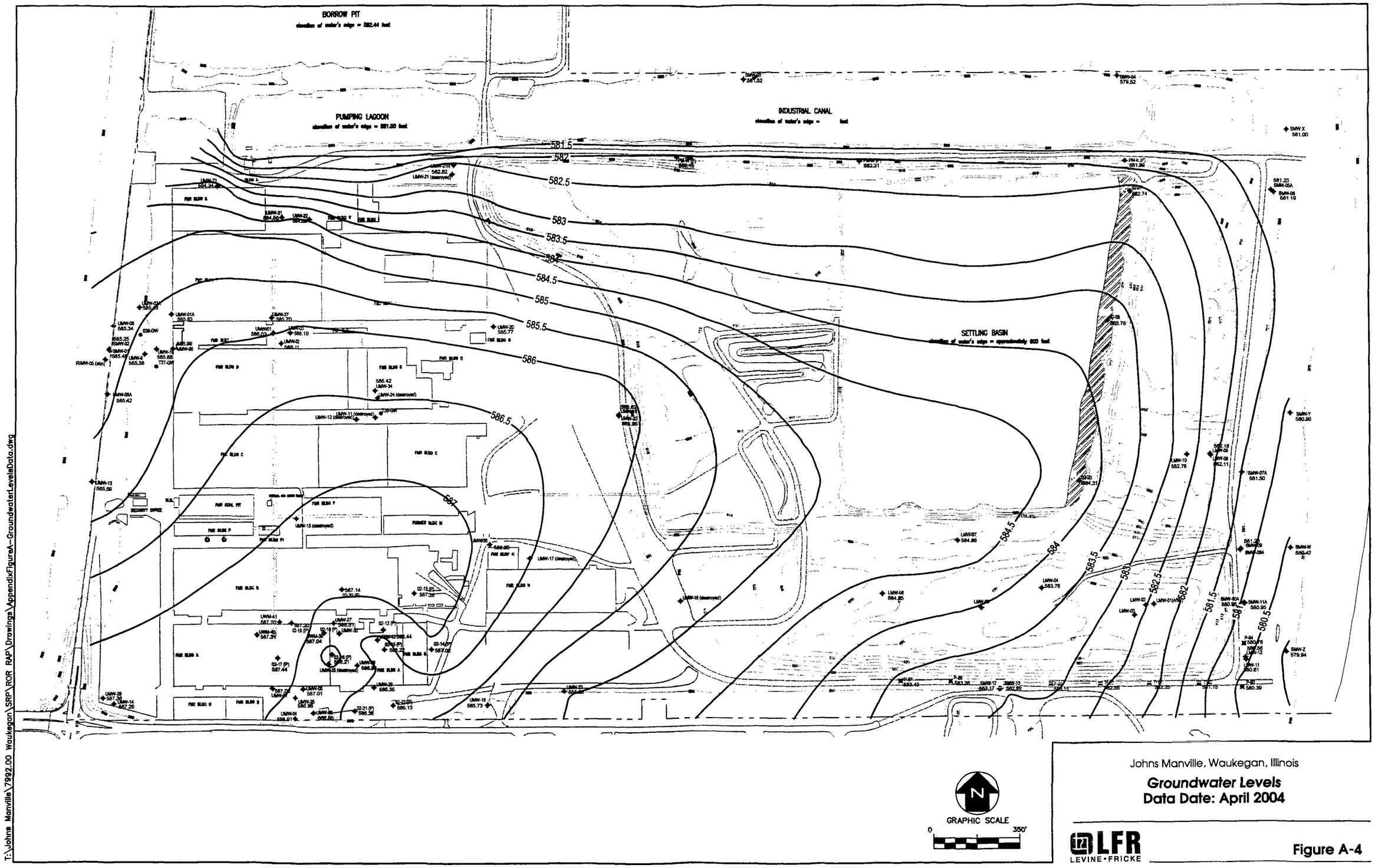
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: December 2003

LFR LEVINE•FRICKE

Figure A-3

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



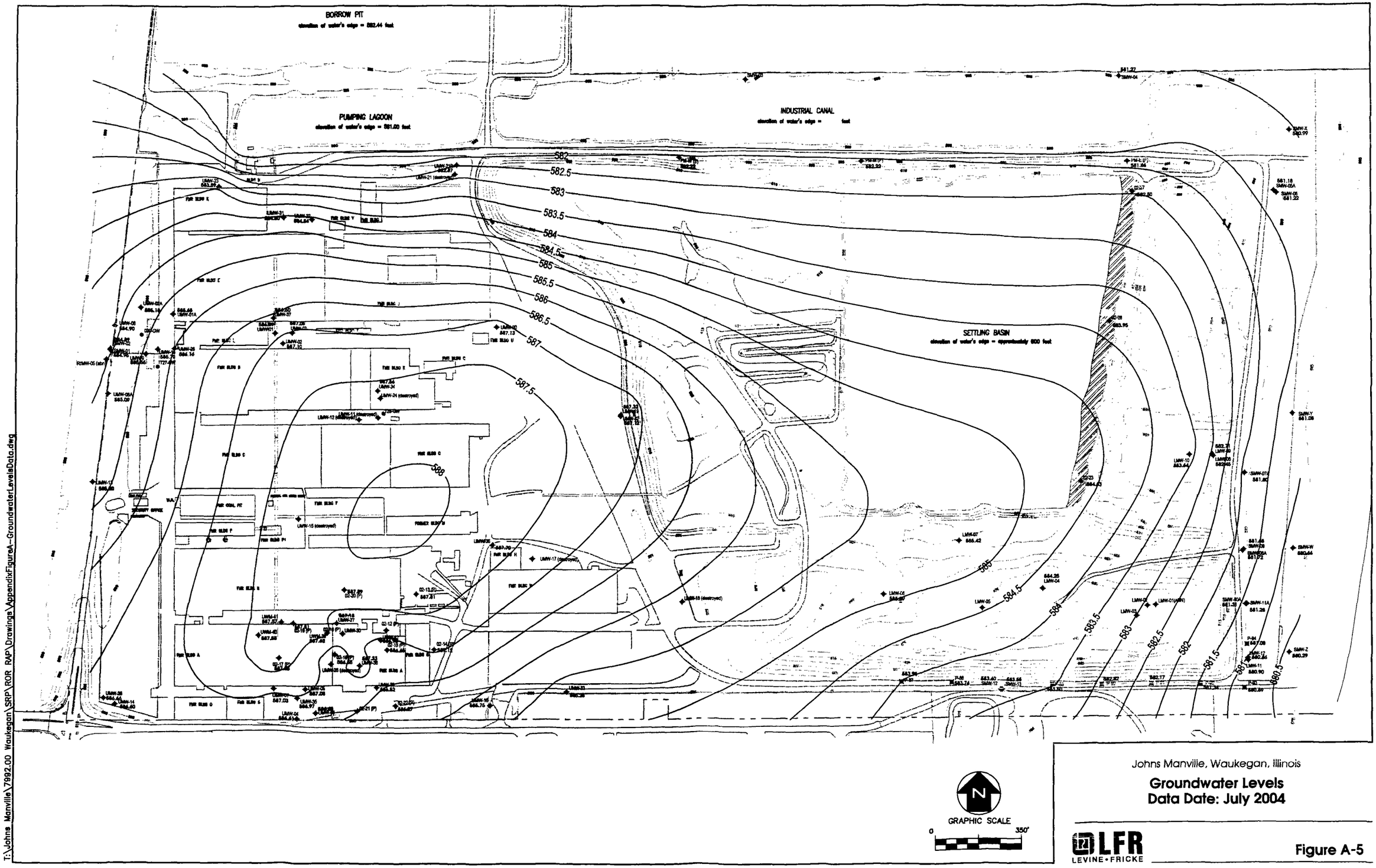
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: April 2004

LFR LEVINE•FRICKE

Figure A-4

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



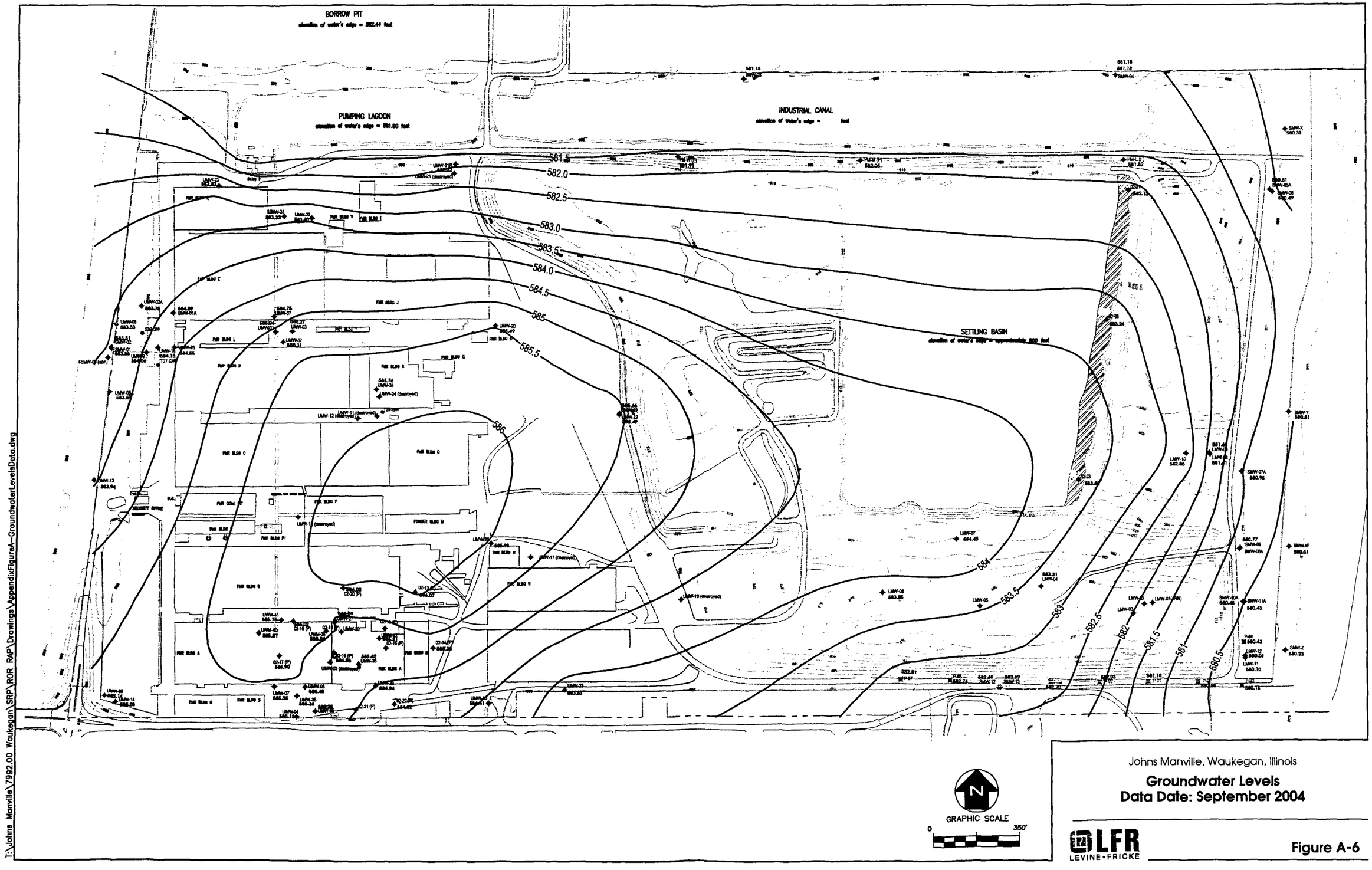
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: July 2004

LFR LEVINE•FRICKE

Figure A-5

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



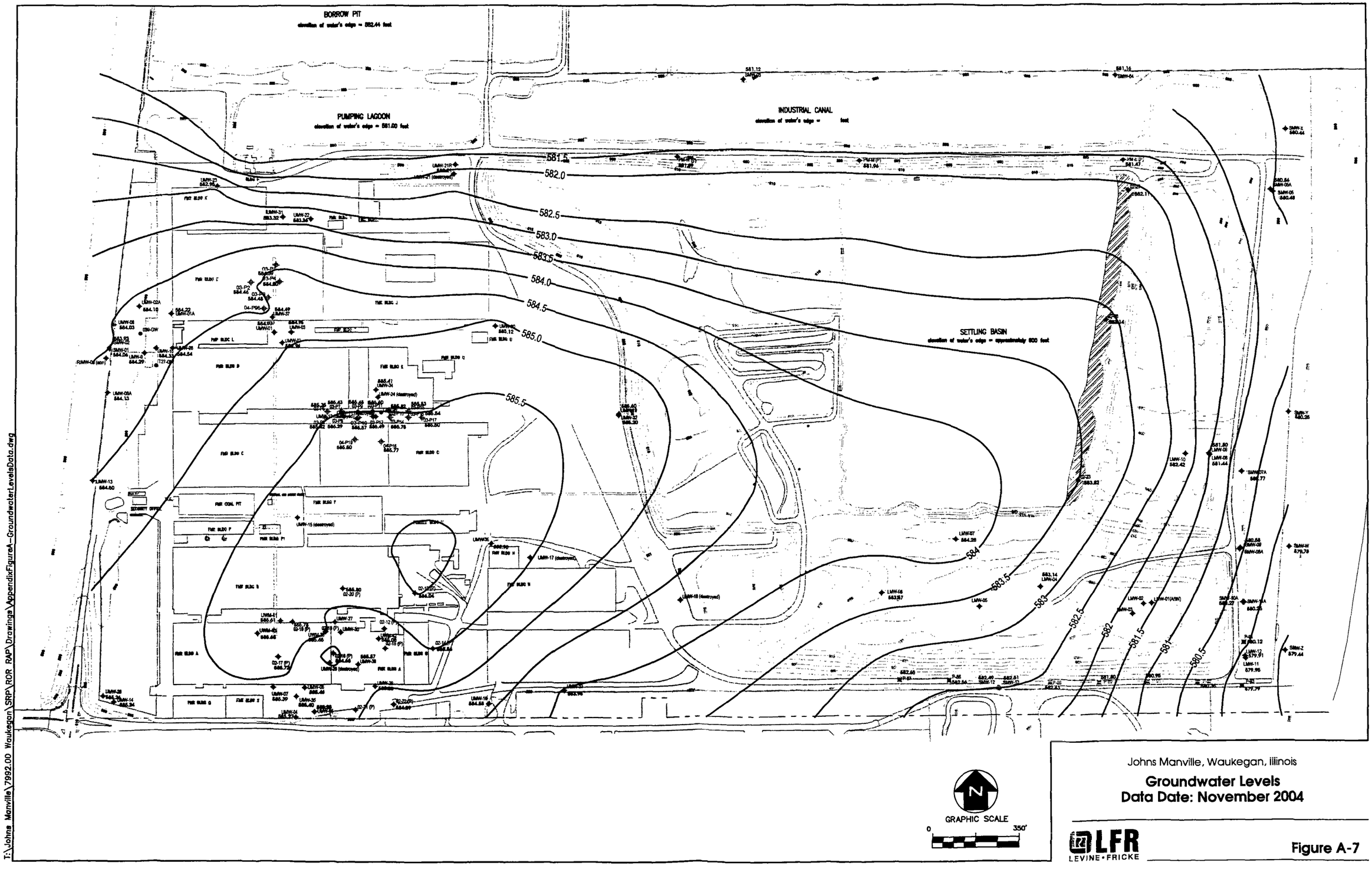
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: September 2004

LFR LEVINE•FRICKE

Figure A-6

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



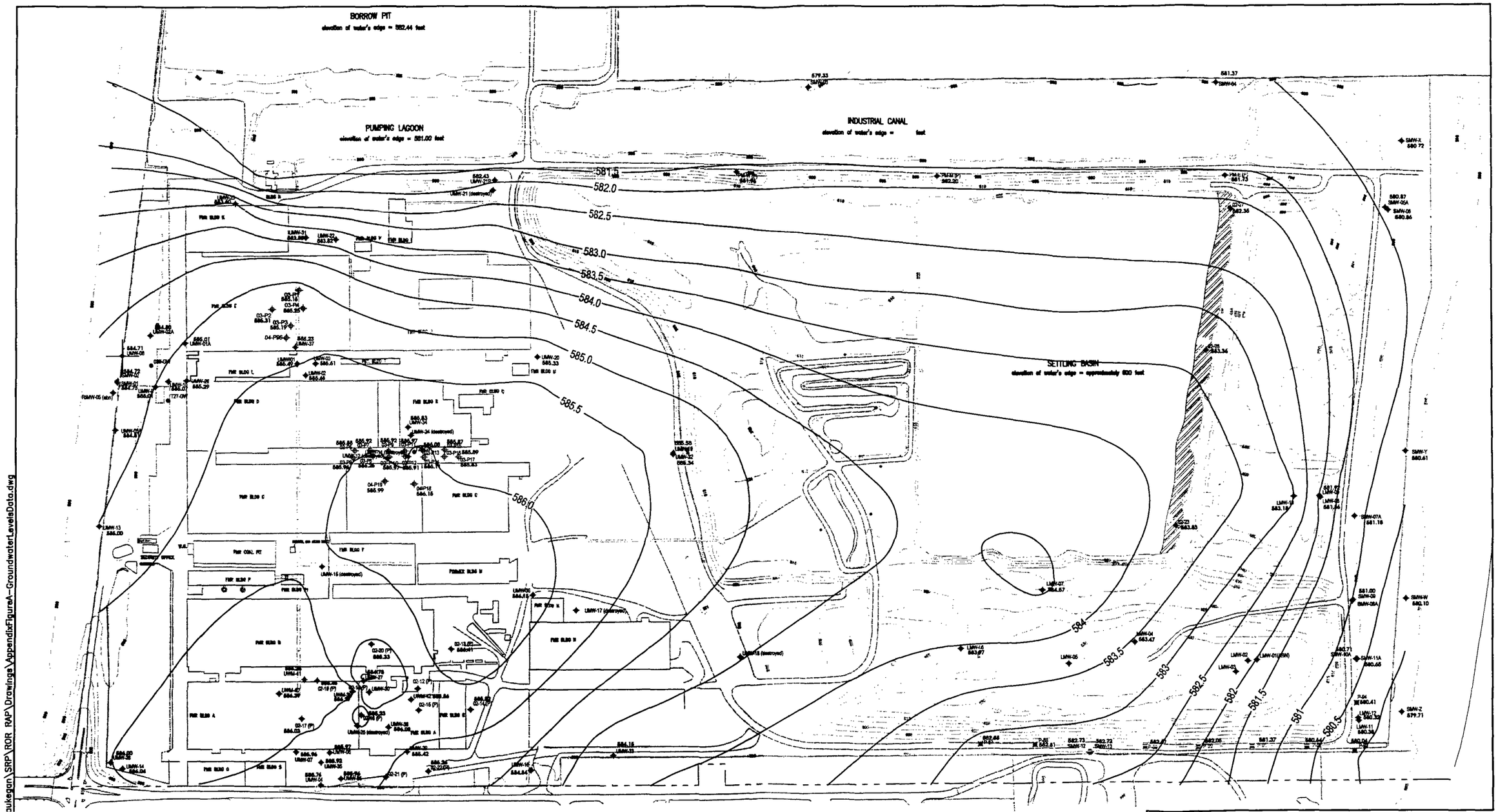
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: November 2004

LFR LEVINE•FRICKE

Figure A-7

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



GRAPHIC SCALE

0 350'

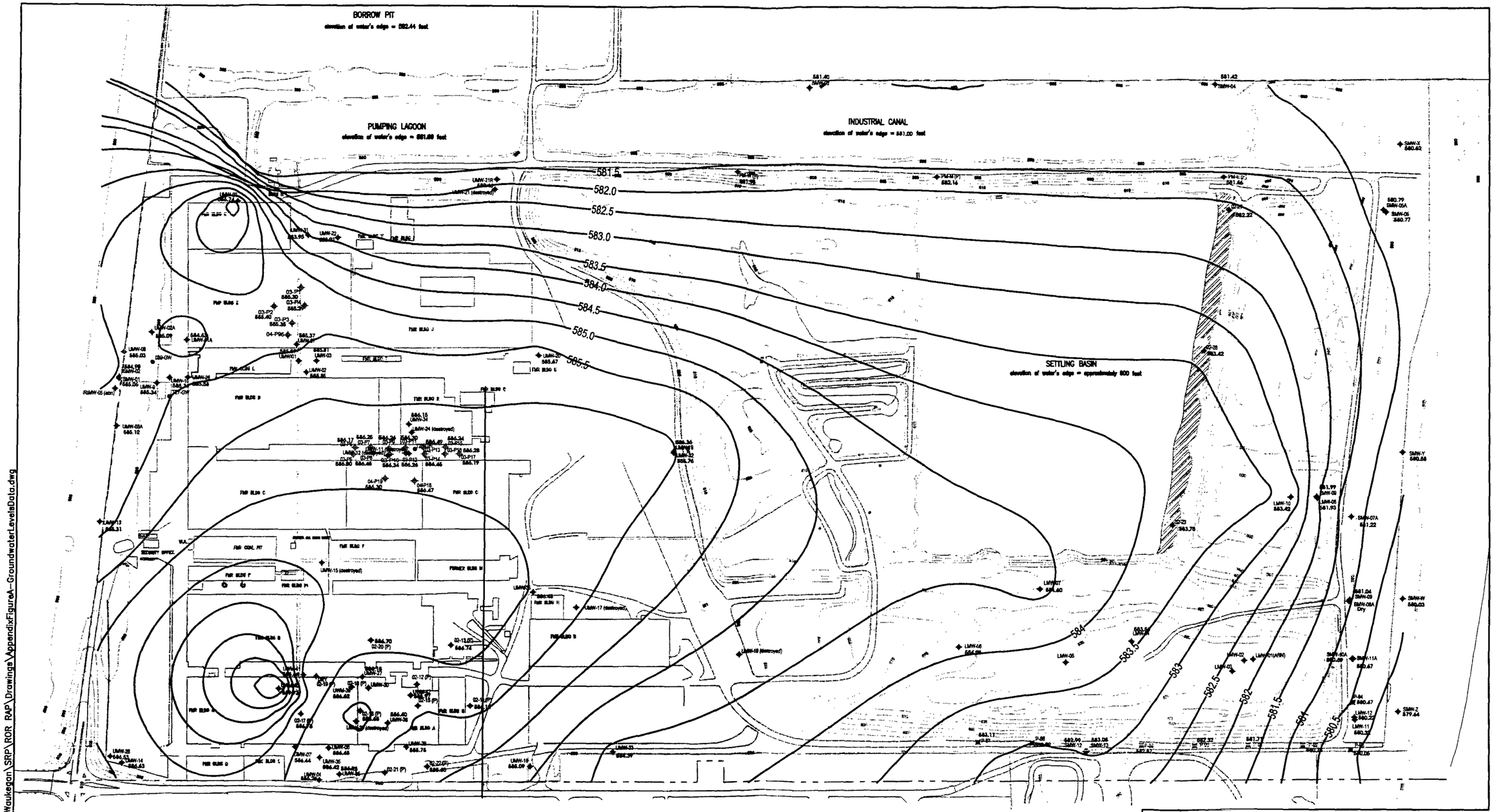
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: December 2004

LFR LEVINE•FRICKE

Figure A-8

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



GRAPHIC SCALE
0 350'

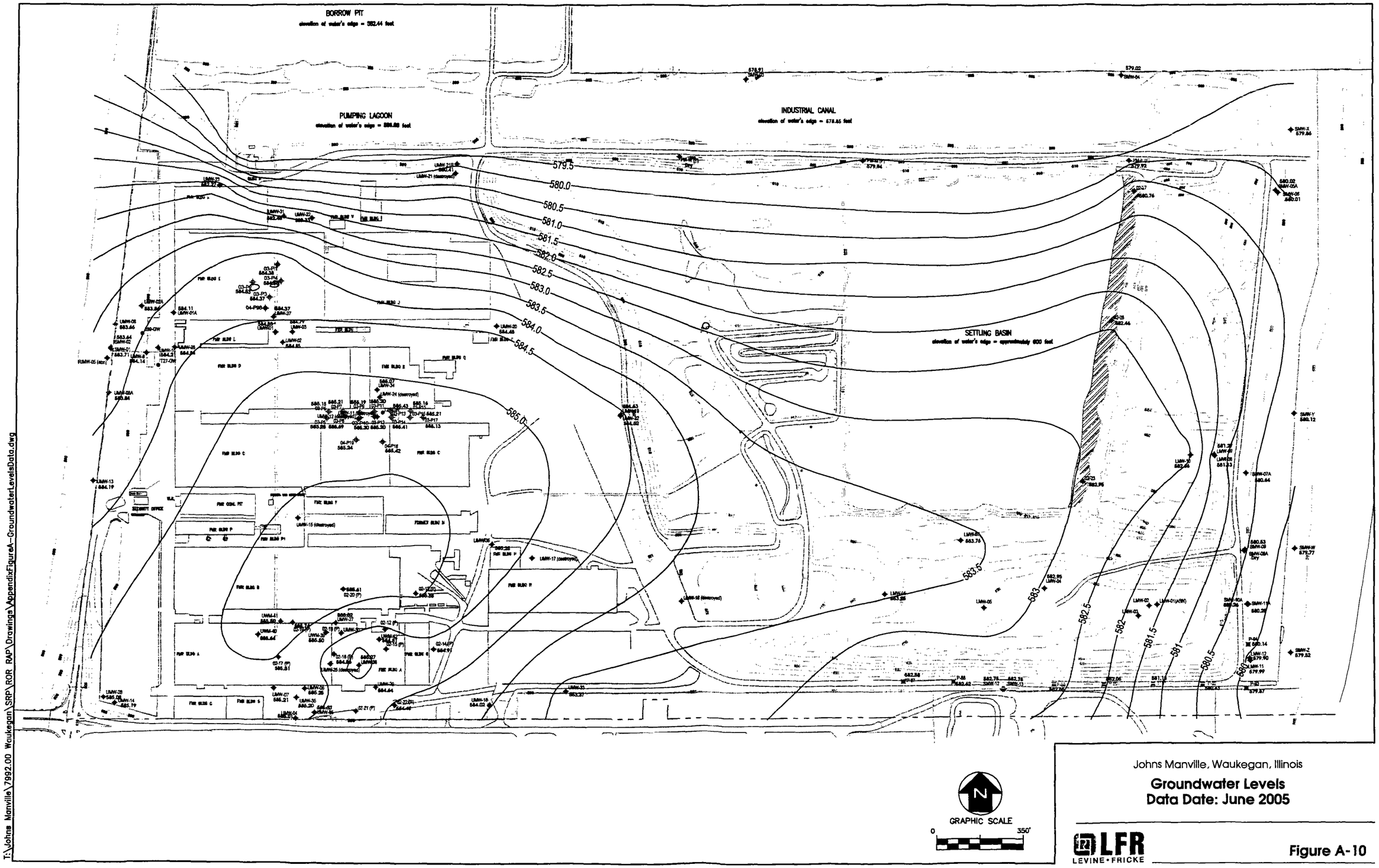
Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: March 2005

LFR LEVINE•FRICKE

Figure A-9

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg



Johns Manville, Waukegan, Illinois

Groundwater Levels
Data Date: June 2005

LFR LEVINE•FRICKE

Figure A-10

T:\Johns Manville\7992.00 Waukegan\SRP\ROR RAP\Drawings\AppendixFigureA-GroundwaterLevelsData.dwg

Appendix B

Soil Attenuation Capacity

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
REC 02: UST Excavation 2, 01-1 (2-4 ft)	0.017		0.648		**0.665**	No	
REC 02: UST Excavation 2, 01-2 (3-4 ft)	0.017		0.674		**0.691**	No	
REC 02: UST Excavation 2, 01-3 (3-4 ft)	0.017		1.185		**1.20**	No	
REC 02: UST Excavation 2, 01-4 (3-4 ft)	0.017		2.422		**2.44**	No	
REC 02: UST Excavation 2, 01-5 (5-7 ft)	0.22		0.955		**1.18**	No	
REC 02: UST Excavation 2, 01-6 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, 01-7 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, 01-8 (7-8 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, 01-9 (6-8 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, 01-10 (3-5 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, Pipe 01-11 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, Pipe 01-12 (8-10 ft)	0.017		0.5697		**0.587**	No	
REC 02: UST Excavation 2, TP-4 (5-5 ft)	0.23		0.3305		**0.561**	No	
REC 02: UST Excavation 2, 03-01 (9-10 ft)	3.6	50.623			**54.2**	No	
REC 02: UST Excavation 2, 03-02 (10-12 ft)	0.225	31.29			**31.5**	No	
REC 02: UST Excavation 2, UMW-37 (10-12 ft)	1.77	37.54			**39.3**	No	
REC 02: UST Excavation 2, UMW-37 (12-14 ft)	0.225	31.29			**31.5**	No	
REC 03: UST Excavation 3, T-039-SB-01 (2-3 ft)	12.4592				**12.5**	No	
REC 03: UST Excavation 3, T-039-SB-02 (5-6 ft)	2.01				**2.01**	No	
REC 03: UST Excavation 3, T-039-SB-03 (5-6 ft)	17.199				**17.2**	No	
REC 03: UST Excavation 3, T-039-SB-04 (5-6 ft)	3.086				**3.09**	No	
REC 03: UST Excavation 3, T-039-SB-05 (5-6 ft)	0.19				**0.190**	No	
REC 03: UST Excavation 3, T-039-SB-06 (3-4 ft)	0.0457				**0.0457**	No	
REC 03: UST Excavation 3, T-039-SB-07 (3-4 ft)	0.0368				**0.0368**	No	
REC 03: UST Excavation 3, T-039-SB-08 (3-4 ft)	0.0406				**0.0406**	No	
REC 03: UST Excavation 3, TA3-02-01 (2-4 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-02 (4-6 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-03 (2-4 ft)	13.7				**13.7**	No	
REC 03: UST Excavation 3, TA3-02-04 (5-7 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-05 (5-7 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-06 (3-5 ft)	1.0661				**1.07**	No	
REC 03: UST Excavation 3, TA3-02-07 (2-4 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-08 (2-4 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-09 (2-4 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, TA3-02-11 (2-4 ft)	0.017				**0.0170**	No	
REC 03: UST Excavation 3, GT-1 (7-8 ft)	0.5769		0.3305		**0.907**	No	
REC 03: UST Excavation 3, GT-2 (6-8 ft)	0.251		0.3305		**0.582**	No	
REC 03: UST Excavation 3, TA3-3 (6-7 ft)	0.266		0.3311		**0.597**	No	

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
REC 03. UST Excavation 3, TA3-4 (8-9 ft)	0.83		0.3305		**1.16**	No	
REC 03 UST Excavation 3, TA3-5 (10-12 ft)	0.266		0.3305		**0.597**	No	
REC 03 UST Excavation 3, TA3-7 (10-12 ft)	0.555		0.4234		**0.978**	No	
REC 04 UST Excavation 4, STF-01-94 (2-3 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-95 (2-3 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-96 (2-3 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-97 (2-3 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-98 (2-3 ft)	0.2214		0.5697		**0.791**	No	
REC 04 UST Excavation 4, STF-01-99 (6-7 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-100 (6-6 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-101 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-102 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-103 (5-7 ft)	0.22		1.856		**2.08**	No	
REC 04: UST Excavation 4, STF-01-104 (5-6 ft)	0.22		0.571		**0.791**	No	
REC 04: UST Excavation 4, STF-01-105 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04: UST Excavation 4, STF-01-106 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04: UST Excavation 4, STF-01-107 (5-6 ft)	0.2212		0.5697		**0.791**	No	
REC 04: UST Excavation 4, STF-01-108 (4-5 ft)	0.22		0.579		**0.799**	No	
REC 04: UST Excavation 4, STF-01-126 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04: UST Excavation 4, STF-01-127 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04 UST Excavation 4, STF-01-128 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04: UST Excavation 4, STF-01-129 (5-6 ft)	0.22		0.5697		**0.790**	No	
REC 04: UST Excavation 4, Exc. 4, P-1 (1-2 ft)	0.22	102.21			**102**	No	
REC 04: UST Excavation 4, Exc. 4, P-2 (1-2 ft)	0.22	31.62			**31.8**	No	
REC 04: UST Excavation 4, Exc. 4, P-3 (1-2 ft)	0.22	31.62			**31.8**	No	
REC 04: UST Excavation 4, Exc. 4, P-4 (1-2 ft)	0.22	31.62			**31.8**	No	
REC 04: UST Excavation 4, Exc. 4, P-5 (1-2 ft)	0.22	31.62			**31.8**	No	
REC 04: UST Excavation 4, STF-1 (6-7 ft)	28.2		3.305		**31.5**	No	
REC 04: UST Excavation 4, STF-3 (7-8 ft)	0.23		3.305		**3.5**	No	
REC 04: UST Excavation 4, 03-13, (6-8 ft)	0.9056	31.29			**32.2**	No	
REC 04 UST Excavation 4, 03-13 (18-20 ft)	0.225	31.29			**31.5**	No	
REC 04 UST Excavation 4, 03-14 (10-12 ft)	0.225	31.29			**31.5**	No	
REC 04 UST Excavation 4, 03-14 (18-20 ft)	0.225	31.29			**31.5**	No	
REC 04: UST Excavation 4, 03-56 (4-6 ft)	0.696				**0.696**	No	
REC 04: UST Excavation 4, 03-56 (8-10 ft)	0.017				**0.0170**	No	
REC 04: UST Excavation 4, 03-58 (8-10 ft)	0.0194				**0.0194**	No	
REC 04: UST Excavation 4, 03-58 (10-12 ft)	0.017				**0.0170**	No	
REC 04: UST Excavation 4, 03-60 (6-8 ft)	0.017				**0.0170**	No	

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
REC 04 UST Excavation 4, 03-60 (8-10 ft)	0.017				**0.0170**	No	
REC 04: UST Excavation 4, 03-62 (6-8 ft)	0.017				**0.0170**	No	
REC 04: UST Excavation 4, 03-62 (8-10 ft)	0.017				**0.0170**	No	
REC 04: UST Excavation 4, 03-65 (6-8 ft)	0.017				**0.0170**	No	
REC 05: UST Excavation 5, D-7 (6-8 ft)	1.41		1.7467		**3.16**	No	
REC 05: UST Excavation 5, TP-1 (6-6 ft)	0.414		3.358		**3.77**	No	
REC 05: UST Excavation 5, TP-2 (5-5 ft)	2.75		3.428		**6.18**	No	
REC 05: UST Excavation 5, TP-7 (5-5 ft)	7.8		0.3305		**8.13**	No	
REC 05: UST Excavation 5, 01-73 (2-4 ft)	0.4098		4.764		**5.17**	No	
REC 05: UST Excavation 5, 01-77 (2-4 ft)	2.812		6.226		**9.04**	No	
REC 05: UST Excavation 5, 03-05 (4-6 ft)	3.4343	263.16			**267**	No	
REC 05: UST Excavation 5, 03-05 (8-10 ft)	0.225	31.29			**31.5**	No	
REC 05: UST Excavation 5, 05-03B (5-7 ft)	3.6				**3.60**	No	
REC 05: UST Excavation 5, 05-04B (4-5 ft)	3.723				**3.72**	No	
REC 11: UST Excavation 11, H-01-90 (2-4 ft)	2.712	33.59			**36.3**	No	
REC 11: UST Excavation 11, H-01-91 (2-4 ft)	0.22	33.59			**33.8**	No	
REC 11: UST Excavation 11, H-01-92 (2-4 ft)	0.22	33.59			**33.8**	No	
REC 11: UST Excavation 11, H-01-93 (2-4 ft)	0.22	33.59			**33.8**	No	
REC 12: Solvent Recovery Room, A-2 (6-8 ft)	1.225		0.4394		**1.66**	No	
REC 12: Solvent Recovery Room, UMW-25 (8-10 ft)	0.584		0.3458		**0.930**	No	
REC 12: Solvent Recovery Room, UMW-27 (3-5 ft)	0.2147		0.5108		**0.726**	No	
REC 12: Solvent Recovery Room, SR-01-132 (3-4 ft)			1.11		**1.11**	No	
REC 12: Solvent Recovery Room, SR-SB-01 (1-2 ft)	396.764				**397**	No	Removed in 2002-2003
REC 12: Solvent Recovery Room, SR-SB-02 (1-2 ft)	1280.54				**1281**	No	Removed in 2002-2003
REC 12: Solvent Recovery Room, SR-SB-04 (2-3 ft)	0.0391				**0.0391**	No	
REC 12: Solvent Recovery Room, SR-SB-05 (2-3 ft)	184.414				**184**	No	Removed in 2002-2003
REC 12: Solvent Recovery Room, SR-SB-07 (6-7 ft)	0.0449				**0.0449**	No	
REC 12: Solvent Recovery Room, "West" (3-4 ft)	3465.06				**3465**	Yes	Removed in 2002-2003
REC 12: Solvent Recovery Room, "East" (3-4 ft)	22.783				**22.8**	No	Removed in 2002-2003
REC 12 Solvent Recovery Room, "Center" (3-4 ft)	31.135				**31.1**	No	Removed in 2002-2003
REC 12 Solvent Recovery Room, SR-01-132 (3-4 ft)	2365.5				**2366**	Yes	Removed in 2002-2003
REC 12 Solvent Recovery Room, UMW-38 (10-12 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, UMW-39 (8-10 ft)	31.9	31.29			**63.2**	No	
REC 12: Solvent Recovery Room, UMW-39 (10-12 ft)	0.0529	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, UMW-40 (8-10 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, UMW-41 (6-8 ft)	8.631	31.29			**39.9**	No	
REC 12: Solvent Recovery Room, UMW-41 (12-14 ft)	0.0259	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, UMW-42 (4-6 ft)	1935.2686	32.809			**1968**	No	REC 12 RAP

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
REC 12: Solvent Recovery Room, UMW-42 (12-14 ft)	0.0203	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-46 (10-12 ft)	1.546	31.29			**32.8**	No	
REC 12: Solvent Recovery Room, 03-46 (12-14 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-47 (10-12 ft)	0.0216	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-47 (12-14 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-48 (5-7 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-49 (6-8 ft)	1.2797	31.29			**32.6**	No	
REC 12: Solvent Recovery Room, 03-49 (12-14 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-50 (4-6 ft)	0.607	31.29			**31.9**	No	
REC 12: Solvent Recovery Room, 03-50 (8-10 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-51 (8-10 ft)	1.212	31.29			**32.5**	No	
REC 12: Solvent Recovery Room, 03-51 (15-17 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-52 (8-10 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-53 (6-8 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-54 (6-8 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-55 (6-8 ft)	4.6792	31.574			**36.3**	No	
REC 12: Solvent Recovery Room, 03-55 (8-10 ft)	0.017	31.29			**31.3**	No	
REC 12: Solvent Recovery Room, 03-68 (6-8 ft)	29.7				**29.7**	No	
REC 12: Solvent Recovery Room, 03-68 (8-10 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-69 (4-6 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-69 (6-8 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-70 (4-6 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-70 (6-8 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-71 (4-6 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-72 (8-10 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-72 (14-16 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-73 (8-10 ft)	0.0203				**0.0203**	No	
REC 12: Solvent Recovery Room, 03-73 (12-14 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 03-76 (4-6 ft)	66.463				**66.5**	No	
REC 12: Solvent Recovery Room, 03-76 (8-10 ft)	0.017				**0.0170**	No	
REC 12: Solvent Recovery Room, 05-06B (7-9 ft)	5.7609				**5.76**	No	
REC 12: Solvent Recovery Room, 05-07B (8-10 ft)	3.6				**3.60**	No	
REC 12: Solvent Recovery Room 05-12B (4-6 ft)	0.884				**0.884**	No	
Pre-Excavation, REC 12: Solvent Recovery Room, C-2 (1.5 ft)	380.21	38.69			**419**	No	Removed in 2002-2003
Pre-Excavation REC 12: Solvent Recovery Room, B-6 (2 ft)	940.76	34.381			**975**	No	Removed in 2002-2003
CURRENT STATUS, REC 12: Solvent Recovery Room C-2 (8 ft)	0.3321	31.29			**31.6**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, D-2 (8 ft)	0.025	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, C-3 (8 ft)	0.0286	31.29			**31.3**	No	

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
CURRENT STATUS, REC 12: Solvent Recovery Room, D-3 (8 ft)	0.0852	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, D-5 (8 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, C-5 (8 ft)	0.0239	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, C-7 (8 ft)	0.2463	31.29			**31.5**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, D-7 (8 ft)	0.0392	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-2 (8 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-3 (8 ft)	0.119	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-5 (8 ft)	0.0298	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-7 (8 ft)	0.059	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, E-3 (4 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, E-2 (4 ft)	0.0174	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, E-4 (4 ft)	0.1902	31.29			**31.5**	No	
Removed Sample, REC 12: Solvent Recovery Room, E-5 (4 ft)	0.1657	31.537			**31.7**	No	Removed in 2002-2003
CURRENT STATUS, REC 12: Solvent Recovery Room, E-6 (4 ft)	0.1061	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, A-B-1 (4 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, A-B-2 (4 ft)	1.2577	31.29			**32.5**	No	
Removed Sample, REC 12: Solvent Recovery Room, A-3 (4 ft)	0.1647	31.29			**31.5**	No	Removed in 2002-2003
Removed Sample, REC 12: Solvent Recovery Room, A-B-4 (4 ft)	5.382	31.29			**36.7**	No	Removed in 2002-2003
Removed Sample, REC 12: Solvent Recovery Room, A-B-5 (4 ft)	136.04	31.603			**168**	No	Removed in 2002-2003
Removed Sample, REC 12: Solvent Recovery Room, A-B-6 (4 ft)	1180.3904	31.907			**1212**	No	Removed in 2002-2003
CURRENT STATUS, REC 12: Solvent Recovery Room, C-1(4 ft)	0.041	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, D-1 (4 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, E-1 (4 ft)	0.671	31.29			**32.0**	No	
Removed Sample, REC 12: Solvent Recovery Room, A-B-7 (4 ft)	701.65	36.073			**738**	No	Removed in 2002-2003
Removed Sample, REC 12: Solvent Recovery Room, C-7 (4 ft)	1849	32.72			**1882**	No	Removed in 2002-2003
Removed Sample, REC 12: Solvent Recovery Room, D-7 (4 ft)	20.168	31.897			**52.1**	No	Removed in 2002-2003
CURRENT STATUS, REC 12: Solvent Recovery Room, E-7 (4 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, AA-4 (4 ft)	1029.025	31.873			**1061**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, AA-5 (4 ft)	0.133	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, AA-6 (4 ft)	0.0323	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, AA-7 (4 ft)	0.1395	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, AA-8 (4 ft)	0.0801	31.29			**31.4**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, A-8 (4 ft)	0.0297	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-8 (4 ft)	485.01	42.6			**528**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, C-8 (4 ft)	0.017	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, D-71/2 (4 ft)	0.0466	31.29			**31.3**	No	
CURRENT STATUS, REC 12: Solvent Recovery Room, B-8 (8 ft)	1389.1629	31.29			**1420**	No	
Removed Sample, REC 12: Solvent Recovery Room, A-6/7 (8 ft)	4.1127	31.29			**35.4**	No	Removed in 2002-2003

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
CURRENT STATUS, REC 12: Solvent Recovery Room, E-F-5 (4 ft)		31.29			**31.3**	No	
REC 13 Bldg D Transformer, PCB-2 (0-1 ft)				0.35	**0.350**	No	
REC 13 Bldg D Transformer, 03-08 (4-6 ft)	9.34	36.39		0.72	**46.4**	No	
REC 13 Bldg D Transformer, 03-09 (4-6 ft)	5.23	36.41		0.72	**42.4**	No	
REC 13 Bldg D Transformer, 03-10 (4-6 ft)	0.325	34.38		0.72	**35.4**	No	
REC 13 Bldg D Transformer, 03-11 (3-5 ft)	0.3336	31.29		0.72	**32.3**	No	
REC 14 Tank 30 UST, T28-E (3-4 ft)	0.017				**0.0170**	No	
REC 14 Tank 30 UST, T28-W (3-4 ft)	0.017				**0.0170**	No	
REC 14 Tank 30 UST, T28-N (3-4 ft)	0.017				**0.0170**	No	
REC 14 Tank 30 UST, T28-S (3-4 ft)	0.017				**0.0170**	No	
REC 16: Bldg E Kero Pits, E-01-13 (4-6 ft)	0.2811		1.0617		**1.34**	No	
REC 16: Bldg E Kero Pits, E-01-16 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 16: Bldg E Kero Pits, E-01-18 (4-6 ft)	0.2392		0.6617		**0.901**	No	
REC 16: Bldg E Kero Pits, E-01-19 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 16: Bldg E Kero Pits, E-01-20 (4-6 ft)	0.017		1.489		**1.51**	No	
REC 16: Bldg E Kero Pits, E-01-37 (4-6 ft)	0.22		0.5697		**0.790**	No	
REC 16: Bldg E Kero Pits, NBT-1 (10-11 ft)	0.23		0.3305		**0.561**	No	
REC 16: Bldg E Kero Pits, TP-B (7-9 ft)	2.3		2.986		**5.29**	No	
REC 16: Bldg E Kero Pits, 03-04 (10-12 ft)	0.364	34.192			**34.6**	No	
REC 16: Bldg E Kero Pits, 03-04 (12-14 ft)	0.325	31.29			**31.6**	No	
REC 16: Bldg E Kero Pits, 03-P2 (8-10 ft)	3.7	44.806			**48.5**	No	
REC 16: Bldg E Kero Pits, 03-P2 (10-12 ft)	3.7	31.47			**35.2**	No	
REC 2/16: Bldg E Kero Pits, 05-01B (8-10 ft)	3.6				**3.60**	No	
REC 2/16: Bldg E Kero Pits, 05-02B (7-9 ft)	7.04				**7.04**	No	
REC 17: Bldg H Material, V-13 (3-4 ft)	11.008				**11.0**	No	
REC 17: Bldg H Material, V-32 (3-5 ft)	11.315				**11.3**	No	
REC 17: Bldg H Material, V-9 (3-4 ft)	11.08				**11.1**	No	
REC 17: Bldg H Material, H-01-147 (2-4 ft)	0.22	32.93			**33.1**	No	
REC 17: Bldg H Material, H-01-147-GLA (2-4 ft)	0.225	10.976			**11.2**	No	
REC 17: Bldg H Material, V-13 (3-4 ft)		10.976			**11.0**	No	
REC 17: Bldg H Material, V-32 (3-5 ft)		10.976			**11.0**	No	
REC 17: Bldg H Material, V-9 (3-4 ft)		10.976			**11.0**	No	
REC 17: Bldg H Material, H-01-148 (2-3 ft)	0.22				**0.220**	No	
REC 17: Bldg H Material, H-01-148-GLA (2-3 ft)	0.225				**0.225**	No	
REC 18: Bldg J Transformer, PCB-1 (0-1 ft)				0.35	**0.35**	No	
REC 18: Bldg J Transformer, West End (0-1 ft)	0.01682		1.68	0.175	**1.87**	No	
REC 18: Bldg J Transformer, South End (0-1 ft)	0.01846		1.68	0.175	**1.87**	No	
REC 18: Bldg J Transformer, East End (0-1 ft)	0.0173		1.68	0.175	**1.87**	No	

*Sum of organic compound concentrations, including reporting limit.

Table B-1
Total Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

REC ID, Boring ID (sample interval)	Total VOCs (Table B-2A and B-2B)	Total SVOCs (Table B-3)	Total PNAs (Table B-4)	Total PCBs (Table B-5)	Total Organic Compounds (incl. RL)*	Exceeds 2,000 mg/kg?	Comments
REC 21: Still Room, D-01-52 (2-4 ft)	0.017		0.5697		**0.587**	No	
REC 21: Still Room, D-01-53 (2-4 ft)	0.017		0.718		**0.735**	No	
REC 22: Bldg D Coal Tar Sat, T-01-44 (4-6 ft)	0.017		0.5697		**0.587**	No	
REC 24: Bldg T Tar Pit, T-01-41 (2-4 ft)	0.017		0.584		**0.601**	No	
REC 25: Bldg D Saturators, TP-N (6-8 ft)	0.23		0.3471	0.35	**0.927**	No	
REC 25: Bldg Saturators, D-01-45 (2-4 ft)	0.017		0.5697		**0.587**	No	
REC 25: Bldg Saturators, D-01-46 (2-4 ft)	0.017		0.5707		**0.588**	No	
REC 25: Bldg Saturators, D-01-47 (2-4 ft)	0.017		0.5697		**0.587**	No	
REC 26: Tank 053, T27-S (3-4 ft)	0.017				**0.0170**	No	
REC 26: Tank 053, T27-E (3-4 ft)	0.017				**0.0170**	No	
REC 26: Tank 053, T27-W (3-4 ft)	0.017				**0.0170**	No	
REC 26: Tank 053, T27-N (3-4 ft)	0.017				**0.0170**	No	
REC 27: Coal Pit, CP-NC (0-1 ft)	0.29228		3.45	0.875	**4.62**	No	
REC 27: Coal Pit, CP-NE (0-1 ft)	0.39721		2.612	0.875	**3.88**	No	
REC 27: Coal Pit, CP-NW (0-1 ft)	0.2711		17.258	0.875	**18.4**	No	Removed in 2001
REC 27: Coal Pit, CP-SE (0-1 ft)	0.4967		2.781	0.875	**4.15**	No	
REC 30: Bldg J Oil Tank, 03-12 (0-2 ft)		31.29			**31.3**	No	
REC 30: Bldg J Oil Tank, 03-12 (4-6 ft)		31.29			**31.3**	No	
REC 31: Locomotive, RR-SB-01 (2-3 ft)	0.0299		2.75		**2.78**	No	
REC 31: Locomotive, RR-SB-02 (0-1 ft)	0.0378		6.55		**6.59**	No	
REC 32: Tank 031, TP-3 (5-5 ft)	0.23		9.571		**9.80**	No	
REC 35: Bldg A Transformer, PCB-4 (0-1 ft)				0.35	**0.350**	No	
REC 36: Bldg P Transformer, PCB-3 (0-1 ft)				0.35	**0.350**	No	
REC 37: UST Excavation 039, JM-039-NW (3-4 ft)	0.0388				**0.0388**	No	
REC 37: UST Excavation 039, JM-039-SW (3-4 ft)	0.0471				**0.0471**	No	
REC 37: UST Excavation 039, JM-039-WW (3-4 ft)	0.0404				**0.0404**	No	
REC 37: UST Excavation 039, JM-039-EW (3-4 ft)	0.0368				**0.0368**	No	
South of Pumping Lagoon, ICS-1 (6-7 ft)	0.23		0.3305		**0.561**	No	
Bldg C - East End, C-3 (6-8 ft)	0.23		0.3305		**0.561**	No	
Building B, B-2 (6-8 ft)	2.305		0.3305		**2.636**	No	
REC 39: Bldg A Pits, 05-10B (7-8 ft)		31.29		0.72	**32.0**	No	

*Sum of organic compound concentrations, including reporting limit.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 01-1 (2-4 ft)	REC 02: UST Excavation 2 01-2 (3-4 ft)	REC 02: UST Excavation 2 01-3 (3-4 ft)	REC 02: UST Excavation 2 01-4 (3-4 ft)	REC 02: UST Excavation 2 01-5 (5-7 ft)	REC 02: UST Excavation 2 01-6 (4-6 ft)	REC 02: UST Excavation 2 01-7 (4-6 ft)	REC 02: UST Excavation 2 01-8 (7-8 ft)	REC 02: UST Excavation 2 01-9 (6-8 ft)	REC 02: UST Excavation 2 01-10 (3-5 ft)	REC 02: UST Excavation 2 Pipe 01-11 (4-6 ft)
1,1,1-Trichloroethane					0.005						
1,1,2,2-Tetrachloroethane					0.005						
1,1,2-Trichloroethane					0.005						
1,1-Dichloroethane					0.005						
1,1-Dichloroethene					0.005						
1,2-Dichloroethane					0.005						
1,2-Dichloropropane					0.005						
2-Chloroethyl Vinyl Ether											
2-Hexanone					0.01						
4-Methyl-2-Pentanone					0.01						
Acetone					0.01						
Benzene	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002	0.002
Bromodichloromethane					0.005						
Bromoform					0.005						
Bromomethane					0.01						
Carbon Disulfide					0.005						
Carbon Tetrachloride					0.005						
Chlorobenzene					0.005						
Chlorodibromomethane					0.005						
Chloroethane					0.01						
Chloroform					0.005						
Chloromethane					0.01						
cis-1,2-Dichloroethene					0.005						
cis-1,3-Dichloropropene					0.005						
Dibromochloromethane											
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride					0.005						
Methyl Ethyl Ketone (2-Butanone)					0.01						
MTBE											
Styrene					0.005						
Tetrachloroethene					0.005						
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,2-Dichloroethene					0.005						
trans-1,3-Dichloropropene					0.005						
Trichloroethene					0.005						
Trichlorofluoromethane											
Vinyl Acetate					0.01						
Vinyl Chloride					0.01						
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**0.017**	**0.017**	**0.017**	**0.017**	**0.22**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 Pipe 01-12 (8-10 ft)	REC 02: UST Excavation 2 TP-4 (5-5 ft)	REC 02: UST Excavation 2 03-01 (9-10 ft)	REC 02: UST Excavation 2 03-02 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (12-14 ft)	REC 03: UST Excavation 3 T-039-SB-01 (2-3 ft)	REC 03: UST Excavation 3 T-039-SB-02 (5-6 ft)	REC 03: UST Excavation 3 T-039-SB-03 (5-6 ft)	REC 03: UST Excavation 3 T-039-SB-04 (5-6 ft)	REC 03: UST Excavation 3 T-039-SB-05 (5-6 ft)	REC 03: UST Excavation 3 T-039-SB-06 (3-4 ft)
1,1,1-Trichloroethane		0.005	0.1	0.005	0.05	0.005						
1,1,2,2-Tetrachloroethane		0.005	0.1	0.005	0.05	0.005						
1,1,2-Trichloroethane		0.005	0.1	0.005	0.05	0.005						
1,1-Dichloroethane		0.005	0.1	0.005	0.05	0.005						
1,1-Dichloroethene		0.005	0.1	0.005	0.05	0.005						
1,2-Dichloroethane		0.005	0.1	0.005	0.05	0.005						
1,2-Dichloropropane		0.005	0.1	0.005	0.05	0.005						
2-Chloroethyl Vinyl Ether		0.01										
2-Hexanone		0.01	0.1	0.01	0.05	0.01						
4-Methyl-2-Pentanone		0.01	0.1	0.01	0.05	0.01						
Acetone		0.025	0.1	0.01	0.05	0.01						
Benzene	0.002	0.005	0.1	0.005	0.02	0.005	0.017	0.057	0.199	0.067	0.034	0.0075
Bromodichloromethane		0.005	0.1	0.005	0.05	0.005						
Bromoform		0.005	0.1	0.005	0.05	0.005						
Bromomethane		0.005	0.1	0.01	0.05	0.01						
Carbon Disulfide		0.005	0.1	0.005	0.05	0.005						
Carbon Tetrachloride		0.005	0.1	0.005	0.05	0.005						
Chlorobenzene		0.005	0.1	0.005	0.05	0.005						
Chlorodibromomethane			0.1	0.005	0.05	0.005						
Chloroethane		0.005	0.1	0.01	0.05	0.01						
Chloroform		0.005	0.1	0.005	0.05	0.005						
Chloromethane		0.005	0.1	0.01	0.05	0.01						
cis-1,2-Dichloroethene		0.005	0.1	0.005	0.05	0.005						
cis-1,3-Dichloropropene		0.005	0.1	0.005	0.05	0.005						
Dibromochloromethane		0.005										
Ethylbenzene	0.005	0.005	0.1	0.005	0.05	0.005	0.037	0.171	1.15	0.286	0.046	0.0058
Methanol												
Methylene Chloride		0.005	0.1	0.005	0.05	0.005						
Methyl Ethyl Ketone (2-Butanone)		0.01	0.1	0.01	0.05	0.01						
MTBE			0.1	0.005	0.05	0.005						
Styrene		0.005	0.1	0.005	0.05	0.005						
Tetrachloroethene		0.005	0.1	0.005	0.05	0.005						
Toluene	0.005	0.005	0.1	0.005	0.05	0.005	0.0052	0.502	3.25	0.403	0.022	0.015
trans-1,2-Dichloroethene		0.005	0.1	0.005	0.05	0.005						
trans-1,3-Dichloropropene		0.005	0.1	0.005	0.05	0.005						
Trichloroethene		0.005	0.1	0.005	0.05	0.005						
Trichlorofluoromethane		0.005										
Vinyl Acetate		0.01	0.1	0.01	0.05	0.01						
Vinyl Chloride		0.005	0.1	0.01	0.05	0.01						
Xylenes, Total	0.005	0.005	0.1	0.005	0.05	0.005	12.4	1.28	12.6	2.33	0.088	0.0174
Total VOCs	**0.017**	**0.23**	**3.6**	**0.225**	**1.77**	**0.225**	**12.4592**	**2.01**	**17.199**	**3.086**	**0.19**	**0.0457**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 03: UST Excavation 3 T-039-SB-07 (3-4 ft)	REC 03: UST Excavation 3 T-039-SB-08 (3-4 ft)	REC 03: UST Excavation 3 TA3-02-01 (2-4 ft)	REC 03: UST Excavation 3 TA3-02-02 (4-6 ft)	REC 03: UST Excavation 3 TA3-02-03 (2-4 ft)	REC 03: UST Excavation 3 TA3-02-04 (5-7 ft)	REC 03: UST Excavation 3 TA3-02-05 (5-7 ft)	REC 03: UST Excavation 3 TA3-02-06 (3-5 ft)	REC 03: UST Excavation 3 TA3-02-07 (2-4 ft)	REC 03: UST Excavation 3 TA3-02-08 (2-4 ft)	REC 03: UST Excavation 3 TA3-02-09 (2-4 ft)
1,1,1-Trichloroethane											
1,1,2,2-Tetrachloroethane											
1,1,2-Trichloroethane											
1,1-Dichloroethane											
1,1-Dichloroethene											
1,2-Dichloroethane											
1,2-Dichloropropane											
2-Chloroethyl Vinyl Ether											
2-Hexanone											
4-Methyl-2-Pentanone											
Acetone											
Benzene	0.0053	0.0059	0.002	0.002	0.1	0.002	0.002	0.002	0.002	0.002	0 002
Bromodichloromethane											
Bromoform											
Bromomethane											
Carbon Disulfide											
Carbon Tetrachloride											
Chlorobenzene											
Chlorodibromomethane											
Chloroethane											
Chloroform											
Chloromethane											
cis-1,2-Dichloroethene											
cis-1,3-Dichloropropene											
Dibromochloromethane											
Ethylbenzene	0.0051	0.0059	0.005	0.005	0.1	0.005	0.005	0.357	0.005	0.005	0.005
Methanol											
Methylene Chloride											
Methyl Ethyl Ketone (2-Butanone)											
MTBE											
Styrene											
Tetrachloroethene											
Toluene	0.011	0 011	0.005	0.005	0.1	0.005	0.005	0.0051	0.005	0.005	0.005
trans-1,2-Dichloroethene											
trans-1,3-Dichloropropene											
Trichloroethene											
Trichlorofluoromethane											
Vinyl Acetate											
Vinyl Chloride											
Xylenes, Total	0.0154	0.0178	0.005	0.005	13.4	0.005	0.005	0.702	0.005	0.005	0.005
Total VOCs	**0.0368**	**0.0406**	**0.017**	**0.017**	**13.7**	**0.017**	**0.017**	**1.0661**	**0.017**	**0.017**	**0.017**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 03: UST Excavation 3 TA3-02-11 (2-4 ft)	REC 03: UST Excavation 3 GT-1 (7-8 ft)	REC 03: UST Excavation 3 GT-2 (6-8 ft)	REC 03: UST Excavation 3 TA3-3 (6-7 ft)	REC 03: UST Excavation 3 TA3-4 (8-9 ft)	REC 03: UST Excavation 3 TA3-5 (10-12 ft)	REC 03: UST Excavation 3 TA3-7 (10-12 ft)	REC 04: UST Excavation 4 STF-01-94 (2-3 ft)	REC 04: UST Excavation 4 STF-01-95 (2-3 ft)	REC 04: UST Excavation 4 STF-01-96 (2-3 ft)	REC 04: UST Excavation 4 STF-01-97 (2-3 ft)
1,1,1-Trichloroethane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1,2,2-Tetrachloroethane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1,2-Trichloroethane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1-Dichloroethane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1-Dichloroethene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,2-Dichloroethane		0.0069	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,2-Dichloropropane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
2-Chloroethyl Vinyl Ether		0.01	0.01	0.01	0.01	0.01	0.01				
2-Hexanone		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4-Methyl-2-Pentanone		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Acetone		0.025	0.025	0.025	0.025	0.025	0.025	0.01	0.01	0.01	0.01
Benzene	0.002	0.35	0.026	0.016	0.005	0.041	0.33	0.005	0.005	0.005	0.005
Bromodichloromethane		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Bromoform		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Bromomethane		0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01
Carbon Disulfide		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Carbon Tetrachloride		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chlorobenzene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chlorodibromomethane								0.005	0.005	0.005	0.005
Chloroethane		0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01
Chloroform		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chloromethane		0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01
cis-1,2-Dichloroethene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
cis-1,3-Dichloropropene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Dibromochloromethane		0.005	0.005	0.005	0.005	0.005	0.005				
Ethylbenzene	0.005	0.005	0.005	0.005	0.48	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Methyl Ethyl Ketone (2-Butanone)		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MTBE											
Styrene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Tetrachloroethene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,2-Dichloroethene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,3-Dichloropropene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Trichloroethene		0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Trichlorofluoromethane		0.005	0.005	0.005	0.005	0.005	0.005				
Vinyl Acetate		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Vinyl Chloride		0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.01	0.01
Xylenes, Total	0.005	0.005	0.005	0.03	0.13	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**0.017**	**0.5769**	**0.251**	**0.266**	**0.83**	**0.266**	**0.555**	**0.22**	**0.22**	**0.22**	**0.22**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-98 (2-3 ft)	REC 04: UST Excavation 4 STF-01-99 (6-7 ft)	REC 04: UST Excavation 4 STF-01-100 (6-6 ft)	REC 04: UST Excavation 4 STF-01-101 (5-6 ft)	REC 04: UST Excavation 4 STF-01-102 (5-6 ft)	REC 04: UST Excavation 4 STF-01-103 (5-7 ft)	REC 04: UST Excavation 4 STF-01-104 (5-6 ft)	REC 04: UST Excavation 4 STF-01-105 (5-6 ft)	REC 04: UST Excavation 4 STF-01-106 (5-6 ft)	REC 04: UST Excavation 4 STF-01-107 (5-6 ft)	REC 04: UST Excavation 4 STF-01-108 (4-5 ft)
1,1,1-Trichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1,2,2-Tetrachloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1,2-Trichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1-Dichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,1-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,2-Dichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
1,2-Dichloropropane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
2-Chloroethyl Vinyl Ether											
2-Hexanone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4-Methyl-2-Pentanone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Acetone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Benzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Bromodichloromethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Bromoform	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Bromomethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Carbon Disulfide	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Carbon Tetrachloride	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chlorobenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chlorodibromomethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chloroethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloroform	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Chloromethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
cis-1,2-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
cis-1,3-Dichloropropene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Dibromochloromethane											
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Methyl Ethyl Ketone (2-Butanone)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
MTBE											
Styrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Tetrachloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Toluene	0.0064	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.0062	0.005
trans-1,2-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,3-Dichloropropene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Trichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Trichlorofluoromethane											
Vinyl Acetate	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Vinyl Chloride	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**0.2214**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.2212**	**0.22**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-126 (5-6 ft)	REC 04: UST Excavation 4 STF-01-127 (5-6 ft)	REC 04: UST Excavation 4 STF-01-128 (5-6 ft)	REC 04: UST Excavation 4 STF-01-129 (5-6 ft)	REC 04: UST Excavation 4 Exc. 4, P-1 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-2 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-3 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-4 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-5 (1-2 ft)	REC 04: UST Excavation 4 STF-1 (6-7 ft)	REC 04: UST Excavation 4 STF-3 (7-8 ft)
1,1,1-Trichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,1,2,2-Tetrachloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,1,2-Trichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,1-Dichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,1-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,2-Dichloroethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
1,2-Dichloropropane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
2-Chloroethyl Vinyl Ether										0.1	0.01
2-Hexanone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.01
4-Methyl-2-Pentanone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.01
Acetone	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.25	0.025
Benzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Bromodichloromethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Bromoform	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Bromomethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.005
Carbon Disulfide	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Carbon Tetrachloride	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Chlorobenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Chlorodibromomethane	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		
Chloroethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.005
Chloroform	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Chloromethane	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.005
cis-1,2-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
cis-1,3-Dichloropropene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Dibromochloromethane										0.05	0.005
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	18	0.005
Methanol											
Methylene Chloride	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Methyl Ethyl Ketone (2-Butanone)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.01
MTBE											
Styrene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Tetrachloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
trans-1,2-Dichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
trans-1,3-Dichloropropene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Trichloroethene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.05	0.005
Trichlorofluoromethane										0.05	0.005
Vinyl Acetate	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.01
Vinyl Chloride	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.05	0.005
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	8	0.005
Total VOCs	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**0.22**	**28.2**	**0.23**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 03-13 (6-8 ft)	REC 04: UST Excavation 4 03-13 (18-20 ft)	REC 04: UST Excavation 4 03-14 (10-12 ft)	REC 04: UST Excavation 4 03-14 (18-20 ft)	REC 04: UST Excavation 4 03-56 (4-6 ft)	REC 04: UST Excavation 4 03-56 (8-10 ft)	REC 04: UST Excavation 4 03-58 (8-10 ft)	REC 04: UST Excavation 4 03-58 (10-12 ft)	REC 04: UST Excavation 4 03-60 (6-8 ft)	REC 04: UST Excavation 4 03-60 (8-10 ft)	REC 04: UST Excavation 4 03-62 (6-8 ft)
1,1,1-Trichloroethane	0.005	0.005	0.005	0.005							
1,1,2,2-Tetrachloroethane	0.005	0.005	0.005	0.005							
1,1,2-Trichloroethane	0.005	0.005	0.005	0.005							
1,1-Dichloroethane	0.005	0.005	0.005	0.005							
1,1-Dichloroethene	0.005	0.005	0.005	0.005							
1,2-Dichloroethane	0.005	0.005	0.005	0.005							
1,2-Dichloropropane	0.005	0.005	0.005	0.005							
2-Chloroethyl Vinyl Ether											
2-Hexanone	0.01	0.01	0.01	0.01							
4-Methyl-2-Pentanone	0.01	0.01	0.01	0.01							
Acetone	0.26	0.01	0.01	0.01							
Benzene	0.244	0.005	0.005	0.005	0.002	0.002	0.0044	0.002	0.002	0.002	0.002
Bromodichloromethane	0.005	0.005	0.005	0.005							
Bromoform	0.005	0.005	0.005	0.005							
Bromomethane	0.01	0.01	0.01	0.01							
Carbon Disulfide	0.005	0.005	0.005	0.005							
Carbon Tetrachloride	0.005	0.005	0.005	0.005							
Chlorobenzene	0.005	0.005	0.005	0.005							
Chlorodibromomethane	0.005	0.005	0.005	0.005							
Chloroethane	0.01	0.01	0.01	0.01							
Chloroform	0.005	0.005	0.005	0.005							
Chloromethane	0.01	0.01	0.01	0.01							
cis-1,2-Dichloroethene	0.005	0.005	0.005	0.005							
cis-1,3-Dichloropropene	0.005	0.005	0.005	0.005							
Dibromochloromethane											
Ethylbenzene	0.016	0.005	0.005	0.005	0.354	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride	0.005	0.005	0.005	0.005							
Methyl Ethyl Ketone (2-Butanone)	0.164	0.01	0.01	0.01							
MTBE	0.005	0.005	0.005	0.005							
Styrene	0.005	0.005	0.005	0.005							
Tetrachloroethene	0.005	0.005	0.005	0.005							
Toluene	0.0114	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,2-Dichloroethene	0.005	0.005	0.005	0.005							
trans-1,3-Dichloropropene	0.005	0.005	0.005	0.005							
Trichloroethene	0.005	0.005	0.005	0.005							
Trichlorofluoromethane											
Vinyl Acetate	0.01	0.01	0.01	0.01							
Vinyl Chloride	0.01	0.01	0.01	0.01							
Xylenes, Total	0.0252	0.005	0.005	0.005	0.335	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**0.9056**	**0.225**	**0.225**	**0.225**	**0.696**	**0.017**	**0.0194**	**0.017**	**0.017**	**0.017**	**0.017**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 03-62 (8-10 ft)	REC 04: UST Excavation 4 03-65 (6-8 ft)	REC 05: UST Excavation 5 D-7 (6-8 ft)	REC 05: UST Excavation 5 TP-1 (6-6 ft)	REC 05: UST Excavation 5 TP-2 (5-5 ft)	REC 05: UST Excavation 5 TP-7 (5-5 ft)	REC 05: UST Excavation 5 01-73 (2-4 ft)	REC 05: UST Excavation 5 01-77 (2-4 ft)	REC 05: UST Excavation 5 03-05 (4-6 ft)	REC 05: UST Excavation 5 03-05 (8-10 ft)	REC 05: UST Excavation 5 05-03B (5-7 ft)
1,1,1-Trichloroethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,1,2,2-Tetrachloroethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,1,2-Trichloroethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,1-Dichloroethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,1-Dichloroethene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,2-Dichloroethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
1,2-Dichloropropane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
2-Chloroethyl Vinyl Ether			0.01	0.01	0.1	0.1					
2-Hexanone			0.01	0.01	0.1	0.1	0.01	0.01	0.05	0.01	0.1
4-Methyl-2-Pentanone			0.01	0.01	0.1	0.1	0.01	0.01	0.05	0.01	0.1
Acetone			0.025	0.025	0.25	0.25	0.01	0.01	0.05	0.01	0.1
Benzene	0.002	0.002	0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Bromodichloromethane			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Bromoform			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Bromomethane			0.005	0.005	0.05	0.05	0.01	0.01	0.05	0.01	0.1
Carbon Disulfide			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Carbon Tetrachloride			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Chlorobenzene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Chlorodibromomethane			0.005				0.005	0.005	0.05	0.005	0.1
Chloroethane			0.005	0.005	0.05	0.05	0.01	0.01	0.05	0.01	0.1
Chloroform			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Chloromethane			0.005	0.005	0.05	0.05	0.01	0.01	0.05	0.01	0.1
cis-1,2-Dichloroethene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
cis-1,3-Dichloropropene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Dibromochloromethane				0.005	0.05	0.05					
Ethylbenzene	0.005	0.005	0.63	0.14	0.32	3.8	0.0563	0.362	1.64	0.005	0.1
Methanol							0.1	0.1			
Methylene Chloride			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Methyl Ethyl Ketone (2-Butanone)			0.01	0.01	0.1	0.1	0.01	0.01	0.05	0.01	0.1
MTBE									0.05	0.005	0.1
Styrene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Tetrachloroethene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Toluene	0.005	0.005	0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
trans-1,2-Dichloroethene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
trans-1,3-Dichloropropene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Trichloroethene			0.005	0.005	0.05	0.05	0.005	0.005	0.05	0.005	0.1
Trichlorofluoromethane			0.005	0.005	0.05	0.05					
Vinyl Acetate			0.01	0.01	0.1	0.1	0.01	0.01	0.05	0.01	0.1
Vinyl Chloride			0.005	0.005	0.05	0.05	0.01	0.01	0.05	0.01	0.1
Xylenes, Total	0.005	0.005	0.56	0.054	0.23	1.8	0.0435	2.14	0.0943	0.005	0.1
Total VOCs	**0.017**	**0.017**	**1.41**	**0.414**	**2.75**	**7.8**	**0.4098**	**2.812**	**3.4343**	**0.225**	**3.6**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 05: UST Excavation 5 05-04B (4-5 ft)	REC 11: UST Excavation 11 H-01-90 (2-4 ft)	REC 11: UST Excavation 11 H-01-91 (2-4 ft)	REC 11: UST Excavation 11 H-01-92 (2-4 ft)	REC 11: UST Excavation 11 H-01-93 (2-4 ft)	REC 12: Solvent Recovery Room A-2 (6-8 ft)	REC 12: Solvent Recovery Room UMW-25 (8-10 ft)	REC 12: Solvent Recovery Room UMW-27 (3-5 ft)	REC 12: Solvent Recovery Room SR-SB-01 (1-2 ft)	REC 12: Solvent Recovery Room SR-SB-02 (1-2 ft)	REC 12: Solvent Recovery Room SR-SB-04 (2-3 ft)
1,1,1-Trichloroethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,1,2,2-Tetrachloroethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,1,2-Trichloroethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,1-Dichloroethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,1-Dichloroethene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,2-Dichloroethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
1,2-Dichloropropane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
2-Chloroethyl Vinyl Ether						0.01	0.01	0.01			
2-Hexanone	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
4-Methyl-2-Pentanone	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
Acetone	0.1	0.01	0.01	0.01	0.01	0.025	0.130A	0.63A			
Benzene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.124	1.34	0.0054
Bromodichloromethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Bromoform	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Bromomethane	0.1	0.01	0.01	0.01	0.01	0.005	0.005	0.005			
Carbon Disulfide	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Carbon Tetrachloride	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Chlorobenzene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Chlorodibromomethane	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Chloroethane	0.1	0.01	0.01	0.01	0.01	0.005	0.005	0.005			
Chloroform	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Chloromethane	0.1	0.01	0.01	0.01	0.01	0.005	0.005	0.005			
cis-1,2-Dichloroethene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
cis-1,3-Dichloropropene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Dibromochloromethane											
Ethylbenzene	0.223	0.362	0.005	0.005	0.005	0.005	0.005	0.005	1.24	12.3	0.0054
Methanol											
Methylene Chloride	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Methyl Ethyl Ketone (2-Butanone)	0.1	0.01	0.01	0.01	0.01	0.01	0.029	0.01			
MTBE	0.1										
Styrene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Tetrachloroethene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Toluene	0.1	0.005	0.005	0.005	0.005	0.005	0.02	0.0057	382	1230	0.012
trans-1,2-Dichloroethene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
trans-1,3-Dichloropropene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Trichloroethene	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.005			
Trichlorofluoromethane						0.005	0.005	0.005			
Vinyl Acetate	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01			
Vinyl Chloride	0.1	0.01	0.01	0.01	0.01	0.005	0.005	0.005			
Xylenes, Total	0.1	2.14	0.005	0.005	0.005	1	0.35	0.014	13.4	36.9	0.0163
Total VOCs	**3.723**	**2.712**	**0.22**	**0.22**	**0.22**	**1.225**	**0.584**	**0.2147**	**396.764**	**1280.54**	**0.0391**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room SR-SB-05 (2-3 ft)	REC 12: Solvent Recovery Room SR-SB-07 (6-7 ft)	REC 12: Solvent Recovery Room "West" (3-4 ft)	REC 12: Solvent Recovery Room "East" (3-4 ft)	REC 12: Solvent Recovery Room "Center" (3-4 ft)	REC 12: Solvent Recovery Room SR-01-132 (3-4 ft)	REC 12: Solvent Recovery Room UMW-38 (10-12 ft)	REC 12: Solvent Recovery Room UMW-39 (8-10 ft)	REC 12: Solvent Recovery Room UMW-39 (10-12 ft)	REC 12: Solvent Recovery Room UMW-40 (8-10 ft)	REC 12: Solvent Recovery Room UMW-41 (6-8 ft)
1,1,1-Trichloroethane						1					
1,1,2,2-Tetrachloroethane						1					
1,1,2-Trichloroethane						1					
1,1-Dichloroethane						1					
1,1-Dichloroethene						1					
1,2-Dichloroethane						1					
1,2-Dichloropropane						1					
2-Chloroethyl Vinyl Ether											
2-Hexanone						1					
4-Methyl-2-Pentanone						1					
Acetone						1					
Benzene	0.164	0.0075	6.66	0.025	0.025	1	0.002	0.1	0.002	0.002	0.093
Bromodichloromethane						1					
Bromoform						1					
Bromomethane						1					
Carbon Disulfide						1					
Carbon Tetrachloride						1					
Chlorobenzene						1					
Chlorodibromomethane						1					
Chloroethane						1					
Chloroform						1					
Chloromethane						1					
cis-1,2-Dichloroethene						1					
cis-1,3-Dichloropropene						1					
Dibromochloromethane											
Ethylbenzene	1.54	0.0051	22.4	0.338	0.57	55.5	0.005	18.6	0.005	0.005	0.493
Methanol											
Methylene Chloride						1					
Methyl Ethyl Ketone (2-Butanone)						1					
MTBE											
Styrene						1					
Tetrachloroethene						1					
Toluene	175	0.017	2770	20.1	27.4	2040	0.005	0.1	0.005	0.005	0.005
trans-1,2-Dichloroethene						1					
trans-1,3-Dichloropropene						1					
Trichloroethene						1					
Trichlorofluoromethane											
Vinyl Acetate						1					
Vinyl Chloride						1					
Xylenes, Total	7.71	0.0153	666	2.32	3.14	238	0.005	13.1	0.0409	0.005	8.04
Total VOCs	**184.414**	**0.0449**	**3465.06**	**22.783**	**31.135**	**2365.5**	**0.017**	**31.9**	**0.0529**	**0.017**	**8.631**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room UMW-41 (12-14 ft)	REC 12: Solvent Recovery Room UMW-42 (4-6 ft)	REC 12: Solvent Recovery Room UMW-42 (12-14 ft)	REC 12: Solvent Recovery Room 03-46 (10-12 ft)	REC 12: Solvent Recovery Room 03-46 (12-14 ft)	REC 12: Solvent Recovery Room 03-47 (10-12 ft)	REC 12: Solvent Recovery Room 03-47 (12-14 ft)	REC 12: Solvent Recovery Room 03-48 (5-7 ft)	REC 12: Solvent Recovery Room 03-49 (6-8 ft)	REC 12: Solvent Recovery Room 03-49 (12-14 ft)	REC 12: Solvent Recovery Room 03-50 (4-6 ft)
1,1,1-Trichloroethane											
1,1,2,2-Tetrachloroethane											
1,1,2-Trichloroethane											
1,1-Dichloroethane											
1,1-Dichloroethene											
1,2-Dichloroethane											
1,2-Dichloropropane											
2-Chloroethyl Vinyl Ether											
2-Hexanone											
4-Methyl-2-Pentanone											
Acetone											
Benzene	0.002	0.0686	0.002	0.1	0.002	0.0042	0.002	0.002	0.002	0.002	0.002
Bromodichloromethane											
Bromoform											
Bromomethane											
Carbon Disulfide											
Carbon Tetrachloride											
Chlorobenzene											
Chlorodibromomethane											
Chloroethane											
Chloroform											
Chloromethane											
cis-1,2-Dichloroethene											
cis-1,3-Dichloropropene											
Dibromochloromethane											
Ethylbenzene	0.005	30.2	0.005	0.838	0.005	0.0066	0.005	0.005	1.26	0.005	0.219
Methanol											
Methylene Chloride											
Methyl Ethyl Ketone (2-Butanone)											
MTBE											
Styrene											
Tetrachloroethene											
Toluene	0.0139	1,720	0.0083	0.1	0.005	0.0058	0.005	0.005	0.0127	0.005	0.005
trans-1,2-Dichloroethene											
trans-1,3-Dichloropropene											
Trichloroethene											
Trichlorofluoromethane											
Vinyl Acetate											
Vinyl Chloride											
Xylenes, Total	0.005	185	0.005	0.508	0.005	0.005	0.005	0.005	0.005	0.005	0.381
Total VOCs	**0.0259**	**1935.2686**	**0.0203**	**1.546**	**0.017**	**0.0216**	**0.017**	**0.017**	**1.2797**	**0.017**	**0.607**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-50 (8-10 ft)	REC 12: Solvent Recovery Room 03-51 (8-10 ft)	REC 12: Solvent Recovery Room 03-51 (15-17 ft)	REC 12: Solvent Recovery Room 03-52 (8-10 ft)	REC 12: Solvent Recovery Room 03-53 (6-8 ft)	REC 12: Solvent Recovery Room 03-54 (6-8 ft)	REC 12: Solvent Recovery Room 03-55 (6-8 ft)	REC 12: Solvent Recovery Room 03-55 (8-10 ft)	REC 12: Solvent Recovery Room 03-68 (6-8 ft)	REC 12: Solvent Recovery Room 03-68 (8-10 ft)	REC 12: Solvent Recovery Room 03-69 (4-6 ft)
1,1,1-Trichloroethane											
1,1,2,2-Tetrachloroethane											
1,1,2-Trichloroethane											
1,1-Dichloroethane											
1,1-Dichloroethene											
1,2-Dichloroethane											
1,2-Dichloropropane											
2-Chloroethyl Vinyl Ether											
2-Hexanone											
4-Methyl-2-Pentanone											
Acetone											
Benzene	0.002	0.002	0.002	0.002	0.002	0.002	0.05	0.002	0.1	0.002	0.002
Bromodichloromethane											
Bromoform											
Bromomethane											
Carbon Disulfide											
Carbon Tetrachloride											
Chlorobenzene											
Chlorodibromomethane											
Chloroethane											
Chloroform											
Chloromethane											
cis-1,2-Dichloroethene											
cis-1,3-Dichloropropene											
Dibromochloromethane											
Ethylbenzene	0.005	0.415	0.005	0.005	0.005	0.005	0.0792	0.005	11.6	0.005	0.005
Methanol											
Methylene Chloride											
Methyl Ethyl Ketone (2-Butanone)											
MTBE											
Styrene											
Tetrachloroethene											
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.32	0.005	0.1	0.005	0.005
trans-1,2-Dichloroethene											
trans-1,3-Dichloropropene											
Trichloroethene											
Trichlorofluoromethane											
Vinyl Acetate											
Vinyl Chloride											
Xylenes, Total	0.005	0.79	0.005	0.005	0.005	0.005	4.23	0.005	17.9	0.005	0.005
Total VOCs	**0.017**	**1.212**	**0.017**	**0.017**	**0.017**	**0.017**	**4.6792**	**0.017**	**29.7**	**0.017**	**0.017**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-69 (6-8 ft)	REC 12: Solvent Recovery Room 03-70 (4-6 ft)	REC 12: Solvent Recovery Room 03-70 (6-8 ft)	REC 12: Solvent Recovery Room 03-71 (4-6 ft)	REC 12: Solvent Recovery Room 03-72 (8-10 ft)	REC 12: Solvent Recovery Room 03-72 (14-16 ft)	REC 12: Solvent Recovery Room 03-73 (8-10 ft)	REC 12: Solvent Recovery Room 03-73 (12-14 ft)	REC 12: Solvent Recovery Room 03-76 (4-6 ft)	REC 12: Solvent Recovery Room 03-76 (8-10 ft)	REC 12: Solvent Recovery Room 05-06B (7-9 ft)
1,1,1-Trichloroethane											0.005
1,1,2,2-Tetrachloroethane											0.005
1,1,2-Trichloroethane											0.005
1,1-Dichloroethane											0.005
1,1-Dichloroethene											0.005
1,2-Dichloroethane											0.005
1,2-Dichloropropane											0.005
2-Chloroethyl Vinyl Ether											
2-Hexanone											0.01
4-Methyl-2-Pentanone											0.01
Acetone											0.01
Benzene	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.05	0.002	0.005
Bromodichloromethane											0.005
Bromoform											0.005
Bromomethane											0.01
Carbon Disulfide											0.005
Carbon Tetrachloride											0.005
Chlorobenzene											0.005
Chlorodibromomethane											0.005
Chloroethane											0.01
Chloroform											0.005
Chloromethane											0.01
cis-1,2-Dichloroethene											0.005
cis-1,3-Dichloropropene											0.005
Dibromochloromethane											
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	27.2	0.005	3.14
Methanol											
Methylene Chloride											0.005
Methyl Ethyl Ketone (2-Butanone)											0.01
MTBE											0.005
Styrene											0.005
Tetrachloroethene											0.005
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.113	0.005	0.0109
trans-1,2-Dichloroethene											0.005
trans-1,3-Dichloropropene											0.005
Trichloroethene											0.005
Trichlorofluoromethane											
Vinyl Acetate											0.01
Vinyl Chloride											0.01
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.0083	0.005	39.1	0.005	2.4
Total VOCs	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**	**0.0203**	**0.017**	**66.463**	**0.017**	**5.7609**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 05-07B (8-10 ft)	REC 12: Solvent Recovery Room 05-12B (4-6 ft)	REC 13: Bldg D Transformer 03-08 (4-6 ft)	REC 13: Bldg D Transformer 03-09 (4-6 ft)	REC 13: Bldg D Transformer 03-10 (4-6 ft)	REC 13: Bldg D Transformer 03-11 (3-5 ft)	REC 14: Tank 30 UST T28-E (3-4 ft)	REC 14: Tank 30 UST T28-W (3-4 ft)	REC 14: Tank 30 UST T28-N (3-4 ft)	REC 14: Tank 30 UST T28-S (3-4 ft)	REC 16: Bldg E Kero Pits E-01-13 (4-6 ft)
1,1,1-Trichloroethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,1,2,2-Tetrachloroethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,1,2-Trichloroethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,1-Dichloroethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,1-Dichloroethene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,2-Dichloroethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
1,2-Dichloropropane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
2-Chloroethyl Vinyl Ether			0.1	0.1	0.1	0.1					
2-Hexanone	0.1	0.01	0.1	0.1	0.01	0.01					0.01
4-Methyl-2-Pentanone	0.1	0.01	0.1	0.1	0.01	0.01					0.01
Acetone	0.1	0.01	0.1	0.1	0.01	0.01					0.0481
Benzene	0.1	0.0447	0.1	0.1	0.005	0.005	0.002	0.002	0.002	0.002	0.007
Bromodichloromethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Bromoform	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Bromomethane	0.1	0.01	0.1	0.1	0.01	0.01					0.01
Carbon Disulfide	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Carbon Tetrachloride	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Chlorobenzene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Chlorodibromomethane	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Chloroethane	0.1	0.01	0.1	0.1	0.01	0.01					0.01
Chloroform	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Chloromethane	0.1	0.01	0.1	0.1	0.01	0.01					0.01
cis-1,2-Dichloroethene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
cis-1,3-Dichloropropene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Dibromochloromethane											
Ethylbenzene	0.1	0.0824	2.63	0.977	0.005	0.005	0.005	0.005	0.005	0.005	0.0059
Methanol											
Methylene Chloride	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Methyl Ethyl Ketone (2-Butanone)	0.1	0.01	0.1	0.1	0.01	0.01					0.0122
MTBE	0.1	0.005	0.1	0.1	0.005	0.005					
Styrene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Tetrachloroethene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Toluene	0.1	0.0499	0.1	0.1	0.005	0.005	0.005	0.005	0.005	0.005	0.0166
trans-1,2-Dichloroethene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
trans-1,3-Dichloropropene	0.1	0.005	0.1	0.1	0.005	0.005					0.005
Trichloroethene	0.1	0.005	0.1	0.1	0.005	0.0136					0.005
Trichlorofluoromethane											
Vinyl Acetate	0.1	0.01	0.1	0.1	0.01	0.01					0.01
Vinyl Chloride	0.1	0.01	0.1	0.1	0.01	0.01					0.01
Xylenes, Total	0.1	0.502	3.21	0.753	0.005	0.005	0.005	0.005	0.005	0.005	0.0113
Total VOCs	**3.6**	**0.884**	**9.34**	**5.23**	**0.325**	**0.3336**	**0.017**	**0.017**	**0.017**	**0.017**	**0.2811**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 16: Bldg E Kero Pits E-01-16 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-18 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-19 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-20 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-37 (4-6 ft)	REC 16: Bldg E Kero Pits NBT-1 (10-11 ft)	REC 16: Bldg E Kero Pits TP-B (7-9 ft)	REC 16: Bldg E Kero Pits 03-04 (10-12 ft)	REC 16: Bldg E Kero Pits 03-04 (12-14 ft)	REC 16: Bldg E Kero Fits 03-P2 (8-10 ft)	REC 16: Bldg E Kero Pits 03-P2 (10-12 ft)
1,1,1-Trichloroethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,1,2,2-Tetrachloroethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,1,2-Trichloroethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,1-Dichloroethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,1-Dichloroethene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,2-Dichloroethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
1,2-Dichloropropane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
2-Chloroethyl Vinyl Ether						0.01	0.1	0.1	0.1	0.1	0.1
2-Hexanone		0.01			0.01	0.01	0.1	0.01	0.01	0.1	0.1
4-Methyl-2-Pentanone		0.01			0.01	0.01	0.1	0.01	0.01	0.1	0.1
Acetone		0.01			0.01	0.025	0.25	0.01	0.01	0.1	0.1
Benzene	0.002	0.0064	0.002	0.002	0.005	0.005	0.05	0.005	0.005	0.1	0.1
Bromodichloromethane		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Bromoform		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Bromomethane		0.01			0.01	0.005	0.05	0.01	0.01	0.1	0.1
Carbon Disulfide		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Carbon Tetrachloride		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Chlorobenzene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Chlorodibromomethane		0.005			0.005			0.005	0.005	0.1	0.1
Chloroethane		0.01			0.01	0.005	0.05	0.01	0.01	0.1	0.1
Chloroform		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Chloromethane		0.01			0.01	0.005	0.05	0.01	0.01	0.1	0.1
cis-1,2-Dichloroethene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
cis-1,3-Dichloropropene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Dibromochloromethane						0.005	0.05				
Ethylbenzene	0.005	0.0056	0.005	0.005	0.005	0.005	0.05	0.0096	0.005	0.1	0.1
Methanol											
Methylene Chloride		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Methyl Ethyl Ketone (2-Butanone)		0.01			0.01	0.01	0.1	0.01	0.01	0.1	0.1
MTBE								0.005	0.005	0.1	0.1
Styrene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Tetrachloroethene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Toluene	0.005	0.0153	0.005	0.005	0.005	0.005	0.05	0.005	0.005	0.1	0.1
trans-1,2-Dichloroethene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
trans-1,3-Dichloropropene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Trichloroethene		0.005			0.005	0.005	0.05	0.005	0.005	0.1	0.1
Trichlorofluoromethane						0.005	0.05				
Vinyl Acetate		0.01			0.01	0.01	0.1	0.01	0.01	0.1	0.1
Vinyl Chloride		0.01			0.01	0.005	0.05	0.01	0.01	0.1	0.1
Xylenes, Total	0.005	0.0119	0.005	0.005	0.005	0.005	0.05	0.0394	0.005	0.1	0.1
Total VOCs	**0.017**	**0.2392**	**0.017**	**0.017**	**0.22**	**0.23**	**2.3**	**0.364**	**0.325**	**3.7**	**3.7**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 2/16: Bldg E Kero Pits 05-01B (8-10 ft)	REC 2/16: Bldg E Kero Pits 05-02B (7-9 ft)	REC 17: Bldg H Material V-13 (3-4 ft)	REC 17: Bldg H Material V-32 (3-5 ft)	REC 17: Bldg H Material V-9 (3-4 ft)	REC 17: Bldg H Material H-01-147 (2-4 ft)	REC 17: Bldg H Material H-01-147-GLA (2-4 ft)	REC 17: Bldg H Material H-01-148 (2-3 ft)	REC 17: Bldg H Material H-01-148-GLA (2-3 ft)	REC 18: Bldg J Transformer West End (0-1 ft)	REC 18: Bldg J Transformer South End (0-1 ft)
1,1,1-Trichloroethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,1,2,2-Tetrachloroethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,1,2-Trichloroethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,1-Dichloroethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,1-Dichloroethene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,2-Dichloroethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
1,2-Dichloropropane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
2-Chloroethyl Vinyl Ether											
2-Hexanone	0.1	0.1	0.5	0.5	0.5	0.01	0.01	0.01	0.01		
4-Methyl-2-Pentanone	0.1	0.1	0.5	0.5	0.5	0.01	0.01	0.01	0.01		
Acetone	0.1	0.1	1.25	1.25	1.25	0.01	0.01	0.01	0.01		
Benzene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005	0.00182	0.00259
Bromodichloromethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Bromoform	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Bromomethane	0.1	0.1	0.25	0.25	0.25	0.01	0.01	0.01	0.01		
Carbon Disulfide	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Carbon Tetrachloride	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Chlorobenzene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Chlorodibromomethane	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Chloroethane	0.1	0.1	0.25	0.25	0.25	0.01	0.01	0.01	0.01		
Chloroform	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Chloromethane	0.1	0.1	0.25	0.25	0.25	0.01	0.01	0.01	0.01		
cis-1,2-Dichloroethene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
cis-1,3-Dichloropropene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Dibromochloromethane											
Ethylbenzene	0.1	0.76	0.25	0.25	0.25	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride	0.1	0.1	0.25	0.558	0.25	0.005	0.005	0.005	0.005		
Methyl Ethyl Ketone (2-Butanone)	0.1	0.1	0.5	0.5	0.5	0.01	0.01	0.01	0.01		
MTBE	0.1	0.1									
Styrene	0.1	0.1	0.25	0.25	0.254	0.005	0.005	0.005	0.005		
Tetrachloroethene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Toluene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005	0.005	0.00587
trans-1,2-Dichloroethene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
trans-1,3-Dichloropropene	0.1	0.1	0.25	0.25	0.25	0.005	0.005	0.005	0.005		
Trichloroethene	0.1	0.1	0.258	0.257	0.326	0.005	0.005	0.005	0.005		
Trichlorofluoromethane			0.25	0.25	0.25		0.005		0.005		
Vinyl Acetate	0.1	0.1	0.5	0.5	0.5	0.01	0.01	0.01	0.01		
Vinyl Chloride	0.1	0.1	0.25	0.25	0.25	0.01	0.01	0.01	0.01		
Xylenes, Total	0.1	2.88	0.25	0.25	0.25	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**3.6**	**7.04**	**11.008**	**11.315**	**11.08**	**0.22**	**0.225**	**0.22**	**0.225**	**0.01682**	**0.01846**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 18: Bldg J Transformer East End (0-1 ft)	REC 21: Still Room D-01-52 (2-4 ft)	REC 21: Still Room D-01-53 (2-4 ft)	REC 22: Bldg D Coal Tar Sat T-01-44 (4-6 ft)	REC 24: Bldg T Tar Pit T-01-41 (2-4 ft)	REC 25: Bldg D Saturators TP-N (6-8 ft)	REC 25: Bldg Saturators D-01-45 (2-4 ft)	REC 25: Bldg Saturators D-01-46 (2-4 ft)	REC 25: Bldg Saturators D-01-47 (2-4 ft)	REC 26: Tank 053 T27-S (3-4 ft)	REC 26: Tank 053 T27-E (3-4 ft)
1,1,1-Trichloroethane						0.005					
1,1,2,2-Tetrachloroethane						0.005					
1,1,2-Trichloroethane						0.005					
1,1-Dichloroethane						0.005					
1,1-Dichloroethene						0.005					
1,2-Dichloroethane						0.005					
1,2-Dichloropropane						0.005					
2-Chloroethyl Vinyl Ether						0.01					
2-Hexanone						0.01					
4-Methyl-2-Pentanone						0.01					
Acetone						0.025					
Benzene	0.0023	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002
Bromodichloromethane						0.005					
Bromoform						0.005					
Bromomethane						0.005					
Carbon Disulfide						0.005					
Carbon Tetrachloride						0.005					
Chlorobenzene						0.005					
Chlorodibromomethane						0.005					
Chloroethane						0.005					
Chloroform						0.005					
Chloromethane						0.005					
cis-1,2-Dichloroethene						0.005					
cis-1,3-Dichloropropene						0.005					
Dibromochloromethane											
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Methanol											
Methylene Chloride						0.005					
Methyl Ethyl Ketone (2-Butanone)						0.01					
MTBE											
Styrene						0.005					
Tetrachloroethene						0.005					
Toluene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
trans-1,2-Dichloroethene						0.005					
trans-1,3-Dichloropropene						0.005					
Trichloroethene						0.005					
Trichlorofluoromethane						0.005					
Vinyl Acetate						0.01					
Vinyl Chloride						0.005					
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Total VOCs	**0.0173**	**0.017**	**0.017**	**0.017**	**0.017**	**0.23**	**0.017**	**0.017**	**0.017**	**0.017**	**0.017**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 26: Tank 053 T27-W (3-4 ft)	REC 26: Tank 053 T27-N (3-4 ft)	REC 27: Coal Pit CP-NC (0-1 ft)	REC 27: Coal Pit CP-NE (0-1 ft)	REC 27: Coal Pit CP-NW (0-1 ft)	REC 27: Coal Pit CP-SE (0-1 ft)	REC 31: Locomotive RR-SB-01 (2-3 ft)	REC 31: Locomotive RR-SB-02 (0-1 ft)	REC 32: Tank 031 TP-3 (5-5 ft)	REC 37: UST Excavation 039 JM-039-NW (3-4 ft)	REC 37: UST Excavation 039 JM-039-SW (3-4 ft)
1,1,1-Trichloroethane			0.005	0.005	0.005	0.005			0.005		
1,1,2,2-Tetrachloroethane			0.005	0.005	0.005	0.005			0.005		
1,1,2-Trichloroethane			0.005	0.005	0.005	0.005			0.005		
1,1-Dichloroethane			0.005	0.005	0.005	0.005			0.005		
1,1-Dichloroethene			0.005	0.005	0.005	0.005			0.005		
1,2-Dichloroethane			0.005	0.005	0.005	0.005			0.005		
1,2-Dichloropropane			0.005	0.005	0.005	0.005			0.005		
2-Chloroethyl Vinyl Ether									0.01		
2-Hexanone			0.01	0.01	0.01	0.01			0.01		
4-Methyl-2-Pentanone			0.01	0.01	0.01	0.01			0.01		
Acetone			0.0951	0.165	0.0761	0.238			0.025		
Benzene	0.002	0.002	0.005	0.005	0.005	0.005	U (0.006)	0.0063	0.005	0.0056	0.0075
Bromodichloromethane			0.005	0.005	0.005	0.005			0.005		
Bromoform			0.005	0.005	0.005	0.005			0.005		
Bromomethane			0.005	0.005	0.005	0.005			0.005		
Carbon Disulfide			0.00718	0.021	0.005	0.0297			0.005		
Carbon Tetrachloride			0.005	0.005	0.005	0.005			0.005		
Chlorobenzene			0.005	0.005	0.005	0.005			0.005		
Chlorodibromomethane			0.005	0.005	0.005	0.005					
Chloroethane			0.005	0.005	0.005	0.005			0.005		
Chloroform			0.005	0.005	0.005	0.005			0.005		
Chloromethane			0.005	0.005	0.005	0.005			0.005		
cis-1,2-Dichloroethene			0.005	0.005	0.005	0.005			0.005		
cis-1,3-Dichloropropene			0.005	0.005	0.005	0.005			0.005		
Dibromochloromethane									0.005		
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.0063	0.005	0.0053	0.0064
Methanol											
Methylene Chloride			0.005	0.005	0.005	0.005			0.005		
Methyl Ethyl Ketone (2-Butanone)			0.01	0.0277	0.01	0.0418			0.01		
MTBE											
Styrene			0.005	0.005	0.005	0.005			0.005		
Tetrachloroethene			0.005	0.005	0.005	0.005			0.005		
Toluene	0.005	0.005	0.005	0.00851	0.005	0.005	0.006	0.0063	0.005	0.012	0.014
trans-1,2-Dichloroethene			0.005	0.005	0.005	0.005			0.005		
trans-1,3-Dichloropropene			0.005	0.005	0.005	0.005			0.005		
Trichloroethene			0.005	0.005	0.005	0.005			0.005		
Trichlorofluoromethane			0.005	0.005	0.005	0.0122			0.005		
Vinyl Acetate			0.01	0.01	0.01	0.01			0.01		
Vinyl Chloride			0.005	0.005	0.005	0.005			0.005		
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.0179	0.0189	0.005	0.0159	0.0192
Total VOCs	**0.017**	**0.017**	**0.29228**	**0.39721**	**0.2711**	**0.4967**	**0.0299**	**0.0378**	**0.23**	**0.0388**	**0.0471**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2A
Total Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 37: UST Excavation 039 JM-039-WW (3-4 ft)	REC 37: UST Excavation 039 JM-039-EW (3-4 ft)	South of Pumping Lagoon ICS-1 (6-7 ft)	Bldg C - East End C-3 (6-8 ft)	Building B B-2 (6-8 ft)
1,1,1-Trichloroethane			0.005	0.005	0.05
1,1,2,2-Tetrachloroethane			0.005	0.005	0.05
1,1,2-Trichloroethane			0.005	0.005	0.05
1,1-Dichloroethane			0.005	0.005	0.05
1,1-Dichloroethene			0.005	0.005	0.05
1,2-Dichloroethane			0.005	0.005	0.05
1,2-Dichloropropane			0.005	0.005	0.05
2-Chloroethyl Vinyl Ether			0.01	0.01	0.1
2-Hexanone			0.01	0.01	0.1
4-Methyl-2-Pentanone			0.01	0.01	0.1
Acetone			0.025	0.025	0.25
Benzene	0.0061	0.0055	0.005	0.005	0.05
Bromodichloromethane			0.005	0.005	0.05
Bromoform			0.005	0.005	0.05
Bromomethane			0.005	0.005	0.05
Carbon Disulfide			0.005	0.005	0.05
Carbon Tetrachloride			0.005	0.005	0.05
Chlorobenzene			0.005	0.005	0.05
Chlorodibromomethane					0.005
Chloroethane			0.005	0.005	0.05
Chloroform			0.005	0.005	0.05
Chloromethane			0.005	0.005	0.05
cis-1,2-Dichloroethene			0.005	0.005	0.05
cis-1,3-Dichloropropene			0.005	0.005	0.05
Dibromochloromethane			0.005	0.005	0.05
Ethylbenzene	0.0058	0.0053	0.005	0.005	0.05
Methanol					
Methylene Chloride			0.005	0.005	0.05
Methyl Ethyl Ketone (2-Butanone)			0.01	0.01	0.1
MTBE					
Styrene			0.005	0.005	0.05
Tetrachloroethene			0.005	0.005	0.05
Toluene	0.011	0.01	0.005	0.005	0.05
trans-1,2-Dichloroethene			0.005	0.005	0.05
trans-1,3-Dichloropropene			0.005	0.005	0.05
Trichloroethene			0.005	0.005	0.05
Trichlorofluoromethane			0.005	0.005	0.05
Vinyl Acetate			0.01	0.01	0.1
Vinyl Chloride			0.005	0.005	0.05
Xylenes, Total	0.0175	0.016	0.005	0.005	0.05
Total VOCs	**0.0404**	**0.0368**	**0.23**	**0.23**	**2.305**

Results or reporting limit (RL) in mg/kg.
Blank parameters not tested.

Table B-2B
Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, Illinois

Analyte Name	Pre-Excavation REC 12: Solvent Recovery Room C-2 (1.5 ft)	Pre-Excavation REC 12: Solvent Recovery Room B-6 (2 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room C-2 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room D-2 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room C-3 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room D-3 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room D-5 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room C-5 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room C-7 (8 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room D-7 (8 ft)
Acetone	0.1	1.0								
Benzene	**3.72**	**2.54**	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Bromodichloromethane	0.1	1.0								
Bromoform	0.1	1.0								
Bromomethane	0.1	1.0								
2-Butanone (Methyl Ethyl Ketone)	0.1	1.0								
Carbon Disulfide	0.1	1.0								
Carbon Tetrachloride	0.1	1.0								
Chlorobenzene	0.1	1.0								
Chlorodibromomethane	0.1	1.0								
Chloroethane	0.1	1.0								
Chloroform	0.1	1.0								
Chloromethane	0.1	1.0								
1,1-Dichloroethane	0.1	1.0								
1,2-Dichloroethane	0.1	1.0								
1,1-Dichloroethene	0.1	1.0								
cis-1,2-Dichloroethene	0.1	1.0								
trans-1,2-Dichloroethene	0.1	1.0								
1,2-Dichloropropane	0.1	1.0								
cis-1,3-Dichloropropene	0.1	1.0								
trans-1,3-Dichloropropene	0.1	1.0								
Ethylbenzene	2.79	5.62	0.0085	0.005	0.005	0.005	0.005	0.005	0.005	0.005
2-Hexanone	0.1	1.0								
4-Methyl-2-Pentanone	0.1	1.0								
Methylene Chloride	0.1	1.0								
MTBE	0.1	1.0								
Styrene	0.1	1.0								
1,1,2,2-Tetrachloroethane	0.1	1.0								
Tetrachloroethene	0.1	1.0								
Toluene	**353**	**866**	0.309	0.013	0.0166	0.0732	0.005	0.0119	0.232	0.0272
1,1,1-Trichloroethane	0.1	1.0								
1,1,2-Trichloroethane	0.1	1.0								
Trichloroethene	0.1	1.0								
Trichlorofluoromethane										
Vinyl Acetate	0.1	1.0								
Vinyl Chloride	0.1	1.0								
Xylenes, Total	17.5	34.6	0.0126	0.005	0.005	0.005	0.005	0.005	0.0073	0.005
Total VOCs	**380.21**	**940.76**	**0.3321**	**0.025**	**0.0286**	**0.0852**	**0.017**	**0.0239**	**0.2463**	**0.0392**

U: Undetected; PQL shown in parentheses.
Results in mg/kg.
Remediation objectives (ROs) from 35 IAC Part 742.
*=Provisional ROs.
**=RO for 4-Methylphenol.
Blank: parameter(s) not tested.
Shaded: result exceeds most stringent RO.

Table B-2B
Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, Illinois

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room B-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-3 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-3 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-2 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room E-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-B-1 (4 ft)
Acetone										
Benzene	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Bromodichloromethane										
Bromoform										
Bromomethane										
2-Butanone (Methyl Ethyl Ketone)										
Carbon Disulfide										
Carbon Tetrachloride										
Chlorobenzene										
Chlorodibromomethane										
Chloroethane										
Chloroform										
Chloromethane										
1,1-Dichloroethane										
1,2-Dichloroethane										
1,1-Dichloroethene										
cis-1,2-Dichloroethene										
trans-1,2-Dichloroethene										
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
trans-1,3-Dichloropropene										
Ethylbenzene	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.005
2-Hexanone										
4-Methyl-2-Pentanone										
Methylene Chloride										
MTBE										
Styrene										
1,1,2,2-Tetrachloroethane										
Tetrachloroethene										
Toluene	0.005	0.107	0.0178	0.047	0.005	0.0054	0.16	0.0898	0.0753	0.005
1,1,1-Trichloroethane										
1,1,2-Trichloroethane										
Trichloroethene										
Trichlorofluoromethane										
Vinyl Acetate										
Vinyl Chloride										
Xylenes, Total	0.005	0.005	0.005	0.005	0.005	0.005	0.0232	0.0689	0.0228	0.005
Total VOCs	**0.017**	**0.119**	**0.0298**	**0.059**	**0.017**	**0.0174**	**0.1902**	**0.1657**	**0.1061**	**0.017**

U: Undetected; PQL shown in parentheses.
Results in mg/kg.
Remediation objectives (ROs) from 35 IAC Part 742.
*=Provisional ROs.
**=RO for 4-Methylphenol.
Blank: parameter(s) not tested.
Shaded: result exceeds most stringent RO.

Table B-2B
Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, Illinois

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room A-B-2 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-3 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-5 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-1 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-7 (4 ft)
Acetone									
Benzene	0.002	0.002	**0.1**	**0.1**	**0.0904**	0.002	0.002	0.002	1.0
Bromodichloromethane									
Bromoform									
Bromomethane									
2-Butanone (Methyl Ethyl Ketone)									
Carbon Disulfide									
Carbon Tetrachloride									
Chlorobenzene									
Chlorodibromomethane									
Chloroethane									
Chloroform									
Chloromethane									
1,1-Dichloroethane									
1,2-Dichloroethane									
1,1-Dichloroethene									
cis-1,2-Dichloroethene									
trans-1,2-Dichloroethene									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
trans-1,3-Dichloropropene									
Ethylbenzene	0.005	0.0061	2.7	4.54	11.9	0.005	0.005	0.005	4.15
2-Hexanone									
4-Methyl-2-Pentanone									
Methylene Chloride									
MTBE									
Styrene									
1,1,2,2-Tetrachloroethane									
Tetrachloroethene									
Toluene	0.0307	0.0276	0.862	**102**	**1100**	0.029	0.005	0.176	**661**
1,1,1-Trichloroethane									
1,1,2-Trichloroethane									
Trichloroethene									
Trichlorofluoromethane									
Vinyl Acetate									
Vinyl Chloride									
Xylenes, Total	1.22	0.129	1.72	29.4	68.4	0.005	0.005	0.488	35.5
Total VOCs	**1.2577**	**0.1647**	**5.382**	**136.04**	**1180.3904**	**0.041**	**0.017**	**0.671**	**701.65**

U: Undetected; PQL shown in parentheses.
Results in mg/kg.
Remediation objectives (ROs) from 35 IAC Part 742.
*=Provisional ROs.
**=RO for 4-Methylphenol.
Blank: parameter(s) not tested.
Shaded: result exceeds most stringent RO.

Table B-2B
Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, Illinois

Analyte Name	Removed Sample REC 12: Solvent Recovery Room C-7 (4 ft)	Removed Sample REC 12: Solvent Recovery Room D-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-4 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-8 (4 ft)
Acetone										
Benzene	1.0	0.1	0.002	0.125	0.0055	0.0048	0.0065	0.0059	0.002	0.1
Bromodichloromethane										
Bromoform										
Bromomethane										
2-Butanone (Methyl Ethyl Ketone)										
Carbon Disulfide										
Carbon Tetrachloride										
Chlorobenzene										
Chlorodibromomethane										
Chloroethane										
Chloroform										
Chloromethane										
1,1-Dichloroethane										
1,2-Dichloroethane										
1,1-Dichloroethene										
cis-1,2-Dichloroethene										
trans-1,2-Dichloroethene										
1,2-Dichloropropane										
cis-1,3-Dichloropropene										
trans-1,3-Dichloropropene										
Ethylbenzene	24	0.1	0.005	13	0.0082	0.005	0.0206	0.005	0.005	2.41
2-Hexanone										
4-Methyl-2-Pentanone										
Methylene Chloride										
MTBE										
Styrene										
1,1,2,2-Tetrachloroethane										
Tetrachloroethene										
Toluene	1660	19	0.005	918	0.0982	0.0144	0.0293	0.055	0.0151	424
1,1,1-Trichloroethane										
1,1,2-Trichloroethane										
Trichloroethene										
Trichlorofluoromethane										
Vinyl Acetate										
Vinyl Chloride										
Xylenes, Total	164	0.968	0.005	97.9	0.0211	0.0081	0.0831	0.0142	0.0076	58.5
Total VOCs	**1849**	**20.168**	**0.017**	**1029.025**	**0.133**	**0.0323**	**0.1395**	**0.0801**	**0.0297**	**485.01**

U: Undetected; PQL shown in parentheses.
Results in mg/kg.
Remediation objectives (ROs) from 35 IAC Part 742.
*=Provisional ROs.
**=RO for 4-Methylphenol.
Blank: parameter(s) not tested.
Shaded: result exceeds most stringent RO.

Table B-2B
Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, Illinois

Analyte Name	**CURRENT STATUS** REC 12: Solvent Recovery Room C-8 (4 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room D-71/2 (4 ft)	**CURRENT STATUS** REC 12: Solvent Recovery Room B-8 (8 ft)	Removed Sample REC 12: Solvent Recovery Room A-6/7 (8 ft)
Acetone				
Benzene	0.002	0.0068	0.0129	0.0095
Bromodichloromethane				
Bromoform				
Bromomethane				
2-Butanone (Methyl Ethyl Ketone)				
Carbon Disulfide				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
Chloroform				
Chloromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethene				
cis-1,2-Dichloroethene				
trans-1,2-Dichloroethene				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
trans-1,3-Dichloropropene				
Ethylbenzene	0.005	0.005	9.55	0.0452
2-Hexanone				
4-Methyl-2-Pentanone				
Methylene Chloride				
MTBE				
Styrene				
1,1,2,2-Tetrachloroethane				
Tetrachloroethene				
Toluene	0.005	0.0248	1,330	3.56
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethene				
Trichlorofluoromethane				
Vinyl Acetate				
Vinyl Chloride				
Xylenes, Total	0.005	0.01	49.6	0.498
Total VOCs	**0.017**	**0.0466**	**1389.1629**	**4.1127**

U: Undetected; PQL shown in parentheses.
Results in mg/kg.
Remediation objectives (ROs) from 35 IAC Part 742.
*=Provisional ROs.
**=RO for 4-Methylphenol.
Blank: parameter(s) not tested.
Shaded: result exceeds most stringent RO.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 03-01 (9-10 ft)	REC 02: UST Excavation 2 03-02 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (12-14 ft)	REC 04: UST Excavation 4 Exc. 4, P-1 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-2 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-3 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-4 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-5 (1-2 ft)	REC 04: UST Excavation 4 03-13 (6-8 ft)	REC 04: UST Excavation 4 03-13 (18-20 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	4.8	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.75	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.78	0.26	0.26	0.26	0.26	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	17.8	0.33	3.54	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	1.98	0.66	0.66	0.66	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
4-Methylphenol					0.99	0.33	0.33	0.33	0.33		
4-Nitroaniline	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	4.8	1.6	1.6	1.6	1.6	1.6	1.6
Acenaphthene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Aniline					0.99						
Anthracene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.18	0.09	0.09	0.09	0.27	0.09	0.09	0.09	0.09	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 03-01 (9-10 ft)	REC 02: UST Excavation 2 03-02 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (10-12 ft)	REC 02: UST Excavation 2 UMW-37 (12-14 ft)	REC 04: UST Excavation 4 Exc. 4, P-1 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-2 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-3 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-4 (1-2 ft)	REC 04: UST Excavation 4 Exc. 4, P-5 (1-2 ft)	REC 04: UST Excavation 4 03-13 (6-8 ft)	REC 04: UST Excavation 4 03-13 (18-20 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33						0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.18	0.09	0.09	0.09	U (0.270)	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	1.45	0.33	1.09	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Fluorene	0.33	0.33	1.44	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	0.33	0.33	0.99					0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Nitrobenzene	0.26	0.26	0.26	0.26	0.78	0.26	0.26	0.26	0.26	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.99	0.66	0.66	0.66	0.66	0.33	0.33
o-Cresol (2-Methylphenol)					0.99	0.33	0.33	0.33	0.33		
Pentachlorophenol	0.33	0.33	0.33	0.33	4.8	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.893	0.33	1.5	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.99	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**50.623**	**31.29**	**37.54**	**31.29**	**102.21**	**31.62**	**31.62**	**31.62**	**31.62**	**31.29**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 03-14 (10-12 ft)	REC 04: UST Excavation 4 03-14 (18-20 ft)	REC 05: UST Excavation 5 03-05 (4-6 ft)	REC 05: UST Excavation 5 03-05 (8-10 ft)	REC 11: UST Excavation 11 H-01-90 (2-4 ft)	REC 11: UST Excavation 11 H-01-91 (2-4 ft)	REC 11: UST Excavation 11 H-01-92 (2-4 ft)	REC 11: UST Excavation 11 H-01-93 (2-4 ft)	REC 12: Solvent Recovery Room UMW-38 (10-12 ft)	REC 12: Solvent Recovery Room UMW-39 (8-10 ft)
1,2,4-Trichlorobenzene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	3.3	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	7.55	0.25	0.33	0.33	0.33	0.33	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.78	0.26	0.33	0.33	0.33	0.33	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	3.3	0.66	0.66	0.66	0.66	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Methylphenol					0.33	0.33	0.33	0.33		
4-Nitroaniline	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	8.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Acenaphthene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Aniline										
Anthracene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.45	0.09	0.33	0.33	0.33	0.33	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 03-14 (10-12 ft)	REC 04: UST Excavation 4 03-14 (18-20 ft)	REC 05: UST Excavation 5 03-05 (4-6 ft)	REC 05: UST Excavation 5 03-05 (8-10 ft)	REC 11: UST Excavation 11 H-01-90 (2-4 ft)	REC 11: UST Excavation 11 H-01-91 (2-4 ft)	REC 11: UST Excavation 11 H-01-92 (2-4 ft)	REC 11: UST Excavation 11 H-01-93 (2-4 ft)	REC 12: Solvent Recovery Room UMW-38 (10-12 ft)	REC 12: Solvent Recovery Room UMW-39 (8-10 ft)
Benzo(g,h,i)perylene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	101	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	1.65	0.33					0.33	0.33
Chrysene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.45	0.09	0.33	0.33	0.33	0.33	0.09	0.09
Dibenzofuran	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluorene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	1.65	0.33					0.33	0.33
Naphthalene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Nitrobenzene	0.26	0.26	0.78	0.26	0.33	0.33	0.33	0.33	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	1.65	0.33	0.66	0.66	0.66	0.66	0.33	0.33
o-Cresol (2-Methylphenol)					0.33	0.33	0.33	0.33		
Pentachlorophenol	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	1.65	0.33	1.6	1.6	1.6	1.6	0.33	0.33
Pyrene	0.33	0.33	1.65	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**263.16**	**31.29**	**33.59**	**33.59**	**33.59**	**33.59**	**31.29**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room UMW-39 (10-12 ft)	REC 12: Solvent Recovery Room UMW-40 (8-10 ft)	REC 12: Solvent Recovery Room UMW-41 (6-8 ft)	REC 12: Solvent Recovery Room UMW-41 (12-14 ft)	REC 12: Solvent Recovery Room UMW-42 (4-6 ft)	REC 12: Solvent Recovery Room UMW-42 (12-14 ft)	REC 12: Solvent Recovery Room 03-46 (10-12 ft)	REC 12: Solvent Recovery Room 03-46 (12-14 ft)	REC 12: Solvent Recovery Room 03-47 (10-12 ft)	REC 12: Solvent Recovery Room 03-47 (12-14 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	0.33	0.33	1.59	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Methylphenol										
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Aniline										
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room UMW-39 (10-12 ft)	REC 12: Solvent Recovery Room UMW-40 (8-10 ft)	REC 12: Solvent Recovery Room UMW-41 (6-8 ft)	REC 12: Solvent Recovery Room UMW-41 (12-14 ft)	REC 12: Solvent Recovery Room UMW-42 (4-6 ft)	REC 12: Solvent Recovery Room UMW-42 (12-14 ft)	REC 12: Solvent Recovery Room 03-46 (10-12 ft)	REC 12: Solvent Recovery Room 03-46 (12-14 ft)	REC 12: Solvent Recovery Room 03-47 (10-12 ft)	REC 12: Solvent Recovery Room 03-47 (12-14 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	0.33	0.33	0.531	0.33	0.33	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
o-Cresol (2-Methylphenol)										
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.388	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**31.29**	**31.29**	**32.809**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-48 (5-7 ft)	REC 12: Solvent Recovery Room 03-49 (6-8 ft)	REC 12: Solvent Recovery Room 03-49 (12-14 ft)	REC 12: Solvent Recovery Room 03-50 (4-6 ft)	REC 12: Solvent Recovery Room 03-50 (8-10 ft)	REC 12: Solvent Recovery Room 03-51 (12-14 ft)	REC 12: Solvent Recovery Room 03-51 (15-17 ft)	REC 12: Solvent Recovery Room 03-52 (8-10 ft)	REC 12: Solvent Recovery Room 03-53 (6-8 ft)	REC 12: Solvent Recovery Room 03-54 (6-8 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Methylphenol										
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Aniline										
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-48 (5-7 ft)	REC 12: Solvent Recovery Room 03-49 (6-8 ft)	REC 12: Solvent Recovery Room 03-49 (12-14 ft)	REC 12: Solvent Recovery Room 03-50 (4-6 ft)	REC 12: Solvent Recovery Room 03-50 (8-10 ft)	REC 12: Solvent Recovery Room 03-51 (12-14 ft)	REC 12: Solvent Recovery Room 03-51 (15-17 ft)	REC 12: Solvent Recovery Room 03-52 (8-10 ft)	REC 12: Solvent Recovery Room 03-53 (6-8 ft)	REC 12: Solvent Recovery Room 03-54 (6-8 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
o-Cresol (2-Methylphenol)										
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-55 (6-8 ft)
1,2,4-Trichlorobenzene	0.33
1,2-Dichlorobenzene	0.33
1,3-Dichlorobenzene	0.33
1,4-Dichlorobenzene	0.33
2,4,5-Trichlorophenol	0.66
2,4,6-Trichlorophenol	0.33
2,4-Dichlorophenol	0.33
2,4-Dimethylphenol	0.33
2,4-Dinitrophenol	1.6
2,4-Dinitrotoluene	0.25
2,6-Dintrotoluene	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33
2-Chlorophenol	0.33
2-Methylnaphthalene	0.33
2-Methylphenol	0.436
2-Nitroaniline	1.6
2-Nitrophenol	1.6
3,3-Dichlorobenzidine	0.66
3-Nitroaniline	1.6
4,6-Dinitro-2-methylphenol	1.6
4-Bromophenyl phenyl ether	0.33
4-Chloro-3-methylphenol	0.33
4-Chloroaniline	0.33
4-Chlorophenyl phenyl ether	0.33
4-Methylphenol	
4-Nitroaniline	1.6
4-Nitrophenol	1.6
Acenaphthene	0.33
Acenaphthylene	0.33
Aniline	
Anthracene	0.33
Benzidine	0.33
Benzo(a)anthracene	0.33
Benzo(a)pyrene	0.09
Benzo(b)fluoranthene	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-55 (6-8 ft)
Benzo(g,h,i)perylene	0.33
Benzo(k)fluoranthene	0.33
Benzoic Acid	0.33
Benzyl Alcohol	0.33
bis (2-Chloroethoxy) methane	0.33
Bis (2-Chloroethyl) ether	0.33
bis (2-Chloroisopropyl) ether	0.33
bis (2-ethylhexyl) phthalate	0.33
Butyl benzyl phthalate	0.33
Carbazole	0.33
Chrysene	0.33
Dibenzo(a,h)anthracene	0.09
Dibenzofuran	0.33
Diethylphthalate	0.33
Dimethylphthalate	0.33
Di-n-butylphthalate	0.33
Di-n-octylphthalate	0.33
Fluoranthene	0.33
Fluorene	0.33
Hexachlorobenzene	0.33
Hexachlorobutadiene	0.33
Hexachlorocyclopentadiene	0.33
Hexachloroethane	0.33
Indeno(1,2,3-cd)pyrene	0.33
Isophorone	0.33
m,p-Cresols (3&4-Methylphenol)	0.508
Naphthalene	0.33
Nitrobenzene	0.26
N-Nitrosodimethylamine	0.33
N-Nitroso-di-n-propylamine	0.33
n-Nitrosodiphenylamine	0.33
o-Cresol (2-Methylphenol)	
Pentachlorophenol	0.33
Phenanthrene	0.33
Phenol	0.33
Pyrene	0.33
Total SVOCs	**31.574**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-55 (8-10 ft)	REC 13: Bldg D Transformer 03-08 (4-6 ft)	REC 13: Bldg D Transformer 03-09 (4-6 ft)	REC 13: Bldg D Transformer 03-10 (4-6 ft)	REC 13: Bldg D Transformer 03-11 (3-5 ft)	REC 16: Bldg E Kero Pits 03-04 (10-12 ft)	REC 16: Bldg E Kero Pits 03-04 (12-14 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	4.27	4.37	0.33	0.33	2.89	0.33
2-Methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Methylphenol							
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Aniline							
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 12: Solvent Recovery Room 03-55 (8-10 ft)	REC 13: Bldg D Transformer 03-08 (4-6 ft)	REC 13: Bldg D Transformer 03-09 (4-6 ft)	REC 13: Bldg D Transformer 03-10 (4-6 ft)	REC 13: Bldg D Transformer 03-11 (3-5 ft)	REC 16: Bldg E Kero Pits 03-04 (10-12 ft)	REC 16: Bldg E Kero Pits 03-04 (12-14 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	3.42	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Naphthalene	0.33	1.49	1.41	0.33	0.33	0.672	0.33
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33
o-Cresol (2-Methylphenol)							
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**36.39**	**36.41**	**34.38**	**31.29**	**34.192**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 16: Bldg E Kero Pits 03-P2 (8-10 ft)	REC 16: Bldg E Kero Pits 03-P2 (10-12 ft)	REC 17: Bldg H Material H-01-147 (2-4 ft)	REC 17: Bldg H Material H-01-147-GLA (2-4 ft)	REC 17: Bldg H Material V-13 (3-4 ft)	REC 17: Bldg H Material V-32 (3-5 ft)	REC 17: Bldg H Material V-9 (3-4 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
1,2-Dichlorobenzene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
1,3-Dichlorobenzene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
1,4-Dichlorobenzene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.5	0.5	0.5	0.5
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2,4-Dichlorophenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2,4-Dimethylphenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2,4-Dinitrophenol	1.6	1.6	1.6	0.5	0.5	0.5	0.5
2,4-Dinitrotoluene	0.25	0.25	0.33	0.1	0.1	0.1	0.1
2,6-Dintrotoluene	0.26	0.26	0.33	0.1	0.1	0.1	0.1
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2-Chlorophenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
2-Methylnaphthalene	9.39	0.33	0.33	0.1	0.1	0.1	0.1
2-Methylphenol	0.33	0.33	0.33				
2-Nitroaniline	1.6	1.6	1.6	0.5	0.5	0.5	0.5
2-Nitrophenol	1.6	1.6	1.6	0.1	0.1	0.1	0.1
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.5	0.5	0.5	0.5
3-Nitroaniline	1.6	1.6	1.6	0.5	0.5	0.5	0.5
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	0.5	0.5	0.5	0.5
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.1	0.1	0.1	0.1
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
4-Chloroaniline	0.33	0.33	0.33	0.1	0.1	0.1	0.1
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.1	0.1	0.1	0.1
4-Methylphenol			0.33				
4-Nitroaniline	1.6	1.6	1.6	0.5	0.5	0.5	0.5
4-Nitrophenol	1.6	1.6	1.6	0.5	0.5	0.5	0.5
Acenaphthene	0.682	0.33	0.33	0.1	0.1	0.1	0.1
Acenaphthylene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Aniline				0.1	0.1	0.1	0.1
Anthracene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Benzidine	0.33	0.33	0.33				
Benzo(a)anthracene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Benzo(a)pyrene	0.09	0.18	0.33	0.058	0.058	0.058	0.058
Benzo(b)fluoranthene	0.33	0.33	0.33	0.1	0.1	0.1	0.1

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 16: Bldg E Kero Pits 03-P2 (8-10 ft)	REC 16: Bldg E Kero Pits 03-P2 (10-12 ft)	REC 17: Bldg H Material H-01-147 (2-4 ft)	REC 17: Bldg H Material H-01-147-GLA (2-4 ft)	REC 17: Bldg H Material V-13 (3-4 ft)	REC 17: Bldg H Material V-32 (3-5 ft)	REC 17: Bldg H Material V-9 (3-4 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Benzo(k)fluoranthene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Benzoic Acid	0.33	0.33	0.33	0.5	0.5	0.5	0.5
Benzyl Alcohol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.1	0.1	0.1	0.1
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.1	0.1	0.1	0.1
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Carbazole	0.33	0.33					
Chrysene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Dibenzo(a,h)anthracene	0.09	0.18	0.33	0.058	0.058	0.058	0.058
Dibenzofuran	1.03	0.33	0.33	0.1	0.1	0.1	0.1
Diethylphthalate	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Dimethylphthalate	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Fluoranthene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Fluorene	1.31	0.33	0.33	0.1	0.1	0.1	0.1
Hexachlorobenzene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Hexachlorobutadiene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Hexachloroethane	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Isophorone	0.33	0.33	0.33	0.1	0.1	0.1	0.1
m,p-Cresols (3&4-Methylphenol)	0.33	0.33		0.1	0.1	0.1	0.1
Naphthalene	2.14	0.33	0.33	0.1	0.1	0.1	0.1
Nitrobenzene	0.26	0.26	0.33	0.1	0.1	0.1	0.1
N-Nitrosodimethylamine	0.33	0.33	0.33				
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.1	0.1	0.1	0.1
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.1	0.1	0.1	0.1
o-Cresol (2-Methylphenol)				0.1	0.1	0.1	0.1
Pentachlorophenol	0.33	0.33	1.6	0.5	0.5	0.5	0.5
Phenanthrene	0.944	0.33	0.33	0.1	0.1	0.1	0.1
Phenol	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Pyrene	0.33	0.33	0.33	0.1	0.1	0.1	0.1
Total SVOCs	**44.806**	**31.47**	**32.93**	**10.976**	**10.976**	**10.976**	**10.976**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 30: Bldg J Oil Tank 03-12 (0-2 ft)	REC 30: Bldg J Oil Tank 03-12 (4-6 ft)	REC 39: Bldg A Pits 05-10B (7-8 ft)
1,2,4-Trichlorobenzene	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33
2,4-Dichlorophenol	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33
2,4-Dinitrophenol	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26
2-Chloronaphthalene (beta-Chloronaphthalene	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6
2-Nitrophenol	1.6	1.6	1.6
3,3-Dichlorobenzidine	0.66	0.66	0.66
3-Nitroaniline	1.6	1.6	1.6
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6
4-Bromophenyl phenyl ether	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33
4-Methylphenol			
4-Nitroaniline	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6
Acenaphthene	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33
Aniline			
Anthracene	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09
Benzo(b)fluoranthene	0.33	0.33	0.33

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3A
Total Semi-Volatile Organic Compounds in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 30: Bldg J Oil Tank 03-12 (0-2 ft)	REC 30: Bldg J Oil Tank 03-12 (4-6 ft)	REC 39: Bldg A Pits 05-10B (7-8 ft)
Benzo(g,h,i)perylene	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33
Benzoic Acid	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33
Di-n-octylphthalate	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33
Fluorene	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33
m,p-Cresols (3&4-Methylphenol)	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33
Nitrobenzene	0.26	0.26	0.26
N-Nitrosodimethylamine	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33
o-Cresol (2-Methylphenol)			
Pentachlorophenol	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33
Phenol	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.
Blank parameters not tested.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	Pre-Excavation REC 12: Solvent Recovery Room C-2 (1.5 ft)	Pre-Excavation REC 12: Solvent Recovery Room B-6 (2 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-3 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-3 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-3 (8 ft)
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	Pre-Excavation REC 12: Solvent Recovery Room C-2 (1.5 ft)	Pre-Excavation REC 12: Solvent Recovery Room B-6 (2 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-3 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-3 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-2 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-3 (8 ft)
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	4.46	3.11	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
3&4-Methylphenol	3.6	0.641	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**38.69**	**34.381**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room B-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-3 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-2 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room E-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-B-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-B-2 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-3 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-5 (4 ft)
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room B-5 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-3 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-2 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room E-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-B-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-B-2 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-3 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-4 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-5 (4 ft)
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	0.33	0.33	0.33	0.485	0.33	0.33	0.33	0.33	0.33	0.602
3&4-Methylphenol	0.33	0.33	0.33	0.33	0.33	0.422	0.33	0.33	0.33	0.33	0.33	0.371
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.537**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**	**31.603**

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	Removed Sample REC 12: Solvent Recovery Room A-B-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-1 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-7 (4 ft)	Removed Sample REC 12: Solvent Recovery Room C-7 (4 ft)	Removed Sample REC 12: Solvent Recovery Room D-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-4 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-7 (4 ft)
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzoic Acid	0.33	0.33	0.33	0.33	0.586	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	Removed Sample REC 12: Solvent Recovery Room A-B-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-1 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-1 (4 ft)	Removed Sample REC 12: Solvent Recovery Room A-B-7 (4 ft)	Removed Sample REC 12: Solvent Recovery Room C-7 (4 ft)	Removed Sample REC 12: Solvent Recovery Room D-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-7 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-4 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-5 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-6 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room AA-7 (4 ft)
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.869	0.33	0.33	0.33	4.72	1.76	0.937	0.33	0.893	0.33	0.33	0.33
3&4-Methylphenol	0.408	0.33	0.33	0.33	0.467	0.33	0.33	0.33	0.35	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.907**	**31.29**	**31.29**	**31.29**	**36.073**	**32.72**	**31.897**	**31.29**	**31.873**	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room AA-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-71/2 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-8 (8 ft)	Removed Sample REC 12: Solvent Recovery Room A-6/7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-F-5 (4 ft)
Acenaphthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Acenaphthylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzidine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)anthracene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(b)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(k)fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(g,h,i)perylene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzo(a)pyrene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Benzoic Acid	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Benzyl Alcohol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroethoxy) methane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Bis (2-Chloroethyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-Chloroisopropyl) ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
bis (2-ethylhexyl) phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Bromophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Butyl benzyl phthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Carbazole	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloroaniline	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chloro-3-methylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chloronaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Chlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4-Chlorophenyl phenyl ether	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Chrysene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dibenzo(a,h)anthracene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Dibenzofuran	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,3-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,4-Dichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
3,3-Dichlorobenzidine	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4-Dichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Diethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4-Dimethylphenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Dimethylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Di-n-butylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
4,6-Dinitro-2-methylphenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
2,4-Dinitrotoluene	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2,6-Dintrotoluene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Di-n-octylphthalate	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Fluoranthene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33

Results or reporting limit in mg/kg.

Table B-3B
Total
Semi-Volatile Organic Compounds in Soil
REC 12: Solvent Recovery Room
Johns Manville
Waukegan, IL

Analyte Name	CURRENT STATUS REC 12: Solvent Recovery Room AA-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room A-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room C-8 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room D-71/2 (4 ft)	CURRENT STATUS REC 12: Solvent Recovery Room B-8 (8 ft)	Removed Sample REC 12: Solvent Recovery Room A-6/7 (8 ft)	CURRENT STATUS REC 12: Solvent Recovery Room E-F-5 (4 ft)
Fluorene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorobutadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachlorocyclopentadiene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Hexachloroethane	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Indeno(1,2,3-cd)pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Isophorone	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylnaphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Methylphenol	0.33	0.33	1.37	0.33	0.33	0.33	0.33	0.33
3&4-Methylphenol	0.33	0.33	10.6	0.33	0.33	0.33	0.33	0.33
Naphthalene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitroaniline	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Nitrobenzene	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
2-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
4-Nitrophenol	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
N-Nitrosodimethylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
N-Nitroso-di-n-propylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
n-Nitrosodiphenylamine	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pentachlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenanthrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Phenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Pyrene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
1,2,4-Trichlorobenzene	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
2,4,5-Trichlorophenol	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
2,4,6-Trichlorophenol	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Total SVOCs	**31.29**	**31.29**	**42.6**	**31.29**	**31.29**	**31.29**	**31.29**	**31.29**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 01-1 (2-4 ft)	REC 02: UST Excavation 2 01-2 (3-4 ft)	REC 02: UST Excavation 2 01-3 (3-4 ft)	REC 02: UST Excavation 2 01-4 (3-4 ft)	REC 02: UST Excavation 2 01-5 (5-7 ft)	REC 02: UST Excavation 2 01-6 (4-6 ft)	REC 02: UST Excavation 2 01-7 (4-6 ft)
Acenaphthene	0.05	0.05	0.05	0.05	0.05	0.05	0 05
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.05	0 05
Anthracene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(a)anthracene	0.087	0.022	0.079	0.156	0.056	0.0087	0.0087
Benzo(a)pyrene	0.015	0.041	0.1	0.226	0.084	0.015	0.015
Benzo(b)fluoranthene	0.011	0.05	0.092	0.226	0.08	0.011	0.011
Benzo(g,h,i)perylene	0.05	0.05	0.074	0.127	0.065	0.05	0.05
Benzo(k)fluoranthene	0.011	0.02	0.074	0.182	0.065	0.011	0.011
Chrysene	0.05	0.05	0.081	0.191	0.063	0.05	0.05
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.036	0.02	0.02	0.02
Fluoranthene	0.05	0.05	0.138	0.37	0.09	0.05	0.05
Fluorene	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.029	0.046	0.08	0.138	0.071	0.029	0.029
Naphthalene	0.025	0.025	0.025	0.025	0.025	0.025	0.025
Phenanthrene	0.05	0.05	0.093	0.195	0.05	0.05	0.05
Pyrene	0.05	0.05	0.129	0.35	0.086	0.05	0.05
Total PNAs	**0.648**	**0.674**	**1.185**	**2.422**	**0.955**	**0.5697**	**0.5697**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 02: UST Excavation 2 01-8 (7-8 ft)	REC 02: UST Excavation 2 01-9 (6-8 ft)	REC 02: UST Excavation 2 01-10 (3-5 ft)	REC 02: UST Excavation 2 Pipe 01-11 (4-6 ft)	REC 02: UST Excavation 2 01-12 (8-10 ft)	REC 02: UST Excavation 2 TP-4 (5-5 ft)
Acenaphthene	0.05	0.05	0.05	0.05	0.05	0.0087
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.2
Anthracene	0.05	0.05	0.05	0.05	0.05	0.0087
Benzo(a)anthracene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.015	0.015	0.015	0.015	0.015	0.0087
Benzo(b)fluoranthene	0.011	0.011	0.011	0.011	0.011	0.0087
Benzo(g,h,i)perylene	0.05	0.05	0.05	0.05	0.05	0.0087
Benzo(k)fluoranthene	0.011	0.011	0.011	0.011	0.011	0.0087
Chrysene	0.05	0.05	0.05	0.05	0.05	0.0087
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.02	0.02	0.0087
Fluoranthene	0.05	0.05	0.05	0.05	0.05	0.0087
Fluorene	0.05	0.05	0.05	0.05	0.05	0.0087
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.029	0.029	0.029	0.0087
Naphthalene	0.025	0.025	0.025	0.025	0.025	0.0087
Phenanthrene	0.05	0.05	0.05	0.05	0.05	0.0087
Pyrene	0.05	0.05	0.05	0.05	0.05	0.0087
Total PNAs	**0.5697**	**0.5697**	**0.5697**	**0.5697**	**0.5697**	**0.3305**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 03: UST Excavation 3 GT-1 (7-8 ft)	REC 03: UST Excavation 3 GT-2 (6-8 ft)	REC 03: UST Excavation 3 TA3-3 (6-7 ft)	REC 03: UST Excavation 3 TA3-4 (8-9 ft)	REC 03: UST Excavation 3 TA3-5 (10-12 ft)	REC 03: UST Excavation 3 TA3-7 (10-12 ft)
Acenaphthene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Acenaphthylene	0.2	0.2	0.2	0.2	0.2	0.2
Anthracene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(a)anthracene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(b)fluoranthene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(g,h,i)perylene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(k)fluoranthene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Chrysene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Dibenzo(a,h)anthracene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Fluoranthene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Fluorene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Indeno(1,2,3-cd)pyrene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Naphthalene	0.0087	0.0087	0.0093	0.0087	0.0087	0.1
Phenanthrene	0.0087	0.0087	0.0087	0.0087	0.0087	0.009
Pyrene	0.0087	0.0087	0.0087	0.0087	0.0087	0.01
Total PNAs	**0.3305**	**0.3305**	**0.3311**	**0.3305**	**0.3305**	**0.4234**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-94 (2-3 ft)	REC 04: UST Excavation 4 STF-01-95 (2-3 ft)	REC 04: UST Excavation 4 STF-01-96 (2-3 ft)	REC 04: UST Excavation 4 STF-01-97 (2-3 ft)	REC 04: UST Excavation 4 STF-01-98 (2-3 ft)	REC 04: UST Excavation 4 STF-01-99 (6-7 ft)
Acenaphthene	0.05	0.05	0.05	0.05	0.05	0.05
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.05
Anthracene	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(a)anthracene	0.0087	0.0087	0.0087	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.015	0.015	0.015	0.015	0.015	0.015
Benzo(b)fluoranthene	0.011	0.011	0.011	0.011	0.011	0.011
Benzo(g,h,i)perylene	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(k)fluoranthene	0.011	0.011	0.011	0.011	0.011	0.011
Chrysene	0.05	0.05	0.05	0.05	0.05	0.05
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.02	0.02	0.02
Fluoranthene	0.05	0.05	0.05	0.05	0.05	0.05
Fluorene	0.05	0.05	0.05	0.05	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.029	0.029	0.029	0.029
Naphthalene	0.025	0.025	0.025	0.025	0.025	0.025
Phenanthrene	0.05	0.05	0.05	0.05	0.05	0.05
Pyrene	0.05	0.05	0.05	0.05	0.05	0.05
Total PNAs	**0.5697**	**0.5697**	**0.5697**	**0.5697**	**0.5697**	**0.5697**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-100 (6-6 ft)	REC 04: UST Excavation 4 STF-01-101 (5-6 ft)	REC 04: UST Excavation 4 STF-01-102 (5-6 ft)	REC 04: UST Excavation 4 STF-01-103 (5-7 ft)	REC 04: UST Excavation 4 STF-01-104 (5-6 ft)	REC 04: UST Excavation 4 STF-01-105 (5-6 ft)
Acenaphthene	0.05	0.05	0.05	0.05	0.05	0.05
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.05
Anthracene	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(a)anthracene	0.0087	0.0087	0.0087	0.159	0.01	0.0087
Benzo(a)pyrene	0.015	0.015	0.015	0.198	0.015	0.015
Benzo(b)fluoranthene	0.011	0.011	0.011	0.146	0.011	0.011
Benzo(g,h,i)perylene	0.05	0.05	0.05	0.112	0.05	0.05
Benzo(k)fluoranthene	0.011	0.011	0.011	0.156	0.011	0.011
Chrysene	0.05	0.05	0.05	0.153	0.05	0.05
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.039	0.02	0.02
Fluoranthene	0.05	0.05	0.05	0.236	0.05	0.05
Fluorene	0.05	0.05	0.05	0.05	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.029	0.132	0.029	0.029
Naphthalene	0.025	0.025	0.025	0.025	0.025	0.025
Phenanthrene	0.05	0.05	0.05	0.05	0.05	0.05
Pyrene	0.05	0.05	0.05	0.25	0.05	0.05
Total PNAs	**0.5697**	**0.5697**	**0.5697**	**1.856**	**0.571**	**0.5697**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-106 (5-6 ft)	REC 04: UST Excavation 4 STF-01-107 (5-6 ft)	REC 04: UST Excavation 4 STF-01-108 (4-5 ft)	REC 04: UST Excavation 4 STF-01-126 (5-6 ft)	REC 04: UST Excavation 4 STF-01-127 (5-6 ft)	REC 04: UST Excavation 4 STF-01-128 (5-6 ft)
Acenaphthene	0.05	0.05	0.05	0.05	0.05	0.05
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.05
Anthracene	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(a)anthracene	0.0087	0.0087	0.014	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.015	0.015	0.015	0.015	0.015	0.015
Benzo(b)fluoranthene	0.011	0.011	0.015	0.011	0.011	0.011
Benzo(g,h,i)perylene	0.05	0.05	0.05	0.05	0.05	0.05
Benzo(k)fluoranthene	0.011	0.011	0.011	0.011	0.011	0.011
Chrysene	0.05	0.05	0.05	0.05	0.05	0.05
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.02	0.02	0.02
Fluoranthene	0.05	0.05	0.05	0.05	0.05	0.05
Fluorene	0.05	0.05	0.05	0.05	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.029	0.029	0.029	0.029
Naphthalene	0.025	0.025	0.025	0.025	0.025	0.025
Phenanthrene	0.05	0.05	0.05	0.05	0.05	0.05
Pyrene	0.05	0.05	0.05	0.05	0.05	0.05
Total PNAs	**0.5697**	**0.5697**	**0.579**	**0.5697**	**0.5697**	**0.5697**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 04: UST Excavation 4 STF-01-129 (5-6 ft)	REC 04: UST Excavation 4 STF-1 (6-7 ft)	REC 04: UST Excavation 4 STF-3 (7-8 ft)	REC 05: UST Excavation 5 D-7 (6-8 ft)	REC 05: UST Excavation 5 TP-1 (6-6 ft)	REC 05: UST Excavation 5 TP-2 (5-5 ft)	REC 05: UST Excavation 5 TP-7 (5-5 ft)
Acenaphthene	0.05	0.087	0.087	0.23	0.087	0.087	0.0087
Acenaphthylene	0.05	2	2	0.2	2	2	0.2
Anthracene	0.05	0.087	0.087	0.0087	0.087	0.087	0.0087
Benzo(a)anthracene	0.0087	0.087	0.087	0.0087	0.087	0.087	0.0087
Benzo(a)pyrene	0.015	0.087	0.087	0.0087	0.087	0.087	0.0087
Benzo(b)fluoranthene	0.011	0.087	0.087	0.0087	0.087	0.087	0.0087
Benzo(g,h,i)perylene	0.05	0.087	0.087	0.0087	0.087	0.087	0.0087
Benzo(k)fluoranthene	0.011	0.087	0.087	0.0087	0.087	0.087	0.0087
Chrysene	0.05	0.087	0.087	0.0087	0.087	0.087	0.0087
Dibenzo(a,h)anthracene	0.02	0.087	0.087	0.0087	0.087	0.087	0.0087
Fluoranthene	0.05	0.087	0.087	0.0087	0.087	0.087	0.0087
Fluorene	0.05	0.087	0.087	0.11	0.087	0.087	0.0087
Indeno(1,2,3-cd)pyrene	0.029	0.087	0.087	0.0087	0.087	0.087	0.0087
Naphthalene	0.025	0.087	0.087	1.1	0.14	0.21	0.0087
Phenanthrene	0.05	0.087	0.087	0.011	0.087	0.087	0.0087
Pyrene	0.05	0.087	0.087	0.0087	0.087	0.087	0.0087
Total PNAs	**0.5697**	**3.305**	**3.305**	**1.7467**	**3.358**	**3.428**	**0.3305**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 05: UST Excavation 5 01-73 (2-4 ft)	REC 05: UST Excavation 5 01-77 (2-4 ft)	REC 12: Solvent Recovery Room A-2 (6-8 ft)	REC 12: Solvent Recovery Room UMW-25 (8-10 ft)	REC 12: Solvent Recovery Room UMW-27 (3-5 ft)	REC 12: Solvent Recovery Room SR-01-132 (3-4 ft)	REC 16: Bldg E Kero Pits E-01-13 (4-6 ft)
Acenaphthene	0.258	0.084	0.0087	0.0087	0.039	0.05	0.188
Acenaphthylene	0.05	0.05	0.2	0.2	0.2	0.05	0.05
Anthracene	0.122	0.131	0.0087	0.0087	0.0087	0.05	0.05
Benzo(a)anthracene	0.2	0.195	0.0087	0.0087	0.009	0.015	0.0087
Benzo(a)pyrene	0.173	0.22	0.0087	0.0087	0.0093	0.048	0.015
Benzo(b)fluoranthene	0.166	0.11	0.016	0.0087	0.012	0.023	0.011
Benzo(g,h,i)perylene	0.09	0.211	0.0087	0.0087	0.0087	0.056	0.05
Benzo(k)fluoranthene	0.119	0.063	0.0087	0.0087	0.0087	0.031	0.011
Chrysene	0.193	0.386	0.0087	0.0087	0.013	0.05	0.05
Dibenzo(a,h)anthracene	0.022	0.038	0.0087	0.0087	0.0087	0.021	0.02
Fluoranthene	0.679	0.184	0.0087	0.0087	0.076	0.05	0.05
Fluorene	0.189	0.096	0.0087	0.0087	0.013	0.05	0.265
Indeno(1,2,3-cd)pyrene	0.081	0.072	0.0087	0.0087	0.0087	0.029	0.029
Naphthalene	1.27	2.54	0.11	0.024	0.056	0.487	0.164
Phenanthrene	0.332	0.306	0.009	0.0087	0.017	0.05	0.05
Pyrene	0.82	1.54	0.0087	0.0087	0.023	0.05	0.05
Total PNAs	**4.764**	**6.226**	**0.4394**	**0.3458**	**0.5108**	**1.11**	**1.0617**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 16: Bldg E Kero Pits E-01-16 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-18 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-19 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-20 (4-6 ft)	REC 16: Bldg E Kero Pits E-01-37 (4-6 ft)	REC 16: Bldg E Kero Pits NBT-1 (10-11 ft)
Acenaphthene	0.05	0.105	0.05	0.114	0.05	0.0087
Acenaphthylene	0.05	0.05	0.05	0.05	0.05	0.2
Anthracene	0.05	0.05	0.05	0.051	0.05	0.0087
Benzo(a)anthracene	0.0087	0.0087	0.0087	0.059	0.0087	0.0087
Benzo(a)pyrene	0.015	0.015	0.015	0.075	0.015	0.0087
Benzo(b)fluoranthene	0.011	0.011	0.011	0.028	0.011	0.0087
Benzo(g,h,i)perylene	0.05	0.05	0.05	0.05	0.05	0.0087
Benzo(k)fluoranthene	0.011	0.011	0.011	0.014	0.011	0.0087
Chrysene	0.05	0.05	0.05	0.237	0.05	0.0087
Dibenzo(a,h)anthracene	0.02	0.02	0.02	0.02	0.02	0.0087
Fluoranthene	0.05	0.05	0.05	0.05	0.05	0.0087
Fluorene	0.05	0.05	0.05	0.288	0.05	0.0087
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.029	0.029	0.029	0.0087
Naphthalene	0.025	0.062	0.025	0.156	0.025	0.0087
Phenanthrene	0.05	0.05	0.05	0.176	0.05	0.0087
Pyrene	0.05	0.05	0.05	0.092	0.05	0.0087
Total PNAs	**0.5697**	**0.6617**	**0.5697**	**1.489**	**0.5697**	**0.3305**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 16: Bldg E Kero Pits TP-B (7-9 ft)	REC 18: Bldg J Transformer West End (0-1 ft)	REC 18: Bldg J Transformer South End (0-1 ft)	REC 18: Bldg J Transformer East End (0-1 ft)	REC 21: Still Room D-01-52 (2-4 ft)	REC 21: Still Room D-01-53 (2-4 ft)
Acenaphthene	0.029	0.1	0.1	0.1	0.05	0.05
Acenaphthylene	2	0.2	0.2	0.2	0.05	0.05
Anthracene	0.087	0.1	0.1	0.1	0.05	0.05
Benzo(a)anthracene	0.013	0.1	0.1	0.1	0.0087	0.011
Benzo(a)pyrene	0.087	0.09	0.09	0.09	0.015	0.015
Benzo(b)fluoranthene	0.087	0.1	0.1	0.1	0.011	0.011
Benzo(g,h,i)perylene	0.087	0.1	0.1	0.1	0.05	0.05
Benzo(k)fluoranthene	0.087	0.1	0.1	0.1	0.011	0.011
Chrysene	0.022	0.1	0.1	0.1	0.05	0.05
Dibenzo(a,h)anthracene	0.087	0.09	0.09	0.09	0.02	0.02
Fluoranthene	0.087	0.1	0.1	0.1	0.05	0.05
Fluorene	0.05	0.1	0.1	0.1	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.087	0.1	0.1	0.1	0.029	0.029
Naphthalene	0.087	0.1	0.1	0.1	0.025	0.134
Phenanthrene	0.069	0.1	0.1	0.1	0.05	0.05
Pyrene	0.02	0.1	0.1	0.1	0.05	0.087
Total PNAs	**2.986**	**1.68**	**1.68**	**1.68**	**0.5697**	**0.718**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 22: Bldg D Coal Tar Sat T-01-44 (4-6 ft)	REC 24: Bldg T Tar Pit T-01-41 (2-4 ft)	REC 25: Bldg D Saturators TP-N (6-8 ft)	REC 25: Bldg Saturators D-01-45 (2-4 ft)	REC 25: Bldg Saturators D-01-46 (2-4 ft)	REC 25: Bldg Saturators D-01-47 (2-4 ft)
Acenaphthene	0.05	0.05	0.0087	0.05	0.05	0.05
Acenaphthylene	0.05	0.05	0.2	0.05	0.05	0.05
Anthracene	0.05	0.05	0.0087	0.05	0.05	0.05
Benzo(a)anthracene	0.0087	0.011	0.0087	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.015	0.015	0.0087	0.015	0.015	0.015
Benzo(b)fluoranthene	0.011	0.014	0.0087	0.011	0.012	0.011
Benzo(g,h,i)perylene	0.05	0.05	0.0087	0.05	0.05	0.05
Benzo(k)fluoranthene	0.011	0.011	0.0087	0.011	0.011	0.011
Chrysene	0.05	0.05	0.0087	0.05	0.05	0.05
Dibenzo(a,h)anthracene	0.02	0.02	0.0087	0.02	0.02	0.02
Fluoranthene	0.05	0.05	0.025	0.05	0.05	0.05
Fluorene	0.05	0.05	0.0087	0.05	0.05	0.05
Indeno(1,2,3-cd)pyrene	0.029	0.029	0.0087	0.029	0.029	0.029
Naphthalene	0.025	0.034	0.0087	0.025	0.025	0.025
Phenanthrene	0.05	0.05	0.0087	0.05	0.05	0.05
Pyrene	0.05	0.05	0.009	0.05	0.05	0.05
Total PNAs	**0.5697**	**0.584**	**0.3471**	**0.5697**	**0.5707**	**0.5697**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 27: Coal Pit CP-NC (0-1 ft)	REC 27: Coal Pit CP-NE (0-1 ft)	REC 27: Coal Pit CP-NW (0-1 ft)	REC 27: Coal Pit CP-SE (0-1 ft)	REC 31: Locomotive RR-SB-01 (2-3 ft)	REC 31: Locomotive RR-SB-02 (0-1 ft)	REC 32: Tank 031 TP-3 (5-5 ft)
Acenaphthene	0.128	0.1	0.216	0.1	0.048	0.05	0.24
Acenaphthylene	0.2	0.2	0.2	0.2	0.048	0.05	2
Anthracene	1	0.176	1.52	1	0.073	0.05	0.087
Benzo(a)anthracene	0.1	0.134	0.968	0.1	0.17	0.68	0.087
Benzo(a)pyrene	0.121	0.143	0.09	0.09	0.27	0.83	0.087
Benzo(b)fluoranthene	0.138	0.177	0.1	0.1	0.19	1	0.087
Benzo(g,h,i)perylene	0.1	0.1	0.643	0.1	0.48	0.68	0.087
Benzo(k)fluoranthene	0.1	0.1	0.1	0.1	0.086	0.05	0.087
Chrysene	0.154	0.159	1.21	0.1	0.17	0.05	0.087
Dibenzo(a,h)anthracene	0.09	0.09	0.831	0.09	0.048	0.05	0.087
Fluoranthene	0.366	0.314	4.38	0.193	0.3	1.2	0.087
Fluorene	0.1	0.1	0.1	0.1	0.048	0.05	0.087
Indeno(1,2,3-cd)pyrene	0.1	0.131	0.1	0.1	0.3	0.61	0.087
Naphthalene	0.1	0.1	0.1	0.1	0.049	0.05	6.2
Phenanthrene	0.25	0.205	3.29	0.116	0.23	0.05	0.087
Pyrene	0.403	0.383	3.41	0.192	0.24	1.1	0.087
Total PNAs	**3.45**	**2.612**	**17.258**	**2.781**	**2.75**	**6.55**	**9.571**

Results or reporting limit in mg/kg.

Table B-4
Total Polynuclear Aromatic Hydrocarbons in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	South of Pumping Lagoon ICS-1 (6-7 ft)	Bldg C - East End C-3 (6-8 ft)	Building B B-2 (6-8 ft)
Acenaphthene	0.0087	0.0087	0.0087
Acenaphthylene	0.2	0.2	0.2
Anthracene	0.0087	0.0087	0.0087
Benzo(a)anthracene	0.0087	0.0087	0.0087
Benzo(a)pyrene	0.0087	0.0087	0.0087
Benzo(b)fluoranthene	0.0087	0.0087	0.0087
Benzo(g,h,i)perylene	0.0087	0.0087	0.0087
Benzo(k)fluoranthene	0.0087	0.0087	0.0087
Chrysene	0.0087	0.0087	0.0087
Dibenzo(a,h)anthracene	0.0087	0.0087	0.0087
Fluoranthene	0.0087	0.0087	0.0087
Fluorene	0.0087	0.0087	0.0087
Indeno(1,2,3-cd)pyrene	0.0087	0.0087	0.0087
Naphthalene	0.0087	0.0087	0.0087
Phenanthrene	0.0087	0.0087	0.0087
Pyrene	0.0087	0.0087	0.0087
Total PNAs	**0.3305**	**0.3305**	**0.3305**

Results or reporting limit in mg/kg.

Table B-5
Total PCBs in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 13: Bldg D Transformer PCB-2 (0-1 ft)	REC 13: Bldg D Transformer 03-08 (4-6 ft)	REC 13: Bldg D Transformer 03-09 (4-6 ft)	REC 13: Bldg D Transformer 03-10 (4-6 ft)	REC 13: Bldg D Transformer 03-11 (3-5 ft)	REC 18: Bldg J Transformer PCB-1 (0-1 ft)	REC 18: Bldg J Transformer West End (0-1 ft)
Arochlor-1016	0.05	0.08	0.08	0.08	0.08	0.05	0.025
Arochlor-1221	0.05	0.08	0.08	0.08	0.08	0.05	0.025
Arochlor-1232	0.05	0.08	0.08	0.08	0.08	0.05	0.025
Arochlor-1242	0.05	0.08	0.08	0.08	0.08	0.05	0.025
Arochlor-1248	0.05	0.08	0.08	0.08	0.08	0.05	0.025
Arochlor-1254	0.05	0.16	0.16	0.16	0.16	0.05	0.025
Arochlor-1260	0.05	0.16	0.16	0.16	0.16	0.05	0.025
Total PCBs	**0.35**	**0.72**	**0.72**	**0.72**	**0.72**	**0.35**	**0.175**

Results or reporting limit in mg/kg.

Table B-5
Total PCBs in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 18: Bldg J Transformer South End (0-1 ft)	REC 18: Bldg J Transformer East End (0-1 ft)	REC 25: Bldg D Saturators TP-N (6-8 ft)	REC 27: Coal Pit CP-NC (0-1 ft)	REC 27: Coal Pit CP-NE (0-1 ft)	REC 27: Coal Pit CP-NW (0-1 ft)	REC 27: Coal Pit CP-SE (0-1 ft)
Arochlor-1016	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1221	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1232	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1242	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1248	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1254	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Arochlor-1260	0.025	0.025	0.05	0.125	0.125	0.125	0.125
Total PCBs	**0.175**	**0.175**	**0.35**	**0.875**	**0.875**	**0.875**	**0.875**

Results or reporting limit in mg/kg.

Table B-5
Total PCBs in Soil

Johns Manville
Waukegan, Illinois

Analyte Name	REC 35: Bldg A Transformer PCB-4 (0-1 ft)	REC 36: Bldg P Transformer PCB-3 (0-1 ft)
Arochlor-1016	0.05	0.05
Arochlor-1221	0.05	0.05
Arochlor-1232	0.05	0.05
Arochlor-1242	0.05	0.05
Arochlor-1248	0.05	0.05
Arochlor-1254	0.05	0.05
Arochlor-1260	0.05	0.05
Total PCBs	**0.35**	**0.35**

Results or reporting limit in mg/kg.

Appendix C

Soil Saturation Limit

Table C-1
Soil Saturation Evaluation for Organic Compounds Greater than Tier 1 Criteria

Johns Manville, Waukegan, Illinois

Organic Compounds Detected at Concentrations Greater than Tier 1 Soil Criteria	Maximum Soil Concentration or Reporting Limit (mg/kg)	Melting Point (degrees C)	Compound melting point > 30 deg C?	Title 35 IAC Section 742 Appendix A, Table A Soil Saturation Limit (C_{sat}) (mg/kg)	Soil Saturation Limit (C_{sat}) by Equation S29 (Table C-2)	Maximum concentration greater than C_{sat}?
Volatile organic compounds (VOCs)						
Benzene	0.35	5.5	Yes	870	--	No
Ethylbenzene	30.2	-95.0	Yes	400	--	No
Methylene Chloride	0.56	-95.1	Yes	2,400	--	No
Toluene	1720	-95	Yes	650	--	Yes[c]
Trichloroethene	0.33	-73	Yes	1,300	--	No
Xylenes, Total	185	-48 to 13	Yes	320	--	No
Semi-volatile organic compounds (VOCs)						
2-Methylnaphthalene	17.8	34.6[a]	No	--	--	
Benzo(a)pyrene	0.45	179[a]	No	--	--	
bis (2-ethylhexyl) phthalate	101	-47[a]	Yes	31,000	--	No
Butyl benzyl phthalate	1.65	<35	Yes	930	--	No
m,p-Cresols (3&4-Methylphenol)	10.6	12.2 to 34.7[a]	Yes[b]	--	3,340	No
Polynuclear Aromatics (PNAs)						
Benzo(a)anthracene	0.68	158-159*	No	--	--	
Benzo(a)pyrene	0.83	179*	No	--	--	
Benzo(b)fluoranthene	1.0	168.3*	No	--	--	
Dibenzo(a,h)anthracene	0.09	262*	No	--	--	

NOTES:
[a]from ATSDR Toxicological Profile Sheets
[b]The melting point for 3-methylphenol (m-cresol) is 12.2 deg. C.
[c]Proposed soil removal in RAP to address soils greater than C_{sat} in REC 12, all other Site soils were less than C_{sat} for toluene

Table C-2
Soil Saturation Limit Derivation for 3-Methylphenol

Johns Manville, Waukegan, Illinois

Equation S29:
Equation for Derivation of the Soil Saturation Limit, C_{sat}

$$C_{sat} = \frac{S}{\rho_b} \times \left[(K_d \times \rho_b) + \theta_w + (H' \times \theta_a) \right]$$

Site Specific Parameters:				
Solubility in water	S	mg/L	see below	ATSDR Toxicological Profile Sheet
Dry bulk soil density	ρ_s	g/cm^3	1.800	Default value for sand
Organic carbon content of soil	f_{oc}	g/g	0.0020	Default for subsurface soil
Organic carbon partition coefficient	K_{oc}	cm^3/g	see below	ATSDR Toxicological Profile Sheet log Koc = 1.54 (assume pH=7)
Soil Water Partition Coefficient	K_d	cm^3/g	see below	Eqn S19 (Appendix C, Table A), Kd=foc*Koc
Water-filled soil porosity	θ_w	L_{water}/L_{soil}	0.140	Default for sand=0.14
Air-filled soil porosity	θ_a	L_{air}/L_{soil}	0.180	Default for sand=0.18
Avg. Soil Moisture content	w	g_w/g_s	0.200	Default for subsurface soil
Henry's Law constant @ 25 deg C	H'	unitless	see below	ATSDR Toxicological Profile Sheet, H=8.65E-7 atm-m3/mol

Chemical-Specific Parameters and Results

Chemical	S (mg/L)	Koc (cm^3/g)	Kd (cm^3/g)	Henry's Law Constant, H' (unitless)	Csat (mg/kg)
3-methylphenol	22,700	34.7	0.069	3.54E-05	**3,340**

Appendix D

Soil Toxicity Characteristic

Table D-1. Maximum Soil Concentration for Toxicity Characteristic Evaluation (Metals)

Substance	Maximum Site Soil Concentration (mg/kg)	Sample Location	Max. Possible Leachate Conc.* (mg/L)	Max. SPLP Leachate Conc. (mg/L)	TCLP Regulatory Level (mg/L)	Has Potential Toxicity?
Arsenic	13.5	REC 30, 03-12 (0-2 ft.)	0.675		5.0	No
Barium	150	REC 30, 03-12 (0-2 ft.)	7.5		100	No
Cadmium	2.4	REC 5, 03-07 (2-4 ft.)	0.12		1.0	No
Chromium	17.3	REC 27, CP-NW (0-1 ft.)	0.87		5.0	No
Lead	592	REC 39, 05-10B (7-8 ft.)	See Lead-SPLP		5.0	See Lead-SPLP
Lead-SPLP	--	REC 27, CP-20S (0-1 ft.)		0.0384	5.0	No
Mercury	0.367	REC 27, CP-NC (0-1 ft.)	0.018		0.2	No
Selenium	1.2	REC 30, 03-12 (0-2 ft.)	0.06		1.0	No
Silver	1.2	Bldg. A, 05-10B (7-8 ft.)	0.06		5.0	No

Note: *Maximum possible leachate concentration assumes 100% of soil constituent mass.

Table D-2. Maximum Soil Concentration for Toxicity Characteristic Evaluation (VOCs)

Substance	Maximum Site Soil Concentration (mg/kg)	Sample Location	Max. Possible Leachate Conc.* (mg/L)	Max. SPLP Leachate Conc. (mg/L)	TCLP Regulatory Level (mg/L)	Has Potential Toxicity?
Benzene	6.66	REC 2, "West" (3-4 ft.)	0.33		0.5	No
Carbon tetrachloride	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		0.5	No
Chlorobenzene	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		100	No
Chloroform	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		6.0	No
1,2-Dichloroethane	0.0069	REC 3, GT-1 (7-8 ft.)	0.00035		0.5	No
1,1-Dichloroethylene	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		0.7	No
Methyl ethyl ketone	0.164	REC 4, 03-13 (6-8 ft.)	0.0082		200	No
Tetrachloroethylene	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		0.7	No
Trichloroethylene	0.326	REC 17, V-9 (3-4 ft.)	0.016		0.5	No
Vinyl chloride	ND (1.0)	REC12, SR-01-132 (3-4 ft.)	<0.05		0.2	No

NOTES:
*Maximum possible leachate concentration assumes 100% of soil pollutant mass.
ND=not detected above highest reporting limit for Site samples

Table D-3. Maximum Soil Concentration for Toxicity Characteristic Evaluation (SVOCs)

Substance	Maximum Site Soil Concentration (mg/kg)	Sample Location	Max. Possible Leachate Conc.* (mg/L)	Max. SPLP Leachate Conc. (mg/L)	TCLP Regulatory Level (mg/L)	Has Potential Toxicity?
o-Cresol	1.59	REC 12, UMW-42 (4-6')	0.080		200	No
m-Cresol	0.531[a]	REC 12, UMW-42 (4-6')	0.027		200	No
p-Cresol	0.531[a]	REC 12, UMW-42 (4-6')	0.027		200	No
Cresol	2.12[b]	REC 12, UMW-42 (4-6')	0.106		200	No
1,4-Dichlorobenzene	ND (1.65)	REC 5, 03-05 (4-6 ft.)	< 0.083		7.5	No
2,4-Dinitrotoluene	ND(7.55)	REC 5, 03-05 (4-6 ft.)	0.377		0.13	See Note A
Hexachlorobenzene	ND (1.65)	REC 5, 03-05 (4-6 ft.)	< 0.083		0.13	No
Hexachlorobutadiene	ND (1.65)	REC 5, 03-05 (4-6 ft.)	< 0.083		0.5	No
Hexachloroethane	ND (1.65)	REC 5, 03-05 (4-6 ft.)	< 0.083		3.0	No
Nitrobenzene	ND (0.78)	REC 5, 03-05 (4-6 ft.)	< 0.039		2.0	No
Pentachlorophenol	ND (1.65)	REC 5, 03-05 (4-6 ft.)	< 0.083		100.0	No
Pyridine	NS					
2,4,5-Trichlorophenol	ND (3.3)	REC 5, 03-05 (4-6 ft.)	<0.17		400	No
2,4,6-Trichlorophenol	ND (1.65)	REC 5, 03-05 (4-6 ft.)	<0.083		2.0	No

NOTES: *Maximum possible leachate concentration assumes 100% of soil pollutant mass.
[a]combined m-cresol and p-cresol
[b]combined o-cresol, m-cresol and p-cresol
ND=not detected above highest reporting limit for Site samples
NS=not sampled. No suspected or known use of pyridine at the Site.
Note A—2,4-dinitrotoluene was not detected in any Site samples. The soil reporting limit ranged from 0.1 to 0.75 mg/kg with the exception of this single REC 5 sample.

Table D-4. Maximum Site Soil Concentration of Contaminants for Toxicity Characteristic Evaluation (Pesticides)

Substance	Maximum Site Soil Concentration (mg/kg)	Sample Location	Max. Possible Leachate Conc. (mg/L)	Max. SPLP Leachate Conc. (mg/L)	TCLP Regulatory Level (mg/L)	Has Potential Toxicity?
Chlordane	NS					
2,4-D	NS					
Endrin	NS					
Heptachlor	NS					
Lindane	NS					
Methoxychlor	NS					
Toxaphene	NS					
2,4,5-TP (Silvex)	NS					

Note: NS=not sampled at the Site, No suspected or known use of pesticides at the Site.

Appendix E

Free Floating Product Survey Results

Table E-1
Free Product Determination
September 16, 2005

Johns Manville - Former Manufacturing Area
All measurements are reported in feet from top of well casing

REC #	Well Number	Depth to Product	Depth to Water	Product Thickness
2/16	03-P1	---	10.61	0
2/16	03-P2	---	11.35	0
2/16	03-P3	---	11.69	0
2/16	03-P4	---	10.05	0
2/16	UMW-01	---	9.28	0
2/16	UMW-02	---	8.7	0
2/16	UMW-03	---	8.69	0
2/16	UMW-37	---	11.39	0
5	03-P5	---	6.99	0
5	03-P6	---	7.33	0
5	03-P7	---	7.68	0
5	03-P8	---	6.32	0
5	03-P9	---	7.21	0
5	03-P10	---	7.22	0
5	03-P11	---	8.04	0
5	03-P12	---	7.34	0
5	03-P13	---	8.51	0
5	03-P14	---	7.39	0
5	03-P15	---	8.09	0
5	03-P16	---	6.9	0
5	03-P17	---	-	0
5	04-P18	---	8.54	0
5	04-P19	---	8.61	0
5	UMW-34	---	11.48	0
12	02-13	---	5.73	0
12	02-14	---	6.5	0
12	02-16	---	7.73	0
12	02-17	---	-	0
12	02-20	---	8.05	0
12	UMW-27	---	8.02	0
12	UMW-38	---	11.33	0
12	UMW-39	---	11.18	0
12	UMW-40	---	10.86	0
12	UMW-41	---	8.49	0
12	UMW-42	---	7.46	0

"---" = No product detected
A Heron brand oil/water interface probe was used to measure the depth to water.

Appendix F

Pathway Exclusion Analysis for Soil Component of Groundwater Ingestion

Introduction

Appendix F provides additional detailed documentation of the pathway exclusion analysis for the soil component of groundwater ingestion at the Johns Manville facility in Waukegan, Illinois. Each contaminant of concern (COC) exceeding Tier 1 remediation objectives is listed below by Recognized Environmental Condition (REC). The rationale used for pathway exclusion for each COC is provided.

REC 2/16—1989 UST Excavation 2 and Building E Kerosene Pits

REC 2/16 soil results presented in the approved CSIR (Revision 1) were found meet the Tier 1 soil remediation objectives for the soil component of the groundwater ingestion exposure route with the exception of the following:

- 2-methylnaphthalene (2MNAP)

The soil component of the groundwater exposure route evaluation for 2MNAP was determined for two occurrences in soil in REC 2/16:

1. Soil Boring 03-01 (9-10 ft.)
2. Soil Boring 03-P2 (8-10 ft.)

Physical property assumptions for 2MNAP used for exposure route evaluations are provided in Tables F-1 and F-2. Physical property values used for the Equation R14 evaluation is provided in Table F-1. The proposed first order degradation constant for 2MNAP is 0.00050 d^{-1} is documented in Table F-2.

The exposure route evaluation for 2MNAP in soil was determined to meet the criteria for exposure route exclusion for groundwater ingestion using Equations R14 and R26. Documentation of the exposure route exclusion is provided in Tables 3-1A and 3-1C for boring 03-01 and Tables 3-1B and 3-1D for Boring 03-P2. The source width assumed for the two separate soil source areas is provided in Figure F-1.

REC 3—1989 UST Excavation 3

REC 3 soil results presented in the approved CSIR (Revision 1) were found to be meet Tier 1 objectives for the soil component of the groundwater ingestion exposure route with the exception of the following:

- SPLP Lead
- Benzene

SPLP Lead result from hand auger sample 04-HA2 (3 ft.) exceeded the groundwater remedial objective for lead of 0.0075 mg/L. The exposure route evaluation for SPLP lead was determined to meet the criteria for exposure route exclusion for groundwater ingestion from soils. Documentation of the exposure route exclusion is provided in Table 3-2. The source width assumed for the lead-impacted soil area is provided in Figure F-2.

The REC 3 remedial objective for benzene is 0.03 mg/kg for the soil component of the groundwater ingestion exposure route. Soil areas exceeding this value will be addressed in the RAP for REC 3.

REC 4—1989 UST Excavation 4

REC 4 soil results presented in the approved CSIR (Revision 1) met the Tier 1 objectives for the soil component of the groundwater ingestion exposure route with the exception of the following:

- Benzene
- Ethylbenzene

The ethylbenzene result in soil boring STF-1 (6-7 ft.) (18 mg/kg) exceeded the groundwater remedial objective of 13 mg/L. The exposure route evaluation for ethylbenzene in soil was determined to meet the criteria for exposure route exclusion for groundwater ingestion using Equations R14 and R26. Documentation of the exposure route exclusion is provided in Tables 3-3A and 3-3B. The source width assumed for the VOC-impacted soil area is provided in Figure F-3.

The benzene result in soil boring 03-13 (6-8 ft.) (0.244 mg/kg) exceeded the groundwater remedial objective of 0.03 mg/kg for the soil component of the groundwater ingestion exposure route. The exposure route evaluation for benzene was determined to meet the criteria for exposure route exclusion for groundwater ingestion from soils using Equations R14 and R26. Documentation of the exposure route exclusion is provided in Tables 3-3A and 3-3B. The source width assumed for the VOC-impacted soil area is provided in Figure F-3. The groundwater exposure route exclusion for benzene is further confirmed by groundwater monitoring results from 1998 to 2004 for monitoring wells UMW-04, UMW-06, UMW-07, and UMW-35 described in Section 2.3.4 for REC 4. VOCs in groundwater do not present a concern in REC 4, therefore, benzene in soil associated with REC 4 is not considered to be concern for the groundwater ingestion pathway.

REC 5—1989 UST Excavation 5

REC 5 soil results presented in the approved CSIR (Revision 1) were found to meet Tier 1 objectives for the soil component of the groundwater ingestion exposure route for all substances.

REC 11—1989 UST Excavation 11

REC 11 soil results presented in the approved CSIR (Revision 1) were found to meet Tier 1 objectives for the soil component of the groundwater ingestion exposure route for all substances.

REC 12—Solvent Recovery Room

REC 12 soil results presented in the approved CSIR (Revision 1) were found to meet Tier 1 objectives for the soil component of the groundwater ingestion exposure route with the exception of the following:

- Benzene, ethylbenzene, and toluene
- 3&4-methylphenol

The extent of benzene, ethylbenzene, toluene and xylenes for REC 12 were described in the approved CSIR (Revision 1), Figure 17d, the Supplemental Site Investigation Report (April 2005), the remedial objectives report (ROR) and remedial action plan (RAP), Figure 4-5. The two proposed areas for excavation in the REC 12 RAP are provided in Figure 4-5.

The exposure route evaluations for soil within REC 12, but outside of the proposed excavation zones described in Section 4.1.2 include maximum concentrations of benzene (0.093 mg/kg), ethylbenzene (27.2 mg/kg), and 3&4-methylphenol (0.508 mg/kg). The proposed soil remediation objective concentration for toluene (650 mg/kg) was assumed to be present for the exposure route exclusion evaluation.

The exposure route evaluation for benzene, ethylbenzene, and toluene in soil was determined to meet the criteria for exposure route exclusion for groundwater ingestion using Equations R14 and R26. Documentation of the exposure route exclusion is provided in Tables 3-4A and 3-4B. The source area assumed for the VOC-impacted soil areas is provided in Figure 4-5.

The exposure route evaluation for 3&4-methylphenol was determined to meet the criteria for exposure route exclusion for groundwater ingestion using Equations R14 and R26. Documentation of the exposure route exclusion is provided in Tables 3-4A and 3-4B. The source area assumed for the &4-methylphenol impacted soil areas is provided in Figure F-4.

References:

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Wilson, J.T., McNabb, J.F., and Cochran, J.W. (1985). Influence of microbial adaptation on the fate of organic pollutants in ground water. *Environmental Toxicology and Chemistry.* 4: 721-726.

Table F-1. Physical Property Data for 2-Methylnaphthalene

CAS No.	Chemical	Physical property	Value	Source
91-57-6	2-Methylnaphthalene	Solubility in water, mg/L	24.6	ATSDR, 2005
		Henry's law constant @ 25°C (unitless)	0.0204	ATSDR, 2005
		Organic carbon partition coefficient (K_{oc}), L/kg	2,450	ATSDR, 2005
		Proposed first order degradation rate constant, d^{-1}	0.00050	Table F-2

Table F-2. Proposed 2-Methylnaphthalene First Order Degradation Rate Constant

Data Source	Environmental Microcosm Source*	Study Methodology	PAHs evaluated (initial concentration)	Temp. (°C)	PAH degradation observed (%)	2MNAP First order rate constant (d^{-1})	NAP First order rate constant (d^{-1})	Ratio of 2MNAP:NAP rate constants
Wilson et al., 1985	PAH-contaminated subsurface groundwater and sediments near wood-creosote waste site	Sediment and groundwater in 45 mL static aerobic batch microcosms. Measurement of PAH loss over 8 weeks.	Naphthalene (NAP)	25	>160% per week	--	0.20	0.026 1.00
			2-Methynaphthalene (2MNAP)	25	8% and >160% per week	0.0052 0.20	--	
	Pristine subsurface groundwater and sediments near wood-creosote waste site	Sediment and groundwater in 45 mL static aerobic batch microcosms spiked with PAHs. Measurement of PAH loss over 8 weeks.	NAP	25	3.7% per week	--	0.0023	0.87
			2MNAP	25	3.5% per week	0.0020	--	
Bakermans et al., 2002	PAH-contaminated subsurface groundwater near a coal-tar waste site	Natural groundwater in 40 mL static batch microcosms. Measured loss of PAH relative to poisoned controls after 12 days.	NAP (0.02, 1.11, and 0.03 mg/L)	10	43, 45, and 72% over 12 days	--	0.020 0.022 0.0461	0.25 0.48
			2MNAP (1.8 and 27 ppm)	10	18 and 32% over 12 days	0.0072 0.0140	--	

NOTE: *Environmental microcosms were samples obtained from the field sites with only native microorganisms were present. Enrichment techniques or microbial inocula were not used to enhance microbial populations within microcosms.

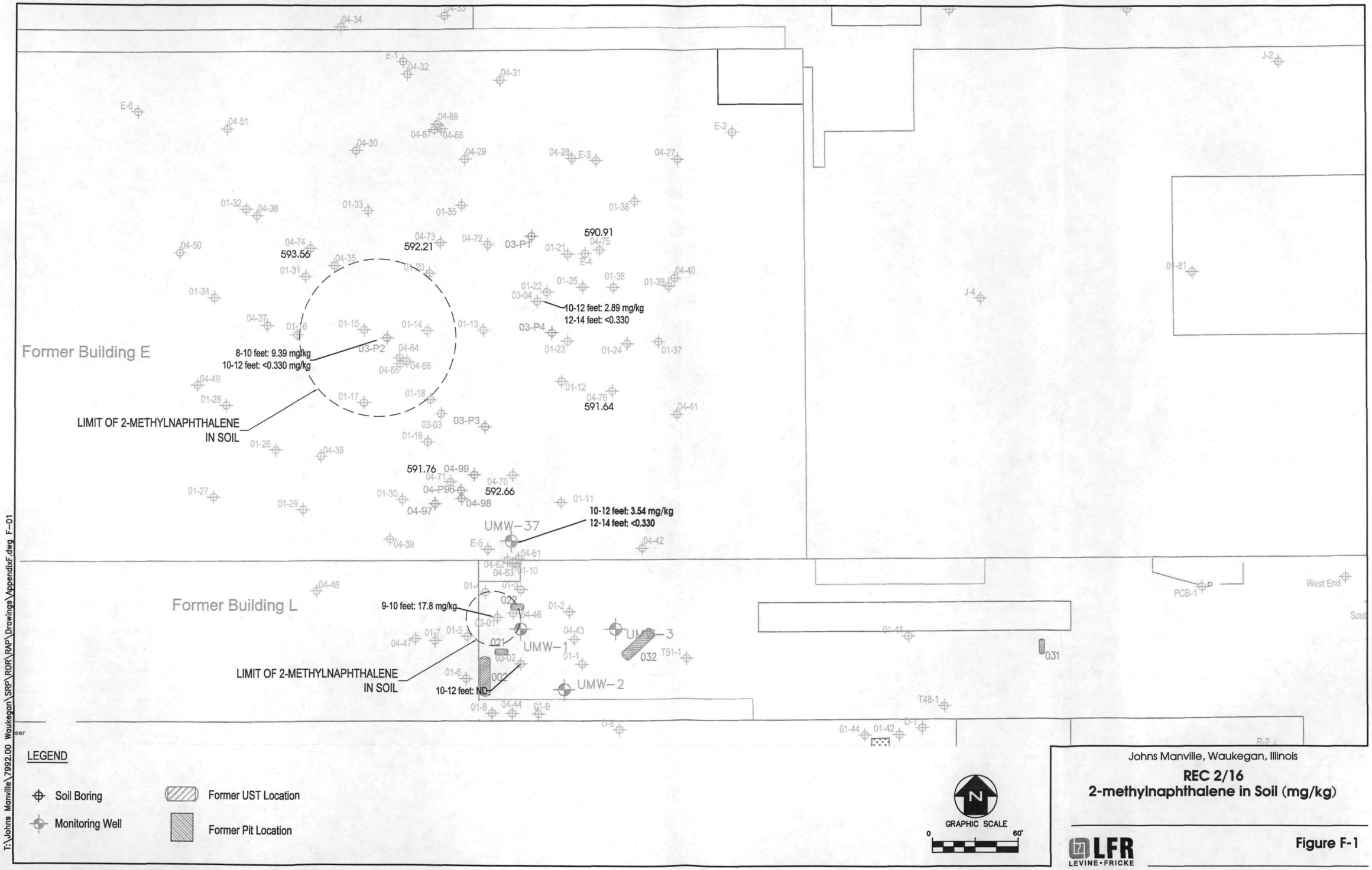
**Average excludes highest degradation rate constant for 2MNAP from Wilson et al., 1985.

Table F-2 (cont'd). 2-Methylnaphthalene First Order Degradation Rate Constant Determination

Data Source	Environmental microcosm source*	Study Methodology	PAHs evaluated (initial concentration)	Temp. (°C)	PAH degradation observed (%)	2MNAP First order rate constant (d^{-1})	NAP First order rate constant (d^{-1})	Ratio of 2MNAP:NAP rate constants
Heitkamp & Cerniglia, 1987	Sediment and water obtained from a pristine freshwater ecosystem with no prior PAH exposure	Sediment and groundwater mixture in 500 mL flow-through microcosms spiked with ^{14}C-labelled PAHs. Continuous measurement of $^{14}CO_2$ evolution was measured over 8 weeks to determine mineralization.	NAP (500 ng/g)	22	54.5% over 56 d	--	0.0061	0.27
			2MNAP (500 ng/g)	22	18.8% over 56 d	0.0016	--	
	Sediment and water obtained from a freshwater ecosystem with prior agricultural chemical exposure.		NAP (500 ng/g)	22	56.5% over 56 d.	--	0.0065	0.33
			2MNAP (500 ng/g)	22	24.3% over 56 d.	0.0022	--	
	Sediment and water obtained from an estuarine ecosystem with chronic exposure to petroleum hydrocarbons.		NAP (500 ng/g)	22	68.5% over 56 d.	--	0.0090	0.30
			2MNAP (500 ng/g)	22	29.2% over 56 d.	0.0027	--	
Average First Order Degradation Rate Constant for 2-Methylnaphtalene Microcosms**:						0.0050	0.040	0.36
Proposed 2-Methylnaphthalene First Order Degradation Rate Constant (Safety Factor = 10):						**0.00050**	--	--

NOTE: *Environmental microcosms were samples obtained from the field sites with only native microorganisms were present. Enrichment techniques or microbial inocula were not used to enhance microbial populations within microcosms.

**Average excludes the highest degradation rate constant result for 2MNAP from Wilson et al., 1985.



Johns Manville, Waukegan, Illinois

REC 2/16
2-methylnaphthalene in Soil (mg/kg)

LFR LEVINE•FRICKE

Figure F-1

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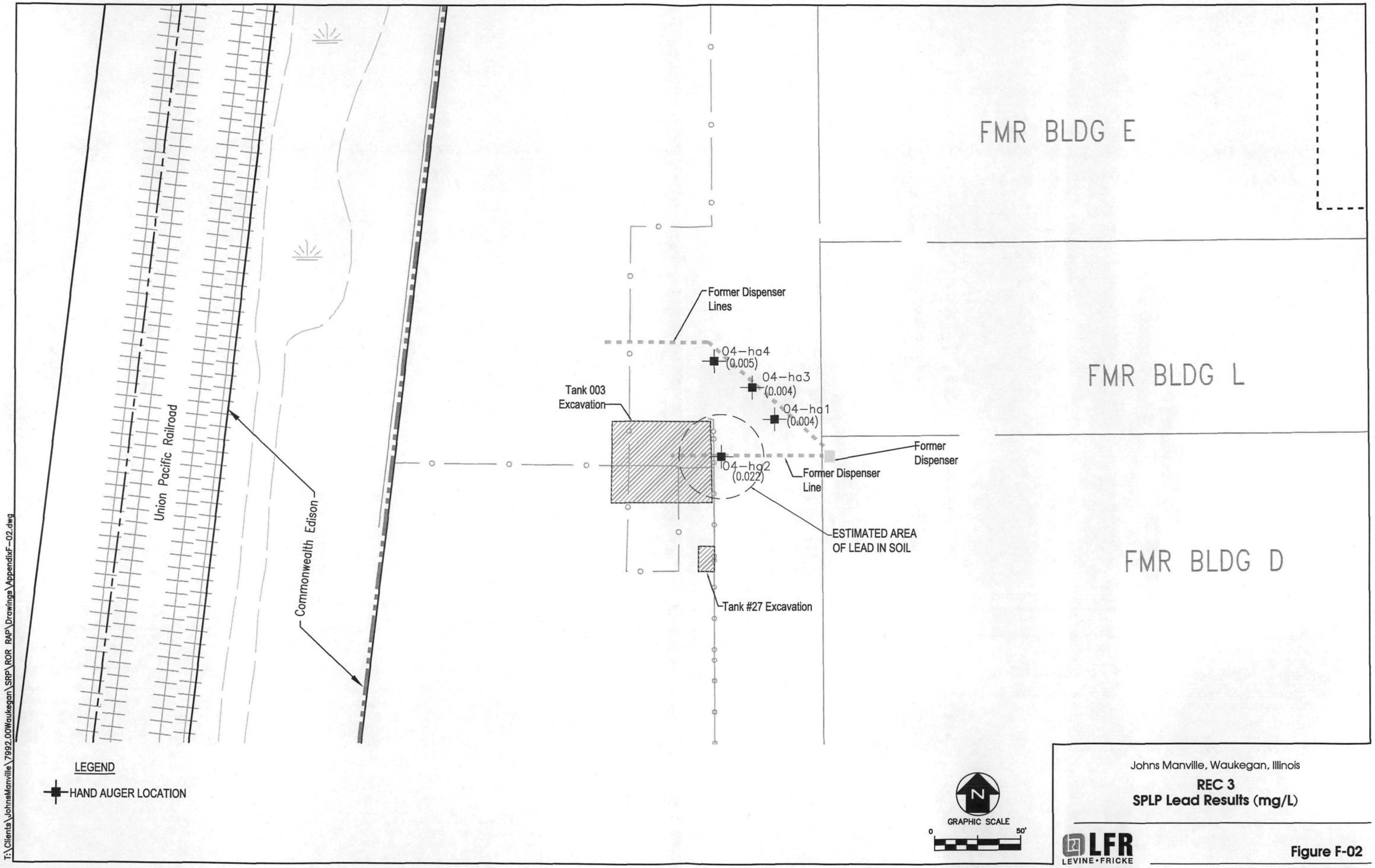
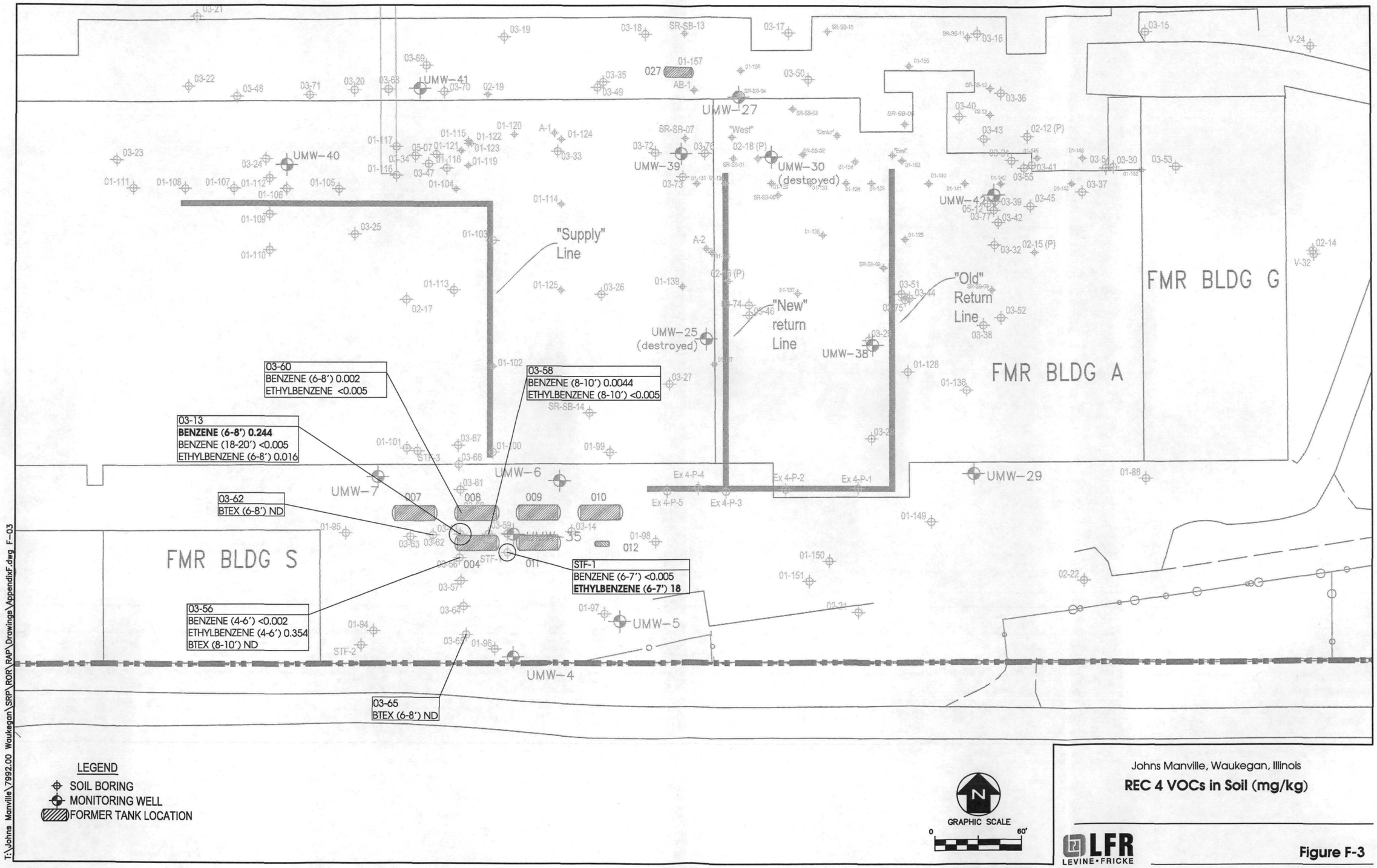


Johns Manville, Waukegan, Illinois

REC 3
SPLP Lead Results (mg/L)

LFR LEVINE•FRICKE

Figure F-02



Johns Manville, Waukegan, Illinois

REC 4 VOCs in Soil (mg/kg)

LFR LEVINE•FRICKE

Figure F-3

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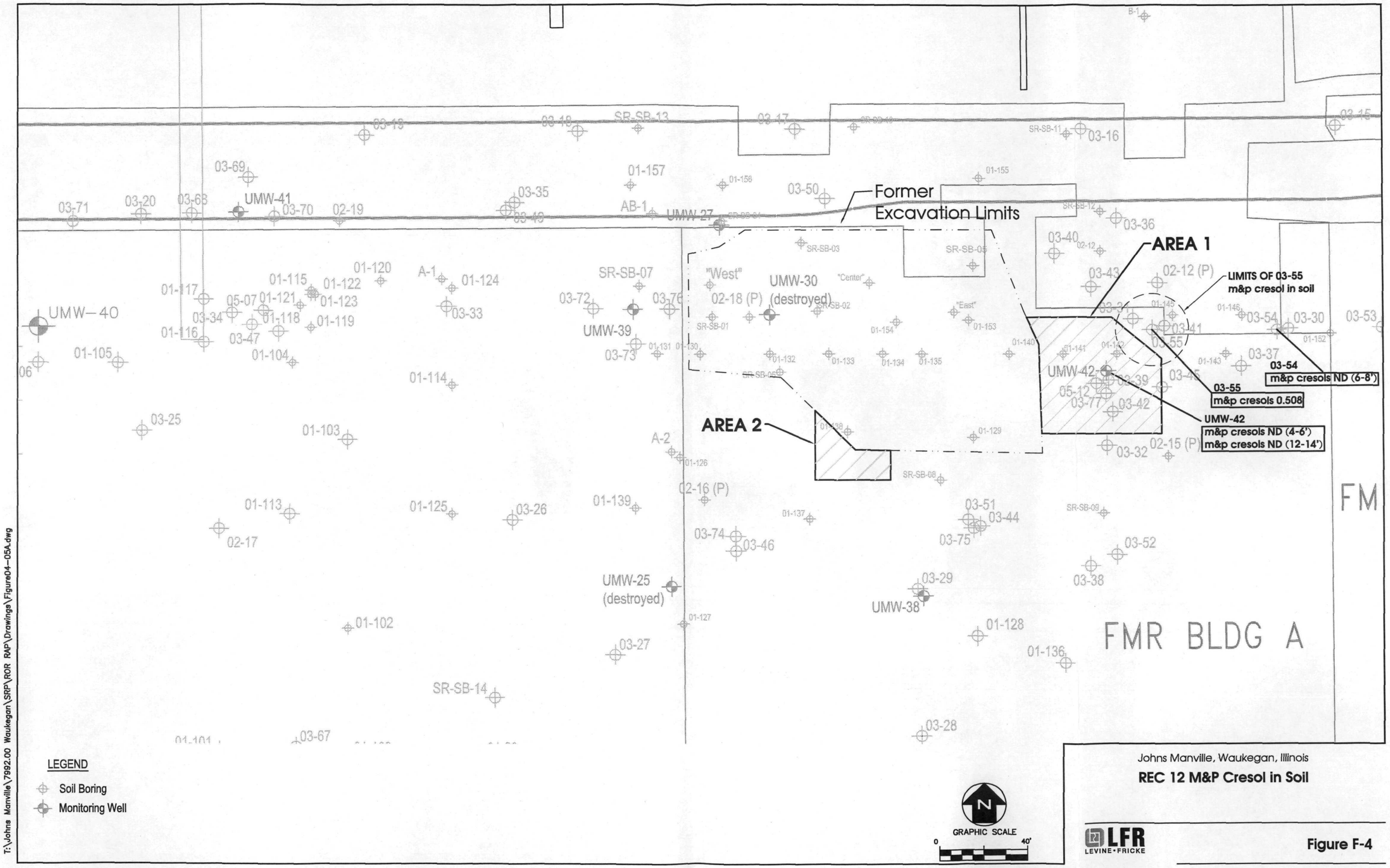

Johns Manville, Waukegan, Illinois

REC 12 M&P Cresol in Soil

LFR LEVINE•FRICKE

Figure F-4

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Appendix G

Pathway Exclusion Analysis for Groundwater Ingestion

Introduction

Appendix G provides additional detailed documentation of the pathway exclusion evaluation for the groundwater ingestion. Each contaminant of concern (COC) exceeding Tier 1 remediation objectives is listed below by Recognized Environmental Condition (REC). The rationale used for pathway exclusion for each COC is provided.

REC 2/16—1989 UST Excavation 2 and Building E Kerosene Pits

REC 2/16 groundwater quality was found to meet the Class I groundwater standards with the exception of the following:

- Manganese
- Benzo(a)anthracene (BAA), benzo(a)pyrene (BAP) (Boring E-5)
- 2-Methylnaphthalene (Boring 03-P1)

The remedial objective for manganese in groundwater is 0.15 mg/L. However the area background groundwater quality exceeds the Class I standard. Manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

Exposure route evaluations for BAA and BAP were determined to meet the criteria for exposure route exclusion for groundwater using Equation R26. Documentation of the exposure route exclusion is provided in Table 3-5A. The source area of BAA and BAP in groundwater used for this evaluation is provided in Figure G-1.

The exposure route evaluation for 2MNAP was determined to meet the criteria for exposure route exclusion for groundwater using Equation R26. Documentation of the exposure route exclusion is provided in Table 3-5B. The proposed first order degradation constant for 2MNAP is 0.00050 d^{-1} is documented in Appendix F, Table F-2. The source area of groundwater impact for 2MNAP used for this evaluation is provided in Figure G-2.

REC 3—1989 UST Excavation 3

- REC 3 groundwater quality was found meet Class I groundwater standards with the exception of the following:
- Lead (UMW-09)
- Benzene, ethylbenzene, toluene, xylenes
- Trichloroethene (TCE), vinyl chloride
- Benzo(a)anthracene (BAA), dibenzo(a,h)anthracene(DBA), indeno(1,2,3-cd)pyrene (IDP), naphthalene (NAP), benzo(a)pyrene (BAP), benzo(b)fluoranthene (BBF), and benzo(k)fluoranthene (BKF)

Groundwater concentrations of TCE and vinyl chloride have not been detected in the area of REC 3 in sampling events subsequent to the detection of these compounds above Class I standards as described in the approved CSIR (Revision 1) and supplemental documents, including the December 2, 2004 Letter of Transmittal regarding chlorinated compounds in groundwater. TCE and vinyl chloride were therefore excluded from consideration in the RAP.

Exposure route evaluations for IDP and NAP were determined to meet the criteria for exposure route exclusion for groundwater REC3. Documentation of the exposure route exclusion is provided in Tables 3-6A and 3-6B. The source area for IDP and NAP in groundwater is presented graphically in Figure G-3.

The proposed remedial objectives for benzene, ethylbenzene, toluene, xylenes, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are provided in Table 3-14. Remedial objectives are the Class I groundwater standards for these compounds at the Site boundary.

REC 4—1989 UST Excavation 4 –

REC 4 groundwater quality was found meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Lead
- Benzene, toluene

The REC 4 groundwater well with iron and lead exceeding Class I standards was resampled in January 2004 and April 2004, as described in the approved CSIR (Revision 1), and all results were less than the Class I groundwater standard. Samples results for lead were below the analytical detection limit. Therefore, iron and lead were not considered for inclusion in the RAP.

REC 4 groundwater concentrations from 1998 to 2004, as described in the approved CSIR (Revision 1), indicated that VOCs were not detected above their respective detection limits for samples collected from wells UMW-04, UMW-06, UMW-07, and UMW-35. Therefore, benzene and toluene in groundwater do not present a concern in REC 4.

The proposed remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However, the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 3.0.

REC 5—1989 UST Excavation 5

REC 5 groundwater quality was found to meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Benzene, ethylbenzene, toluene
- Trichloroethene (TCE)
- Benzo(a)pyrene (BAP) , benzo(k)fluoranthene (BKF), dibenzo(a,h)anthracene (DBA), naphthalene (NAP
- Bis-2-ethylhexylphthalate (BEHP)

Exposure route evaluations for benzene, ethylbenzene, toluene, TCE, BAP, BKF, DBA, NAP, and BEHP were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Tables 3-7A and 3-7B. The area of VOCs in groundwater used for this evaluation is provided in Figure G-4A. The area of semivolatile organics in groundwater used for this evaluation is provided in Figure G-4B.

The proposed remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

REC 11—1989 UST Excavation 11

REC 11 groundwater quality was found to be less than the Class I groundwater standard with the exception of the following substances:

- Manganese
- Lead
- Benzo(a)anthracene (BAA)

The remedial objective for manganese in groundwater is 0.15 mg/L. However the background groundwater quality exceeds the Class I standard. Manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

Lead was excluded from the ROR/RAP based on re-sampling results documented in the approved CSIR (Revision 1).

The exposure route evaluation for BAA was determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-8. The source area of BAA in groundwater used for this evaluation is provided in Figure G-5.

REC 12—Solvent Recovery Room

REC 12 groundwater quality was found to meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Lead
- Benzene, ethylbenzene, toluene
- 3&4 methylphenol

Exposure route evaluations for lead, benzene, ethylbenzene, toluene, and 3&4-methylphenol were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Tables 3-9A, 3-9B, and 3-9C. The source area of contaminants of concern in groundwater used for this evaluation is provided in Figure 4-5.

The remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

REC 32—Tank 031

REC 32 groundwater quality was found meet the Class I groundwater standards with the exception of the following:

- Benzo(a)anthracene (BAA), benzo(a)pyrene (BAP), benzo(b)fluoranthene (BBF), benzo(k)fluoranthene (BKF), chrysene (CHR), dibenzo(a,h)anthracene (DBA), and indeno (1,2,3-cd)pyrene (IDP)

Exposure route evaluations for BAA, BAP, BBF, BKF, CHR, DBA, and IDP were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-10. The presumed area of ground water used for the evaluation of REC 32 is presented in Figure G-1.

REC 38—Deep Wells

REC 38 groundwater quality was found to be less than the Class I groundwater standard with the exception of the following substances:

- Iron and manganese
- Vinyl chloride

The exposure route evaluation for vinyl chloride was determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-11. The area of vinyl chloride in deep groundwater used for this evaluation is presented in Figure G-6.

The remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

Appendix G

Pathway Exclusion Analysis for Groundwater Ingestion

Introduction

Appendix G provides additional detailed documentation of the pathway exclusion evaluation for the groundwater ingestion. Each contaminant of concern (COC) exceeding Tier 1 remediation objectives is listed below by Recognized Environmental Condition (REC). The rationale used for pathway exclusion for each COC is provided.

REC 2/16—1989 UST Excavation 2 and Building E Kerosene Pits

REC 2/16 groundwater quality was found to meet the Class I groundwater standards with the exception of the following:

- Manganese
- Benzo(a)anthracene (BAA), benzo(a)pyrene (BAP) (Boring E-5)
- 2-Methylnaphthalene (Boring 03-P1)

The remedial objective for manganese in groundwater is 0.15 mg/L. However the area background groundwater quality exceeds the Class I standard. Manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

Exposure route evaluations for BAA and BAP were determined to meet the criteria for exposure route exclusion for groundwater using Equation R26. Documentation of the exposure route exclusion is provided in Table 3-5A. The source area of BAA and BAP in groundwater used for this evaluation is provided in Figure G-1.

The exposure route evaluation for 2MNAP was determined to meet the criteria for exposure route exclusion for groundwater using Equation R26. Documentation of the exposure route exclusion is provided in Table 3-5B. The proposed first order degradation constant for 2MNAP is 0.00050 d^{-1} is documented in Appendix F, Table F-2. The source area of groundwater impact for 2MNAP used for this evaluation is provided in Figure G-2.

REC 3—1989 UST Excavation 3

- REC 3 groundwater quality was found meet Class I groundwater standards with the exception of the following:
- Lead (UMW-09)
- Benzene, ethylbenzene, toluene, xylenes
- Trichloroethene (TCE), vinyl chloride
- Benzo(a)anthracene (BAA), dibenzo(a,h)anthracene(DBA), indeno(1,2,3-cd)pyrene (IDP), naphthalene (NAP), benzo(a)pyrene (BAP), benzo(b)fluoranthene (BBF), and benzo(k)fluoranthene (BKF)

Groundwater concentrations of TCE and vinyl chloride have not been detected in the area of REC 3 in sampling events subsequent to the detection of these compounds above Class I standards as described in the approved CSIR (Revision 1) and supplemental documents, including the December 2, 2004 Letter of Transmittal regarding chlorinated compounds in groundwater. TCE and vinyl chloride were therefore excluded from consideration in the RAP.

Exposure route evaluations for IDP and NAP were determined to meet the criteria for exposure route exclusion for groundwater REC3. Documentation of the exposure route exclusion is provided in Tables 3-6A and 3-6B. The source area for IDP and NAP in groundwater is presented graphically in Figure G-3.

The proposed remedial objectives for benzene, ethylbenzene, toluene, xylenes, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene are provided in Table 3-14. Remedial objectives are the Class I groundwater standards for these compounds at the Site boundary.

REC 4—1989 UST Excavation 4 –

REC 4 groundwater quality was found meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Lead
- Benzene, toluene

The REC 4 groundwater well with iron and lead exceeding Class I standards was resampled in January 2004 and April 2004, as described in the approved CSIR (Revision 1), and all results were less than the Class I groundwater standard. Samples results for lead were below the analytical detection limit. Therefore, iron and lead were not considered for inclusion in the RAP.

REC 4 groundwater concentrations from 1998 to 2004, as described in the approved CSIR (Revision 1), indicated that VOCs were not detected above their respective detection limits for samples collected from wells UMW-04, UMW-06, UMW-07, and UMW-35. Therefore, benzene and toluene in groundwater do not present a concern in REC 4.

The proposed remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However, the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 3.0.

REC 5—1989 UST Excavation 5

REC 5 groundwater quality was found to meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Benzene, ethylbenzene, toluene
- Trichloroethene (TCE)
- Benzo(a)pyrene (BAP) , benzo(k)fluoranthene (BKF), dibenzo(a,h)anthracene (DBA), naphthalene (NAP
- Bis-2-ethylhexylphthalate (BEHP)

Exposure route evaluations for benzene, ethylbenzene, toluene, TCE, BAP, BKF, DBA, NAP, and BEHP were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Tables 3-7A and 3-7B. The area of VOCs in groundwater used for this evaluation is provided in Figure G-4A. The area of semivolatile organics in groundwater used for this evaluation is provided in Figure G-4B.

The proposed remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

REC 11—1989 UST Excavation 11

REC 11 groundwater quality was found to be less than the Class I groundwater standard with the exception of the following substances:

- Manganese
- Lead
- Benzo(a)anthracene (BAA)

The remedial objective for manganese in groundwater is 0.15 mg/L. However the background groundwater quality exceeds the Class I standard. Manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

Lead was excluded from the ROR/RAP based on re-sampling results documented in the approved CSIR (Revision 1).

The exposure route evaluation for BAA was determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-8. The source area of BAA in groundwater used for this evaluation is provided in Figure G-5.

REC 12—Solvent Recovery Room

REC 12 groundwater quality was found to meet Class I groundwater standards with the exception of the following:

- Iron, manganese
- Lead
- Benzene, ethylbenzene, toluene
- 3&4 methylphenol

Exposure route evaluations for lead, benzene, ethylbenzene, toluene, and 3&4-methylphenol were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Tables 3-9A, 3-9B, and 3-9C. The source area of contaminants of concern in groundwater used for this evaluation is provided in Figure 4-5.

The remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.

REC 32—Tank 031

REC 32 groundwater quality was found meet the Class I groundwater standards with the exception of the following:

- Benzo(a)anthracene (BAA), benzo(a)pyrene (BAP), benzo(b)fluoranthene (BBF), benzo(k)fluoranthene (BKF), chrysene (CHR), dibenzo(a,h)anthracene (DBA), and indeno (1,2,3-cd)pyrene (IDP)

Exposure route evaluations for BAA, BAP, BBF, BKF, CHR, DBA, and IDP were determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-10. The presumed area of ground water used for the evaluation of REC 32 is presented in Figure G-1.

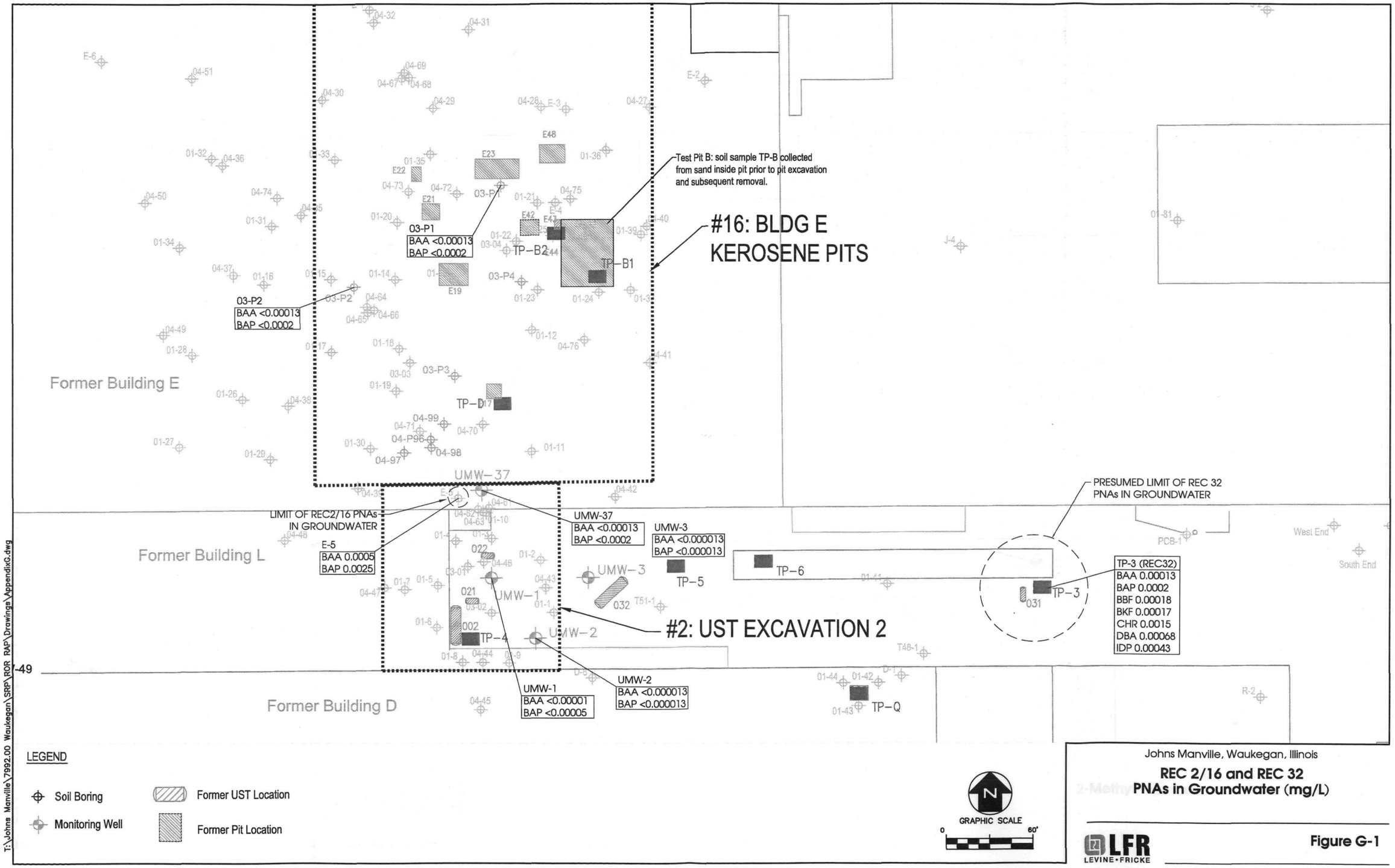
REC 38—Deep Wells

REC 38 groundwater quality was found to be less than the Class I groundwater standard with the exception of the following substances:

- Iron and manganese
- Vinyl chloride

The exposure route evaluation for vinyl chloride was determined to meet the criteria for exposure route exclusion for groundwater. Documentation of the exposure route exclusion is provided in Table 3-11. The area of vinyl chloride in deep groundwater used for this evaluation is presented in Figure G-6.

The remedial objective for manganese and iron in groundwater is 0.15 mg/L and 5 mg/L, respectively. However the background groundwater quality exceeds the Class I standards. Iron and manganese is addressed in RAP groundwater institutional controls described in Section 4.0.



Johns Manville, Waukegan, Illinois

REC 2/16 and REC 32 PNAs in Groundwater (mg/L)

LFR LEVINE•FRICKE

Figure G-1

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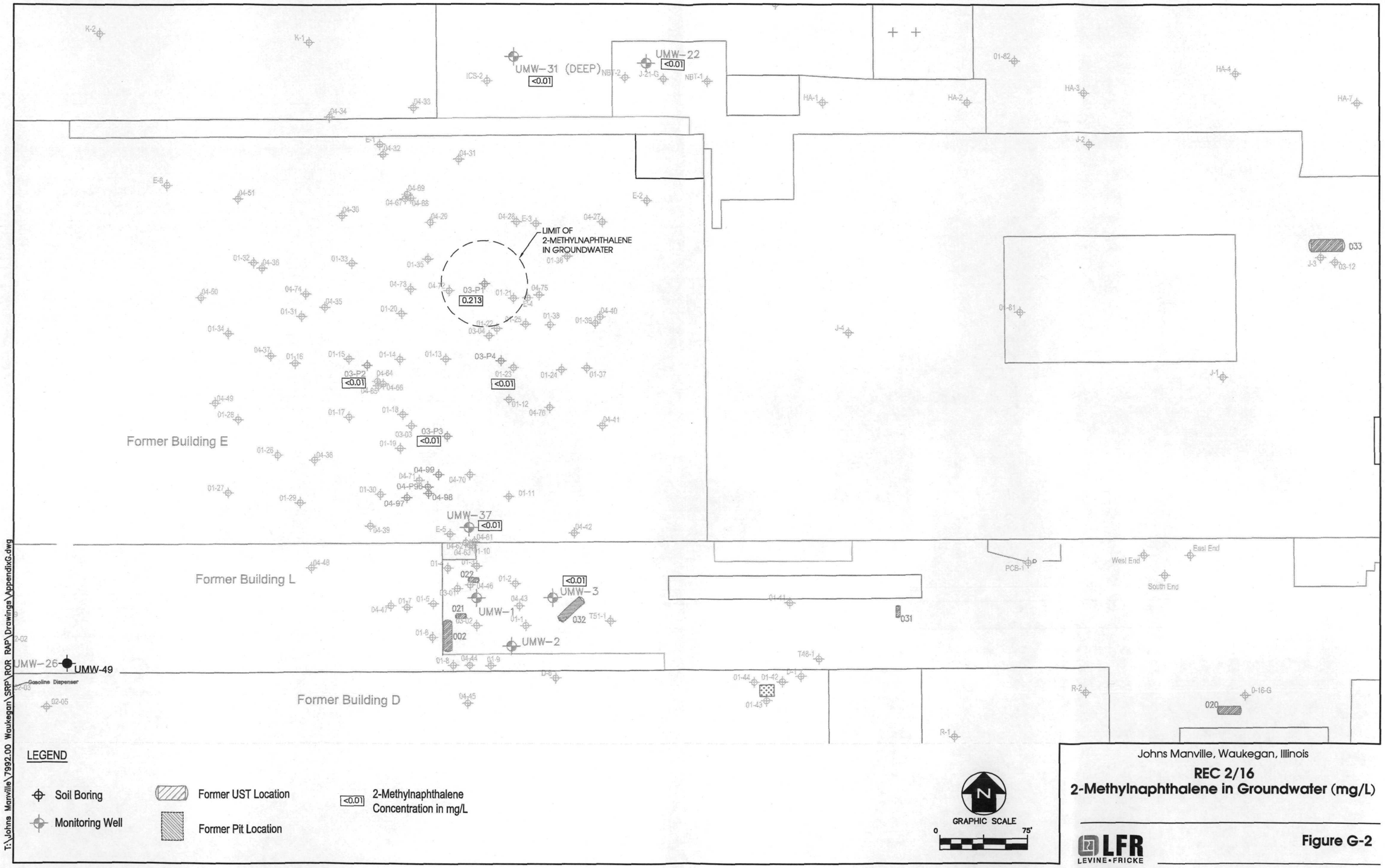

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REC 2/16

2-Methylnaphthalene in Groundwater (mg/L)

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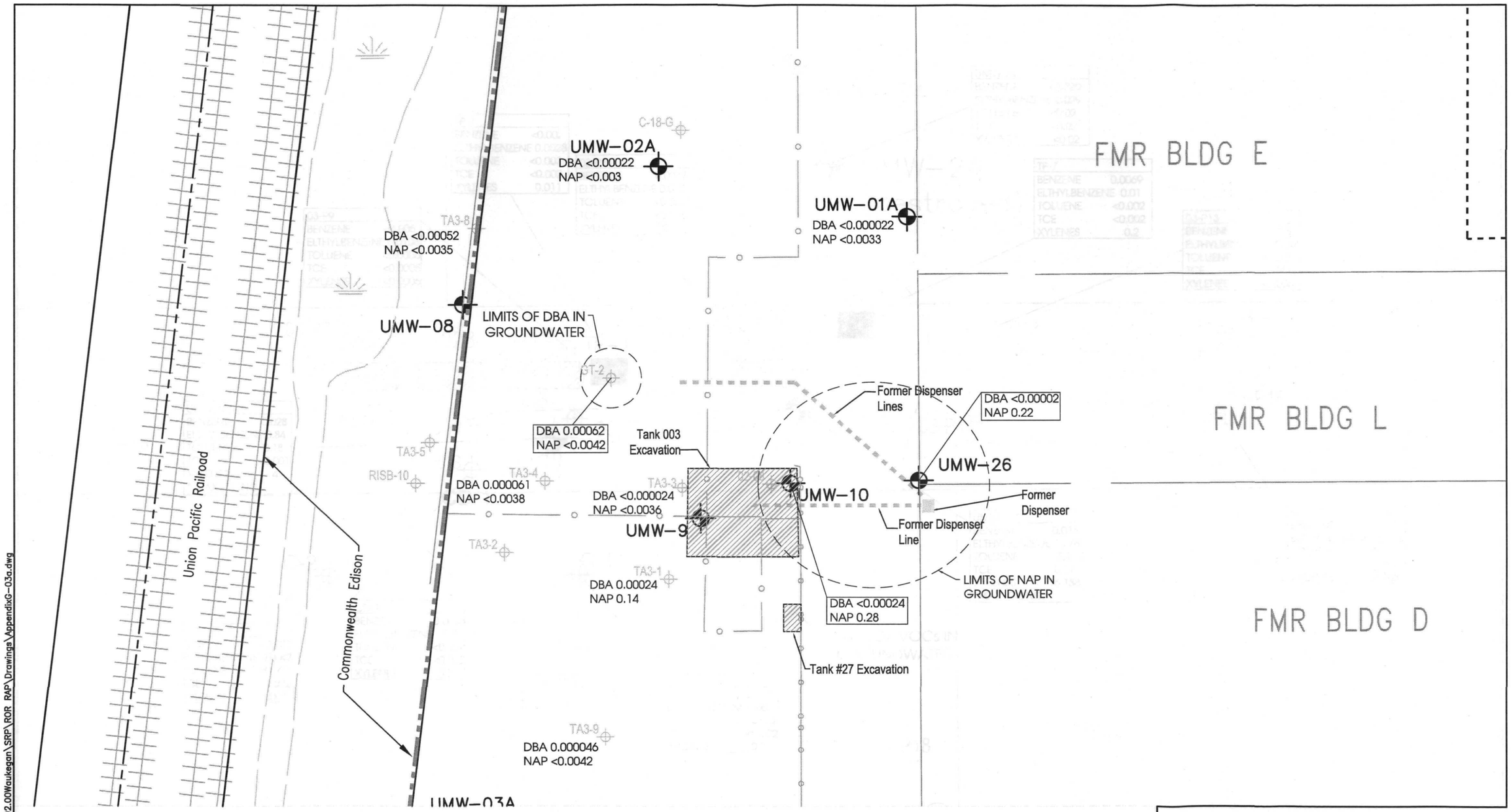
Figure G-2



LEGEND
MONITORING WELL
PIEZOMETER

NOTES:
1. LATEST REPORT SHOWN, 11/98
2. ND: NOT DETECTED ABOVE PQL
3. PNA RESULTS IN mg/L, DBA = Dibenzo(a,h)anthracene, NAP = Naphthalene

N
GRAPHIC SCALE
0 50'

Johns Manville, Waukegan, Illinois

REC 3 Area of Groundwater Impact for selected PNAs (mg/L)

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Figure G-3

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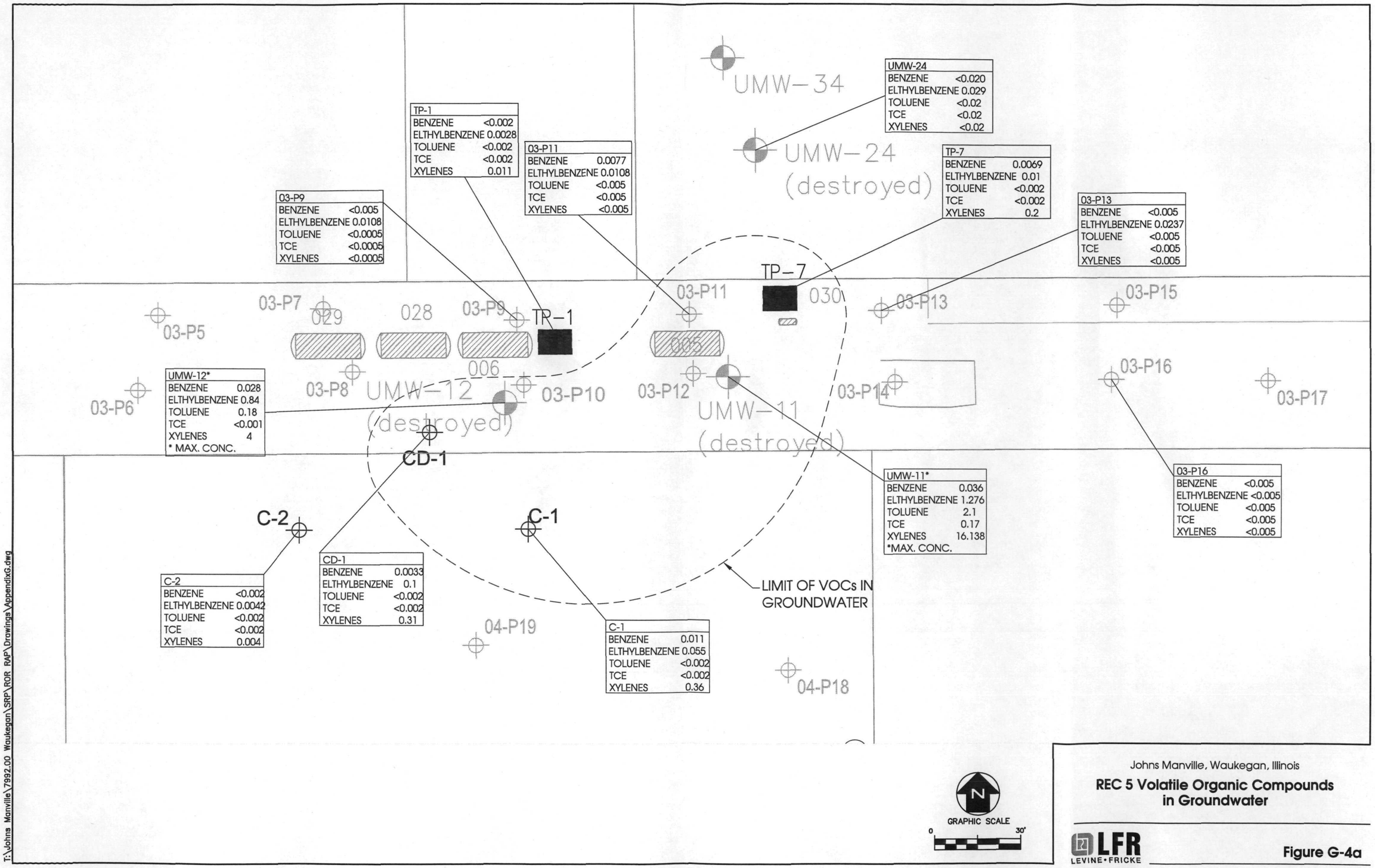

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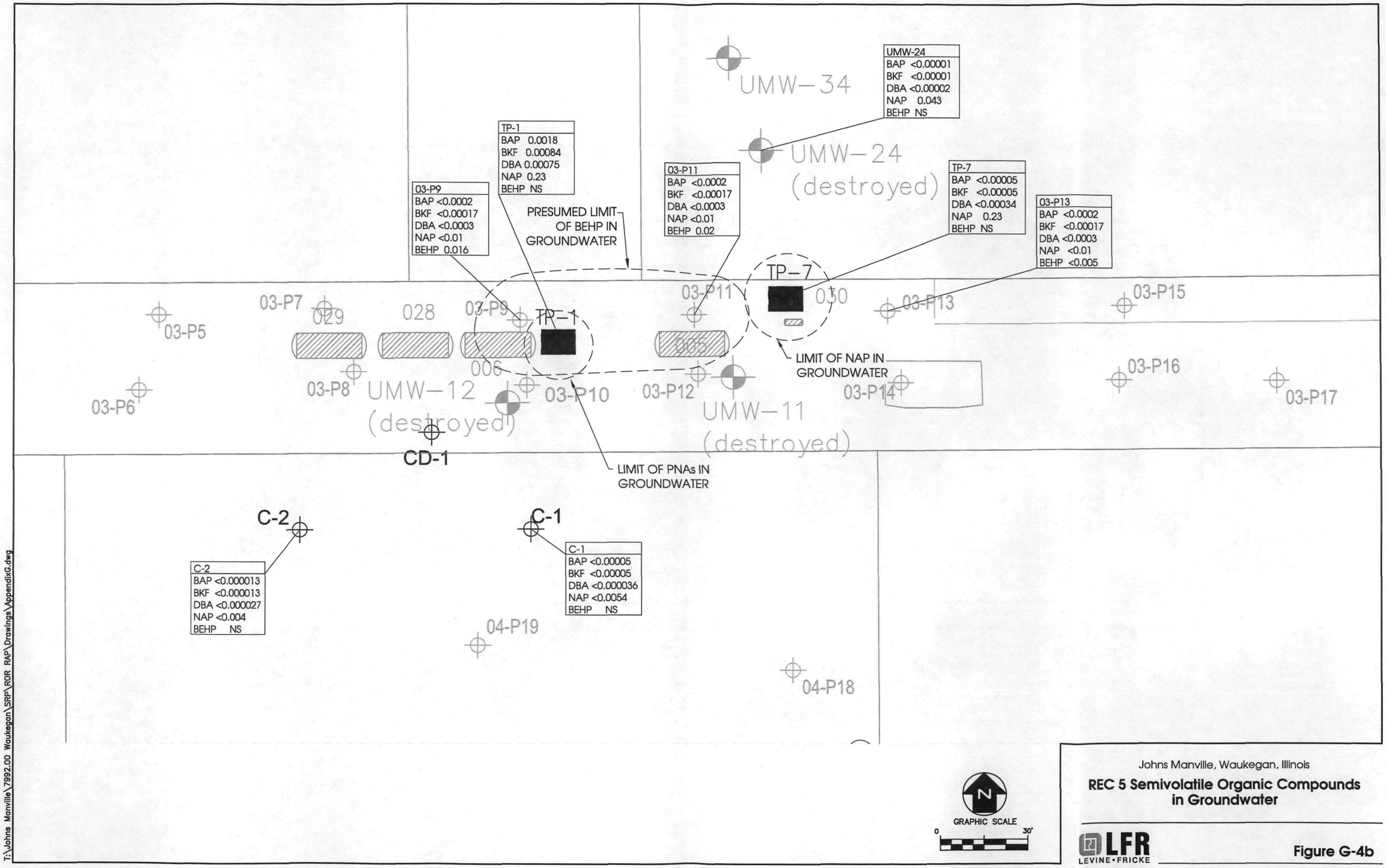
Johns Manville, Waukegan, Illinois

REC 5 Volatile Organic Compounds in Groundwater

LFR LEVINE•FRICKE

Figure G-4a



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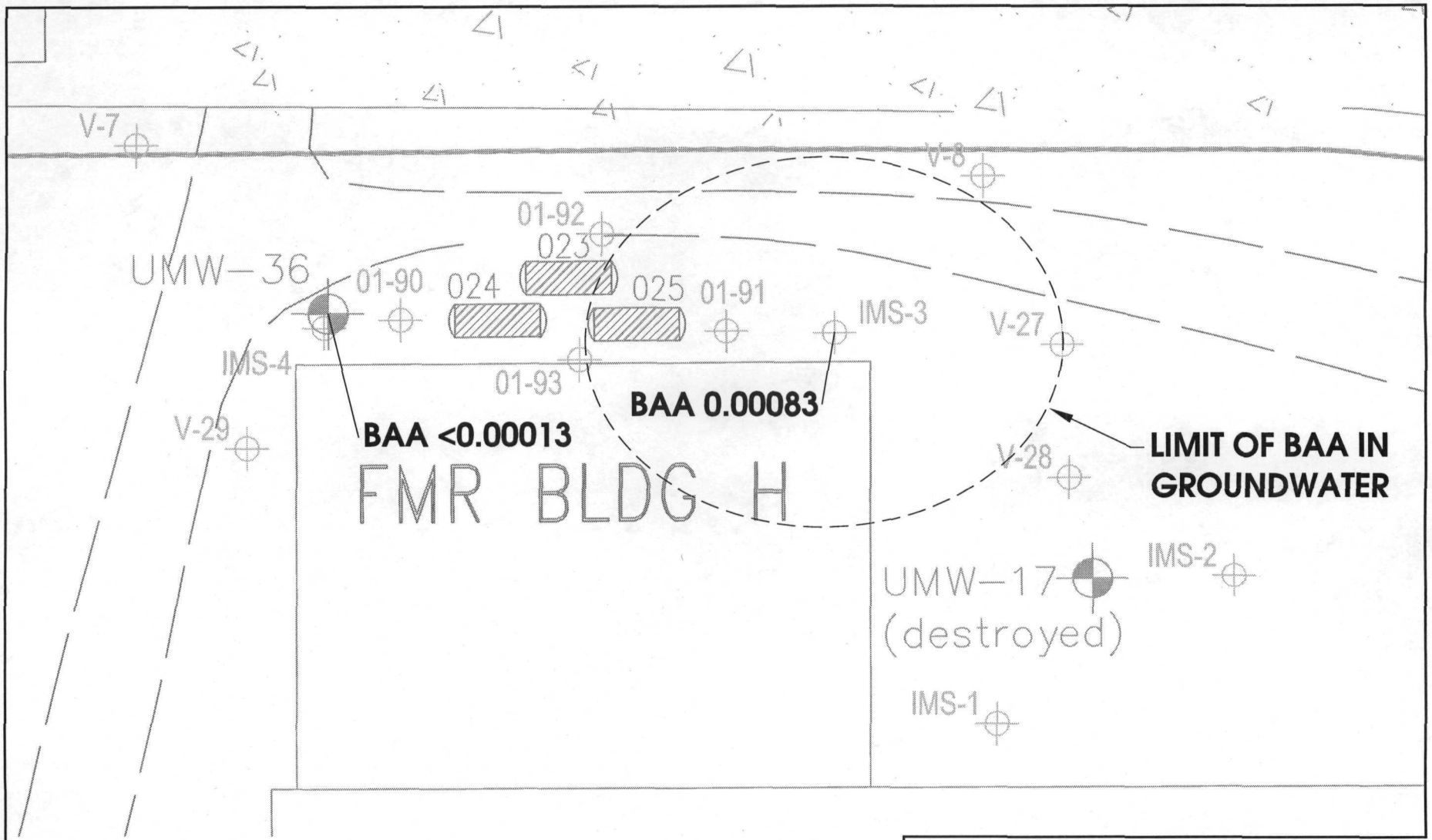
Johns Manville, Waukegan, Illinois

REC 5 Semivolatile Organic Compounds in Groundwater

LFR LEVINE•FRICKE

Figure G-4b



Johns Manville, Waukegan, Illinois

REC 11
PNAs in Groundwater (mg/L)

LFR LEVINE•FRICKE

Figure G-5

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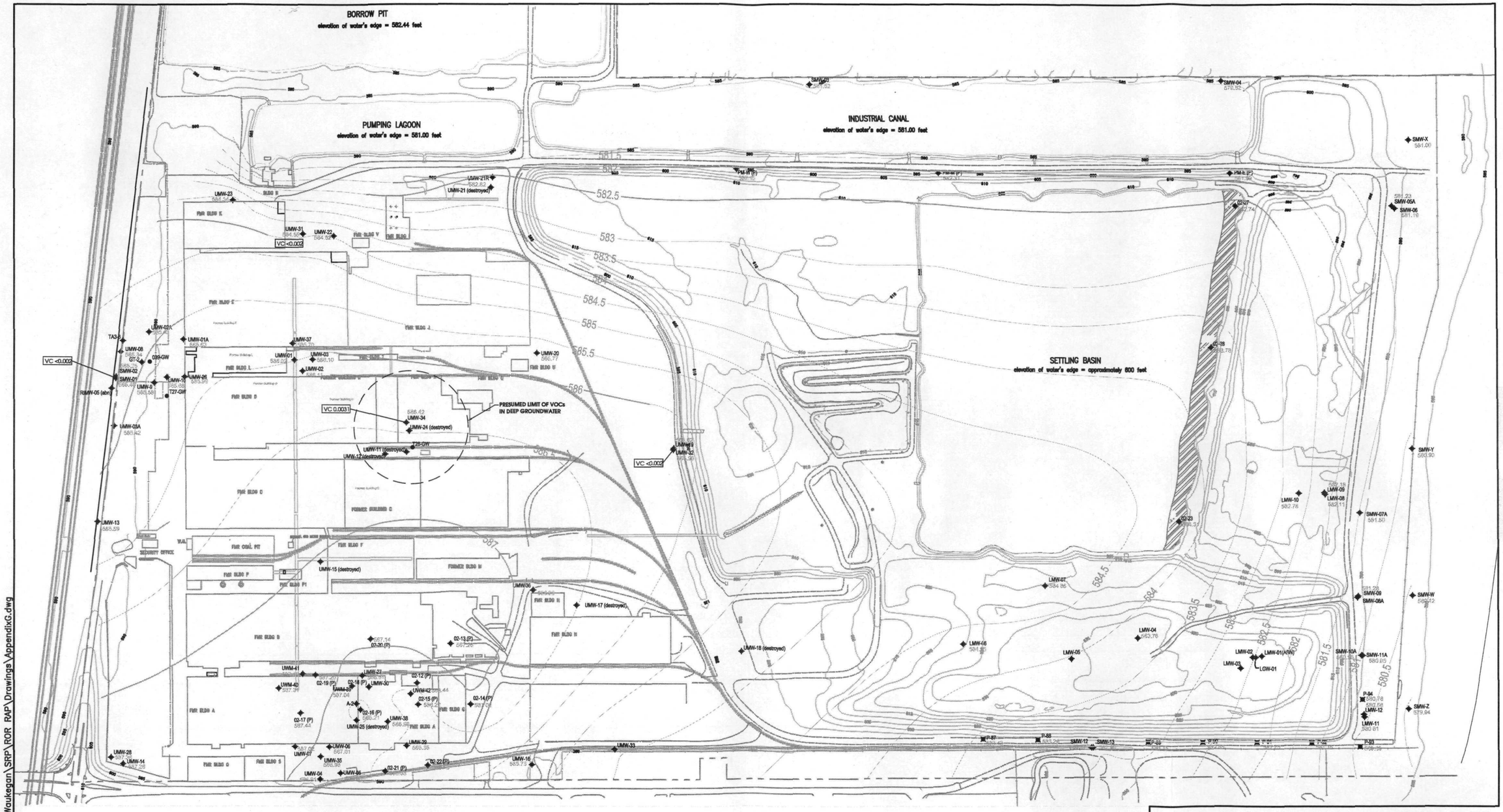

NOTE:
APRIL 2004 GROUNDWATER LEVELS SHOWN

GRAPHIC SCALE
0 350'

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REC 38 VOCs in Deep Groundwater (mg/L)

LFR LEVINE•FRICKE

Figure G-6

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