

ILLINOIS POLLUTION CONTROL BOARD
December 7, 2006

IN THE MATTER OF:)
)
PROPOSED AMENDMENTS TO TIERED) R06-10
APPROACH TO CORRECTIVE ACTION) (Rulemaking - Land)
OBJECTIVES (35 ILL. ADM. CODE 742))

Proposed Rule. Second Notice.

OPINION AND ORDER OF THE BOARD (by A.S. Moore):

Today the Board proposes amendments to the Tiered Approach to Corrective Action Objectives (TACO) rules (35 Ill. Adm. Code 742) for second-notice review by the Joint Committee on Administrative Rules (JCAR). The amendments are primarily designed to update standards and improve procedures under TACO and make numerous corrections and clarifications. Since first-notice publication of the proposed amendments in the *Illinois Register*, the Board has received no additional public comments. The Board makes several minor changes to the rule amendments proposed at first notice, none of which merit discussion.

This rulemaking was initiated when the Illinois Environmental Protection Agency (Agency) filed a proposal with the Board. After conducting two public hearings and considering the entire record, including public comments and Agency *errata* sheets, the Board, on September 7, 2006, adopted for first notice the amendments proposed or agreed to by the Agency. Publication of those proposed amendments in the *Illinois Register* (30 Ill. Reg. 15366 (Sept. 29, 2006)) began a 45-day public comment period.

TACO was last amended in 2002. Generally, TACO provides methods for developing risk-based remediation objectives to be used in environmental contamination cleanups under several regulatory programs: Leaking Underground Storage Tank (LUST) Program; Site Remediation Program (SRP); and Resource Conservation and Recovery Act (RCRA) Part B Permits and Closure Plans. The changes being adopted include the addition of background soil levels for polynuclear aromatic hydrocarbons (PAHs) and newly-applicable residential remediation objectives to protect construction workers, as well as mandatory forms to be used for certain institutional controls.

In this opinion, the Board first provides the procedural history of this rulemaking. The Board then gives background on the current TACO rules. Next, the Board discusses the proposal and the key issues raised prior to, and resolved in, the Board's first-notice decision. The second-notice amendments themselves are set forth in the order following this opinion.

PROCEDURAL HISTORY

The Agency filed its rulemaking proposal on September 30, 2005.¹ On October 20, 2005, the Board accepted the Agency's proposal for hearing, but required the Agency to file more copies of the materials that the Agency sought to have incorporated into TACO by reference. On November 2, 2005, the Agency timely filed the additional copies.

The Board held two public hearings in this rulemaking.² The first hearing took place in Chicago on January 31, 2006. Five persons testified on behalf of the Agency at the first hearing: (1) Gary King, Manager of the Division of Remediation Management in the Agency's Bureau of Land; (2) Dr. Thomas Hornshaw, Manager of the Agency's Toxicity Assessment Unit; (3) Lawrence Eastep, the former Manager of the Remedial Project Management Section in the Agency's Bureau of Land, now retired; (4) Gregory Dunn, Manager of one of the Voluntary Site Remediation Units in the Agency's Bureau of Land; and (5) Doug Clay, Manager of the LUST Section in the Agency's Bureau of Land.

Also testifying at the Chicago hearing were Harry Walton and Jarrett Thomas. Mr. Walton testified on behalf of the Illinois Environmental Regulatory Group (IERG) and the Site Remediation Advisory Committee (SRAC). IERG is a not-for-profit Illinois corporation affiliated with the Illinois State Chamber of Commerce and consists of over 60 member companies. SRAC was established under Section 58.11(a) of the Environmental Protection Act (Act) (415 ILCS 5/58.11(a) (2004)) as a 10-member committee appointed by the Governor to, among other things, "[r]eview, evaluate, and make recommendations regarding State laws, rules, and procedures that relate to site remediations." 415 ILCS 5/58.11(b)(1) (2004).

SRAC members are from the Illinois State Chamber of Commerce, the Illinois Manufacturers' Association, the Chemical Industry Council of Illinois, the Consulting Engineers Council of Illinois, the Illinois Bankers Association, the Community Bankers Association of Illinois, the Illinois Association of Realtors, and the National Solid Waste Management Association. Martin PFT2 at 1-2. Mr. Thomas is the President of the Illinois Association of Environmental Laboratories (IAETL) and Vice-President of Suburban Laboratories, Inc. IAETL consists of approximately 24 member laboratories. Tr.2 at 115.

The second hearing took place in Springfield on March 1, 2006. All those who testified at the first hearing also testified at the second hearing. The following additional persons testified at the second hearing: Brian Martin; Steven Gobelman; Ron Turpin; Tracey Hurley; Joe Truesdale; Greg Pronger; Richard Halm.

¹ The Board cites the Agency's Statement of Reasons within the Agency's proposal as "Stat. of Reas. at _."

² The first hearing transcript is cited as "Tr.1 at _," and the second hearing transcript is cited as "Tr.2 at _." The Board cites testimony prefiled for the first hearing as "[witness] PFT1 at _," and testimony prefiled for the second hearing as "[witness] PFT2 at _." Hearing exhibits are cited as "Exh. [#] at _."

Mr. Martin testified on behalf of IERG. Mr. Martin is a Consulting Environmental Scientist at Ameren Services who represents the Illinois Manufacturers' Association as Chairman of SRAC. Mr. Martin is also Chairman of the IERG Corrective Action Work Group, "which includes numerous companies engaged in industry, commerce, manufacturing, and transportation related activity." Martin PFT2 at 1. Mr. Gobelman testified on behalf of the Illinois Department of Transportation (IDOT). Mr. Gobelman is the Geologic and Waste Assessment Specialist in IDOT's Bureau of Design and Environment. Mr. Turpin is the Manager of the Quality Assurance Section of the Agency's Division of Laboratories. Ms. Hurley is with the Agency's Toxicity Assessment Unit. Mr. Truesdale is a professional engineer and professional geologist with CSD Environmental Services. Mr. Pronger is the Technical Director for Suburban Laboratories, Inc. Finally, Mr. Halm is the General Manager of Environmental Monitoring and Technologies.

The transcripts of the Chicago and Springfield hearings were received by the Board on February 10 and March 10, 2006, respectively, and promptly placed in the Clerk's Office On Line (COOL) on the Board's Web site at www.ipcb.state.il.us. Many other documents from this rulemaking are available through COOL, including Board opinions and orders, hearing officer orders, prefiled testimony, and public comments.

As required by Section 27(b) of the Act (415 ILCS 5/27(b) (2004)), the Board requested that the Department of Commerce and Economic Opportunity (DCEO) conduct an economic impact study (EcIS) on this rulemaking. The Board's EcIS request, dated November 10, 2006, was placed in this rulemaking's docket. DCEO did not respond to the Board's request. At hearing, the hearing officer noted the Board's EcIS request and DCEO's lack of response, affording anyone the opportunity to testify. No one testified about DCEO's lack of response. Tr.2 at 6-7.

The hearing officer entered 16 hearing exhibits into the record. The hearing exhibits are described as follows:

Exhibit 1: Agency *Errata* Sheet Number 1

Exhibit 2: Agency *Errata* Sheet Number 2

Exhibit 3: Prefiled Testimony of Mr. King (first hearing)

Exhibit 4: Prefiled Testimony of Dr. Hornshaw (first hearing)

Exhibit 5: Prefiled Testimony of Mr. Eastep (first hearing)

Exhibit 6: Prefiled Testimony of Mr. Dunn (first hearing)

Exhibit 7: Agency *Errata* Sheet Number 3

Exhibit 8: Prefiled Testimony of Mr. Dunn (second hearing)

Exhibit 9: Prefiled Testimony of Dr. Hornshaw (second hearing)

Exhibit 10: Prefiled Testimony of Mr. Eastep (second hearing)

Exhibit 11: Prefiled Testimony of Mr. Martin (second hearing)

Exhibit 12: Testimony of Mr. Gobelman (second hearing), attaching proposed rule language

Exhibit 13: Agency “Studies and Reports List,” attaching six United States Environmental Protection Agency (USEPA) “Integrated Risk Information System” documents: (1) Acetone; (2) Boron & Compounds; (3) 1,2-Dibromoethane; (4) 1,1-Dichloroethylene; (5) Phenol; and (6) Xylenes

Exhibit 14: Prefiled Testimony of Mr. Thomas (second hearing)

Exhibit 15: Documentation from R00-19 concerning the testimony of Ms. Hurley (documentation filed March 6, 2006; Exhibit 15 was reserved at the second hearing for the documentation)

Exhibit 16: Agency Listing of Accredited Laboratories that Perform Specified Analytical Methods

The Agency filed three *errata* sheets, proposing rule language changes to its original proposal. *Errata* sheet number one was filed on January 10, 2006 (Exh. 1); *errata* sheet number two on January 27, 2004 (Exh. 2); and *errata* sheet number three on February 10, 2006 (Exh. 7).

On February 21, 2006, the Agency filed a motion to correct the first hearing transcript, which the hearing officer granted on the record at the second hearing. Tr.2 at 8-9. In a March 7, 2006 order, the hearing officer set a public comment filing deadline of April 17, 2006, for those who wished to ensure that the Board would consider their public comment before proceeding to any first-notice decision. The Board received three pre-first notice public comments, all timely filed on the deadline: (1) public comment of IAETL (PC 1); (2) public comment of IERG (PC 2); and (3) public comment of the Agency (PC 3).

IERG and SRAC supported the Agency’s proposed amendments. Martin PFT2 at 2. As discussed below, IAETL sought changes to TACO’s Acceptable Detection Limits (ADLs), which the Agency, IERG, and SRAC opposed.

On September 7, 2006, the Board adopted its first-notice opinion and order, in which the Board also granted the Agency’s April 3, 2006 motion to correct the second hearing transcript. The amendments proposed for first notice were published in the *Illinois Register* on September 29, 2006, which began the 45-day public comment period. *See* 30 Ill. Reg. 15366 (Sept. 29, 2006). The Board received no additional public comments.

BACKGROUND ON TACO

The Board adopted TACO rules in 1997 under Title XVII of the Act (415 ILCS 5/58-58.17 (2004)). The rules are set forth in Part 742 of Title 35 of the Illinois Administrative Code (35 Ill. Adm. Code 742). As the Agency notes, the TACO rules provide “procedures for developing remediation objectives based on various risks to human health posed by environmental conditions at a site.” Stat. of Reas. at 2. Under TACO, persons assess the site conditions, evaluate the risks to human health, and propose remediation objectives to “mitigate conditions at the site so that they no longer pose a threat to human health.” *Id.*

Generally, TACO is used at sites being remediated under the SRP, the LUST Program, and RCRA Part B Permits and Closures. Stat. of Reas. at 1; 35 Ill. Adm. Code 742.105(b). The Agency states that using TACO has put “many sites back into productive use while significantly decreasing remediation costs statewide.” Stat. of Reas. at 4. Indeed, Gary King of the Agency testified that he had spoken with:

State environmental representatives from Indiana, Missouri, Wisconsin, New York, and Mississippi as they have developed their own State programs and have looked to the Illinois TACO rules to help guide their decision making. King PFT1 at 2; Tr.1 at 9.

The Board has amended the TACO rules several times over the years. For example, in 2000, the Board adopted amendments proposed by the Agency that were “necessitated by new technology, science, and programmatic changes.” Stat. of Reas. at 2. According to the Agency, it is again necessary to amend TACO to keep it “current.” *Id.*

DISCUSSION

In this portion of the opinion, the Board first provides an overview of the proposal. The Board then discusses the most significant changes being made to the current TACO rules, and the key issues presented before, and addressed in, the Board’s first-notice decision. Those topics are discussed in the following sequence: (1) applicability of TACO; (2) institutional controls, including ordinances and new mandatory forms; (3) background soil levels for polynuclear aromatic hydrocarbons or PAHs; (4) construction worker protection in residential scenarios; (5) new lead remediation objectives; (6) matters raised by the laboratory community, including concerns over Acceptable Detection Limits or ADLs; and (7) the technical feasibility and economic reasonableness of the amendments.

Overview

The Agency described the nature of the proposal:

The proposed amendments range in content from comments from the regulated community to improve procedures to new standards established for various contaminants, updated test methods, and new toxicity criteria. The effect of the proposed amendments is to update and improve standards and procedures so that

end users of the rules can achieve accurate data results that are protective of human health. Stat. of Reas. at 2-3; *see also* PC 3 at 1-2; Tr.1 at 9-10.

The Board's first-notice amendments made no substantive changes to the Agency's original proposal or three Agency *errata* sheets, with two exceptions: IDOT and IAETL had each suggested rule language, all of which is detailed below and agreed to by the Agency. Today at second notice, the Board makes no substantive changes to its first-notice proposal.

Many of the amendments are found in TACO appendices because they are new values established for contaminants or are new forms for institutional controls. Hornshaw PFT1 at 3-4; Tr.1 at 18-19. Many other changes are given effect by amending TACO's incorporations by reference, reflecting new or updated test methods and technical support documents. Stat. of Reas. at 4, 7-10; Dunn PFT1 at 2-5; Tr.1 at 18-19, 26. The amendments also reflect a number of minor corrections and clarifications. Hornshaw PFT1 at 7-14.

Applicability of TACO

The Board adds a new subsection (h) to Section 742.105 on TACO applicability, clarifying that landfills cannot use TACO in lieu of the procedures and requirements applicable to landfills under Part 807 or Parts 811 through 814 (35 Ill. Adm. Code 807, 811-814). Stat. of Reas. at 5; King PFT1 at 2-3. This change "represent[s] longstanding Agency practices." Stat. of Reas. at 2. In fact, the Agency's Gary King testified in the original TACO rulemaking that "landfills were not an appropriate fit for use of TACO because of technical and regulatory issues." King PFT1 at 2-3; Tr.1 at 10.

Institutional Controls

Under TACO, an "institutional control" is "a legal mechanism for imposing a restriction on land use, as described in Subpart J." 35 Ill. Adm. Code 742.200. Institutional controls include No Further Remediation (NFR) Letters, Environmental Land Use Controls (ELUCs), Highway Authority Agreements (HAAs), and ordinances. *See* 35 Ill. Adm. Code 742.Subpart J. Several types of institutional controls are impacted by the amendments.

Highway Authority Agreements or HAAs

For contamination remaining under highways, the Board adds new language to clarify the use of HAAs. Such agreements are typically between the highway authority and the property owner. The amendments are needed to address when a LUST owner or operator (*i.e.*, the person who would receive the NFR Letter from the Agency) is *not* the owner of the property. *See* Proposed Section 742.1000(c)(5); Appendix D; King PFT1 at 3.

In addition, a new instrument is added as an institutional control (Highway Authority Agreement Memorandum of Agreement or HAA MOA) to address situations where the highway authority *is* the property owner or LUST owner or operator and contamination remains under the highway. The problem resolved by this amendment is that the highway authority cannot enter into a binding agreement with itself. The HAA MOA then, as proposed, would be entered into

between the highway authority and the Agency. *See* Proposed Sections 742.1000(c)(6), 742.1020(g), (h); Appendix E; King PFT1 at 3, 4-6.

Ordinances

Mr. King testified that ordinances, like other institutional controls, “must remain in effect in perpetuity unless a responsible party demonstrates to the Agency that the ordinance (or other institutional control) is no longer necessary.” King PFT1 at 4. Ordinances, however, “by their nature, may be amended,” and the Agency is aware of at least two instances where ordinances approved as institutional controls were later amended or repealed without notice to the Agency. *Id.* Accordingly, the Board adds new requirements to alert the Agency of such actions regarding institutional control ordinances. *Id.*; *see* Proposed Section 742.1015(c).

The Agency’s Gregory Dunn testified that under current Section 742.320(d), an ordinance can be used to exclude the groundwater ingestion exposure route only if the ordinance effectively prohibits installing and using potable water supply wells within 2,500 feet from the source of the release. The 2,500-foot distance was originally proposed to correspond to the maximum setback zone for a community water supply well under Section 14.3 of the Act (415 ILCS 5/14.3 (2004)). Dunn PFT1 at 7; Stat. of Reas. at 5-6. A difficulty has arisen, however, for sites near a municipal boundary. These sites cannot now use Section 742.320(d) because the 2,500-foot radius would extend beyond the municipal boundary—and because beyond the municipal boundary there is no such ordinance in effect. Dunn PFT1 at 7-8; Stat. of Reas. at 5-6.

According to Mr. Dunn, among those sites precluded from using an ordinance to exclude the groundwater pathway are sites that “may only have measured and modeled concentrations extending only a short distance off-site, but well within 2,500 feet of the boundary of the municipality with the groundwater ordinance.” Dunn PFT1 at 8. To address this issue, the amendments would allow use of a groundwater ordinance for any area within the measured and modeled extent of groundwater contamination above what would otherwise be the applicable Tier I groundwater objectives. *Id.*; Tr.1 at 29-30; Stat. of Reas. at 6.

Mandatory Forms

The Agency over the last several years has developed “model documents” to implement the different institutional controls under TACO. The Agency did so “to make document preparation and Agency review more effective.” King PFT1 at 6. Specifically, the Agency believes that requiring the use of the forms “significantly decreases the burden on the regulated community to craft forms themselves and also substantially decreases the [Agency’s] review time of the documents.” Stat. of Reas. at 7. The Agency posted the model documents on its Web site for easy public use. Tr.1 at 11. Mr. King testified that it would now be appropriate to codify the model documents and formally require their use. King PFT1 at 6.

According to the Agency, the forms were prepared by Agency attorneys “to meet the four corners of the law.” Eastep PFT2 at 5. Over the possible concern that the act of non-lawyers completing these legal documents might constitute the unauthorized practice of law, the Agency maintains that “simply having members of the regulated community fill in the blanks with site

specific information does not require any legal expertise, nor does the Agency believe it constitutes the practice of law.” *Id.* The Agency likens these forms to other government forms that are filled out every day by members of the public without being classified as the unauthorized practice of law. *Id.* at 5-6. Further, before submitting its proposal to the Board, the Agency shared a draft of the proposed forms with and met with SRAC and IERG, neither of which raised concerns over any potential for the unauthorized practice of law. Stat. of Reas. at 3; Martin PFT2 at 2; Tr.1 at 101-06. The proposed mandatory forms appear in new TACO Appendices D (HAA), E (HAA MOA), F (ELUC), and H (Memorandum of Understanding) and are cross-referenced in the rule text. King PFT1 at 6; Eastep PFT2 at 5.

At the Springfield hearing, Steven Gobelman of IDOT testified that IDOT wished to be exempt from having to use the Agency’s proposed mandatory HAAs. Exh. 12 at 1. Mr. Gobelman testified that IDOT, as a State agency, has “unique legal requirements that other highway authorities would not have.” *Id.* He explained that the HAA currently used by IDOT:

contains the following additional legal provisions unique to the State of Illinois[:]
all [IDOT] HAAs must be reviewed and approved by the Illinois Attorney General’s Office; (2) the [IDOT] HAA is null and void if the Illinois Attorney General’s Office and the Agency do[] not approve such agreement; (3) if [IDOT] should breach the HAA, the owner/operator’s sole remedy is for an action for damages in the Illinois Court of Claims. *Id.* at 1-2.

According to Mr. Gobelman, IDOT has worked with the Agency and the Illinois Attorney General’s Office to establish its own agreements, “which satisfy not only the requirements of the Model HAA but also the TACO regulations.” Exh. 12 at 1-2. At hearing, IDOT offered changes to the Agency’s proposed Section 742.1020(a) amendments to carve IDOT out from the requirement to use the Appendix D HAA form. *Id.*; Tr.2 at 22-24. The Agency concurs with IDOT’s proposed rule language (PC 3 at 2), which is reflected in today’s proposal.

Finally, IERG asked the Board to address in its opinion whether the new mandatory forms would be “retroactively applied.” PC 2 at 1-2. Mr. King testified that the Agency does not intend to require use of the new forms where the institutional control agreements have already been negotiated and executed before the effective date of these amendatory rules. Tr.2 at 10-11; PC 2 at 1-2. The Board agrees with the Agency and as IERG suggests, these rules will not require such pre-existing agreements to be renegotiated “even where the agreements may not be identical to the new forms.” PC 2 at 2.

Background Soil Levels for Polynuclear Aromatic Hydrocarbons or PAHs

Based on the Agency’s years of experience in reviewing contaminant investigation reports submitted under the SRP, it became apparent to the Agency that significant levels of PAHs are “ubiquitous throughout much of the State.” Stat. of Reas. at 7; Eastep PFT1 at 2; Tr.1 at 21-23. PAHs “occur as a result of the incomplete combustion of organic material or a result of other natural or anthropogenic activities.” Stat. of Reas. at 7. Natural sources of PAHs might include forest fires, volcanic activity, and for the City of Chicago, the Great Chicago Fire.

Eastep PFT1 at 1. Anthropogenic sources may include motor vehicles, coal burning power plants, burning refuse, outdoor grilling, and industrial operations like manufactured gas plants. *Id.*

The problem presented by these “background” levels of PAHs is that to meet existing TACO remediation objectives for certain PAHs, persons have had to “remediate to levels below the naturally occurring levels.” Stat. of Reas. at 7-8. According to the Agency, “[t]his could mean removal of soils to excessive depths and then trying to find clean fill that might meet all the Tier 1 objectives,” which was often “either technically infeasible or economically unreasonable.” Eastep PFT1 at 2. In the words of IERG’s Brian Martin:

Requiring the remedial applicant to remediate to achieve Tier 1 residential [remediation objectives] would result in “islands of clean” and would “chill” the recycling of commercial/industrial properties to a residential land use. The increased cost to achieve the Tier 1 [remediation objectives] will not result in a decreased risk to the residential community. Martin PFT2 at 5.

A new Table H to Appendix A would set forth background soil levels for PAHs that may be used as remediation objectives. The PAH levels are based on two studies performed in 2001 and 2002. One study was conducted by the City of Chicago in conjunction with the United States Geological Survey (USGS) to assess PAH levels in Chicago ambient soils. A Brownfield Redevelopment Grant was approved for the City of Chicago in July 2000 to allow for the study. The results of the study were presented by Tetra Tech EM Inc. in *Polynuclear Aromatic Hydrocarbon Background Study, City of Chicago, Illinois*, which is being incorporated by reference. Stat. of Reas. at 8; Eastep PFT1 at 2. The study assessed “those soils whose chemical composition is affected by ubiquitous natural or anthropogenic processes rather than site-specific disposal of waste materials.” Eastep PFT1 at 2-4; Tr.1 at 22.

The other study was conducted by the Electric Power Research Institute (EPRI) on soils statewide, but outside of the City of Chicago. The Agency consulted with EPRI on this study and concurred with the site selection and sampling protocols before the study began. The results of the study were published in *Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Soil in Illinois: Background PAHs*, which is being incorporated by reference. Eastep PFT1 at 3-5; Stat. of Reas. at 8; Martin PFT2 at 2-3; PC 2 at 3; Tr.1 at 22; Tr.2 at 15-20.

For PAHs that have background levels exceeding any tier remediation objective, the “appropriate background level is incorporated into the Tier 1 table by virtue of a footnote” directing the reader to the newly-added background PAH levels table. Eastep PFT1 at 2-5; Stat. of Reas. at 8; *see* Proposed Appendix A, Table H; Appendix B, Table A, footnote w; Appendix B, Table B, footnote x.

The background PAH table, as with background levels for arsenic added in 2000, is not part of the “area background” provisions of TACO’s Subtitle D (35 Ill. Adm. Code 742.Subpart D). Eastep PFT2 at 2-5; Martin PFT2 at 3-4; *see* Proposed Amendments to Tiered Approach to Corrective Action Objectives (TACO) (35 Ill. Adm. Code 742), R00-19(a) (Dec. 21, 2000). Larry Eastep of the Agency testified:

Arsenic was found to be present everywhere above the Tier 1 residential objectives. It was in residential areas, natural areas, and many other uncontaminated areas. The Agency determined that even though arsenic was above Tier 1 objectives, it poses no additional (incremental) excess risk over what the public is exposed to every day. *** [A]rsenic was not characterized as “area background” since it was a statewide phenomenon

Since the studies have shown [PAHs] to be ubiquitous in Illinois, the use of statewide background does not fit the concept of “area background” provided in the Act and current rules. “Area background” was intended to address specific areas contaminated by local activities of industry. Eastep PFT2 at 3-4, 5; *see also* Tr.1 at 80-81, 83, 90-91.

The new Table H with background PAH levels could be used for a site in Chicago or in any other “populated area.” Eastep PFT1 at 5; Stat. of Reas. at 8. The proposed definition of “populated area” reads as follows:

“Populated Area” means (1) an area within the boundaries of a municipality that has a population of 10,000 or greater based on the year 2000 or most recent census; or (2) an area less than three miles from the property boundary of a municipality that has a population of 10,000 or greater based on the year 2000 or most recent census. *See* Proposed Section 742.200.

Table H contains three columns of differing background soil values: one column for Chicago; one for “metropolitan areas”; and one for “non-metropolitan areas.” Eastep PFT1 at 5. For purposes of the table, “Chicago” means within the corporate limits of the City of Chicago. *See* Proposed Appendix A, Table H, footnote a. The term “metropolitan area” means a “populated area” (other than the City of Chicago) that *is* located within any county in a standard metropolitan statistical area (SMSA). *See* Proposed Appendix A, Table H, footnote b. The term “non-metropolitan area” means a “populated area” that is *not* located within any county in a SMSA. *See* Proposed Appendix A, Table H, footnote c.³

The three separate geographical areas are used because background PAH levels were statistically different in those areas. Eastep PFT1 at 5. The Agency provided an example:

For benzo(a)anthracene, background levels exceeded Tier 1 ingestion levels only in Chicago and the downstate metropolitan areas, but not non-metropolitan areas. Thus, the non-metropolitan areas would not use Table H since background in these areas was below Tier 1 levels. *Id.*

³ Counties within a SMSA are: Boone, Champaign, Clinton, Cook, DuPage, Grundy, Henry, Jersey, Kane, Kankakee, Kendall, Lake, Macon, Madison, McHenry, McLean, Menard, Monroe, Peoria, Rock Island, Sangamon, St. Clair, Tazewell, Will, Winnebago, and Woodford. *See* 35 Ill. Adm. Code 742.APPENDIX A, Table G, Board Note.

Mr. Eastep testified that PAHs have a “statewide presence that residents are exposed to every day.” Eastep PFT2 at 4. According to Mr. Eastep, the proposed amendments “should have no impact in terms of excess risk” because there is “no increase in risk to people.” *Id.* at 5; Tr.2 at 11-12. Responding to potential concerns about the cumulative effect of similar acting carcinogenic chemicals, the Agency contended that if multiple PAHs are present at concentrations less than the values listed in the new background table, then the risk levels fall within “the acceptable range of 10^{-4} to 10^{-6} .” PC 3 at 3, Attachment 1; Tr.1 at 13-14, 84-87; Tr.2 at 11-14.

Mr. Eastep concluded in testimony that allowing cleanups to use the new PAH background table “will help hold costs down and allow them to focus on contaminants of concern, while still protecting human health and the environment.” Eastep PFT1 at 6; PC 2 at 5. The Board proposes the new Table H on PAH background levels.

Construction Worker Protection in Residential Scenarios

The Board adds a new footnote, footnote x, to Appendix B, Table A, because 28 chemicals listed in TACO were found to have “industrial/commercial construction worker inhalation” remediation objectives that are *more* stringent than the “residential inhalation” objectives. Stat. of Reas. at 8-9. In other words, a site cleaned up to current residential levels might nevertheless not meet all of the construction worker objectives. Of course, construction work may occur on residential properties, including emergency work or repairs. Further, many sites are cleaned up to TACO residential levels even though the property is intended to be used for commercial or industrial purposes, “to reduce encumbrances on their property.” Eastep PFT1 at 9-10; Tr.1 at 23-24, 94-95. The new footnote x is designed to apply the more stringent objectives for those 28 chemicals. *Id.*; Stat. of Reas. at 8-9.

New Lead Remediation Objectives

Dr. Thomas Hornshaw of the Agency testified that TACO’s current lead soil remediation objective of 400 milligrams per kilogram (mg/kg) for the industrial/commercial and construction worker ingestion pathways is based on a child’s exposure assumptions. Hornshaw PFT1 at 4. The Agency conferred with USEPA and reviewed the USEPA Adult Blood Lead Model, according to Dr. Hornshaw. The Agency determined that it would be appropriate to use the default inputs for this model to calculate new lead soil objectives of 800 mg/kg and 700 mg/kg for the industrial/commercial and construction worker ingestion routes, respectively. *Id.*, Exh. B, C; Tr.1 at 16-17. These new values appear in proposed Appendix B, Table B.

Laboratory Matters

Acceptable Detection Limits or ADLs

Current Section 742.200 of TACO defines ADL as follows:

“ADL” means Acceptable Detection Limit, which is the detectable concentration of a substance that is equal to the lowest appropriate Practical Quantitation Limit (PQL) as defined in this Section. 35 Ill. Adm. Code 742.200.

In turn, PQL is defined as follows:

“PQL” means practical quantitation limit or estimated quantitation limit, which is the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions in accordance with “Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods”, EPA Publication No. SW-846, incorporated by reference in Section 742.210. When applied to filtered water samples, PQL includes the method detection limit or estimated detection limit in accordance with the applicable method revision in: “Methods for the Determination of Organic Compounds in Drinking Water”, Supplement II”, EPA Publication No. EPA/600/4-88/039; “Methods for the Determination of Organic Compounds in Drinking Water, Supplement III”, EPA Publication No. EPA/600/R-95/131, all of which are incorporated by reference in Section 742.210. 35 Ill. Adm. Code 742.200.

The ADLs are based either on USEPA’s SW-846 test methods document or drinking water methods. Tr.1 at 36-37. Generally, under TACO, where the remediation objective for a chemical is less than the ADL, the ADL serves as the remediation objective. *See* 35 Ill. Adm. Code 742.505(b)(3)(B) (groundwater), 742.510(a)(8) (soil).

IAETL proposed revisions to current ADLs in TACO, as well as new ADLs where TACO provides no ADLs. PC 1, Attachment; Tr.1 at 42; 59-61, 67. IAETL argued that the Agency “clearly intended the cleanup objectives found in TACO to be analytically achievable.” PC 1 at 2. IAETL claimed that the Agency’s proposal nevertheless failed to address USEPA’s warning that method Estimated Quantitation Limits (EQLs) listed in USEPA’s SW-846 test methods document are “highly matrix dependent” and “provided for guidance and may not always be achievable.” *Id.* Additionally, IAETL cautioned that linking TACO remediation objectives to USEPA SW-846 EQLs poses significant risk because the methods tend to change over time. *Id.* In fact, USEPA is removing all references to EQLs from future methods and revisions, according to IAETL. *Id.*

IAETL maintained that the Agency also did not consider the limited number, and in some cases, the complete lack of accredited laboratories that may be able to achieve the published EQLs, and the potentially high costs of implementing non-routine and specialized methods. PC 1 at 2. IAETL’s Jarrett Thomas testified:

[S]ome of those analytes are unachievable using conventional methods that are used by environmental labs every day. There are methods that exist in USEPA that have supersensitive detection limits. However, the cost of using those methods is very high. Tr.1 at 60.

IAETL pointed to Mr. Dunn's testimony to show that the Agency does not intend to revise the ADLs even though they are aware that the objectives cannot be achieved. PC 1 at 3.

IAETL suggested that the regulations should require "best available technology" to ensure ADLs are readily achievable. PC 1 at 3-4. IAETL proposed specific ADLs derived from what it considers "commonly used methods of analysis in the environmental laboratory industry." *Id.*, Attachment 1; Tr.1 at 59-61. Further, IAETL recommended that the Board establish a "Technical Advisory Committee" that would include members of IAETL. PC 1 at 4. The committee, IAETL continued, would offer guidance to the Agency on a routine basis to ensure TACO is "technically sound and method/ADL references are kept current." *Id.*

IERG opposed IAETL's proposed revisions to TACO ADLs. IERG believed that changing the ADL regulatory structure to address the laboratory community's concerns would "conflict with TACO protective and 'conservative' policy goals." PC 2 at 6. IERG contended that the "current ADL compliance policy" assures that the Tier 1 remediation objectives are:

protective in all exposure scenarios. The regulated community, which includes the financial and lending industry, developers and the legal community, rely upon the current TACO policy and process, which provide cost effective tools to address theoretical risks. *Id.*

The Agency stated that it "understands there are compounds for which routinely used methods cannot meet their respective remediation objective established in TACO." Dunn PFT2 at 3. The Agency argued, however, that if ADLs are "set too high, then the remediation objectives are not protective and can become meaningless." PC 3 at 4. The Agency further asserted that labs either in Illinois or other states are accredited to perform most of the specified procedures, and where no labs are certified, alternative methods are available under the Act and TACO. In response to IAETL's claims that routinely-used methods often cannot meet remediation objectives or ADLs, the Agency listed labs in Illinois and other states that are certified for most parameters. PC 3 at 4-5, Attachment 2; Tr.2 at 39, 71-73.

Dr. Hornshaw testified at the time of the original TACO rulemaking that Method 8310 was not then widely available at laboratories to test for PAHs, but has since become "fairly widespread": "in that case we kind of forced the technology to catch up with the detection limits." Tr.1 at 64-65. According to the Agency, although no labs are currently certified for Method 8061A and Method 8131, other methods are available and, moreover, the Agency "has not encountered these compounds as constituents of concern." PC 3 at 4.

The Agency contended that even with over 300 SRP sites and over 1,000 LUST sites processed annually, numerous certified laboratories are achieving TACO ADLs "without issue." PC 3 at 5-6. Moreover, Mr. Dunn testified that TACO already provides a number of ways to comply when faced with a laboratory detection limit that exceeds a risk-based remediation objective for a chemical:

1. A Tier 2 evaluation can be completed on the contaminant of concern to achieve a higher remediation objective for that compound. Equations in

Appendix C, Table A and Appendix C, Table C allow the use of site-specific information to determine a site-specific remediation objective for the route (ingestion, inhalation, soil migration to groundwater or groundwater ingestion) of concern.

2. A Tier 3 option is also available, allowing a person to provide information to the Agency documenting the exposure route of concern is not complete, the remediation of this compound above the established remediation objective is impractical, or any other situation allowed pursuant to Section 742.900.
3. The exposure route of concern can be excluded pursuant to the requirements of Sections 742.310, 742.315, or 742.320. The use of institutional controls (Environmental Land Use Controls, Highway Authority Agreements, Groundwater Ordinances, etc.) or engineered barriers can be used to exclude the route of concern.
4. An argument could be made to the Agency stating the chemical with the detection limit exceeding the established remediation objective in TACO is not a contaminant of concern at the site. The argument must include reasons why the chemical would not be a contaminant of concern.
5. The Remediation Applicant, owner/operator, or anyone else using TACO could petition the Illinois Pollution Control Board to request the use of an adjusted standard pursuant to Section 28.1 of the Environmental Protection Act [415 ILCS 5/28.1 (2004)]. Dunn PFT2 at 2-3; Tr.1 at 52, 54-55, 69-70; Tr.2 at 111-12.

The Agency also disagreed with the testimony of Mr. Thomas concerning the applicability of ADLs to the Class I groundwater remediation objectives. PC 3 at 5. Mr. Thomas testified that the ADLs were too difficult to meet and were unnecessary because “no one drinks the groundwater near remediation sites.” *Id.* However, the Agency cited examples of private wells located in the vicinity of remediation sites and claimed that there are thousands of similarly situated private wells. *Id.* According to the Agency, if it did not consider drinking water, the regulations would not be protective of human health. *Id.*

In addition, the Agency opposed Mr. Thomas’ suggestion of adopting a performance based measurement system (PBMS) approach to analytical requirements in TACO. PC 3 at 7; Tr.2 at 29-31; Thomas PFT2 at 6. The Agency believed that Mr. Thomas was referring to a “procedurally rich RCRA [Resource Conservation and Recovery Act] program under USEPA.” PC 3 at 7. The Agency maintained, however, that the elements identified by Mr. Thomas (questions to be answered by monitoring, decisions to be supported by the data, level of uncertainty considered acceptable, documentation that must be generated to support the approach) “are fundamental to its remediation programs and are already addressed by TACO and program procedural rules.” *Id.* at 7-8.

Furthermore, the Agency continued, the purpose of employing a PBMS would be to “allow remediation objectives to be based on what is analytically achievable as opposed to being risk based.” PC 3 at 8. As noted in the testimony of the Agency’s Ron Turpin:

[I]t was never the intention that the program be able to operate only using what some laboratories call routine or common methods. It’s understood that there are times in order to be protective of health and the environment that more specialized methods would be needed. *Id.* (quoting Tr.2 at 73).

Finally, the Agency commented that “[t]o change the structure of TACO for convenience or for economic reasons would not be consistent with the Act.” *Id.*

After careful consideration, the Board found at first notice that there was not enough information in this record to support the sweeping ADL-related changes proposed by IAETL. IAETL provided no corroborating data or detailed explanation to substantiate its numerous suggestions. Moreover, the Board noted that it shared the concern of the Agency and IERG that broadly relaxing ADLs to match routinely-used, lower-cost test methods may risk rendering certain TACO remediation objectives no longer protective of human health. As the Board observed, laboratories are Agency-certified for most test methods, and there are several alternative mechanisms to evaluate compounds about which IAETL complained. Further, the Board noted that it has every expectation that the Agency will continue to propose to the Board appropriate rulemaking “updates” to reflect “changes in scientific information.” PC 3 at 1.

After the second hearing, the hearing officer’s order encouraged persons to include in public comment their views on how the Board should procedurally address the concerns raised in this record about ADLs and other laboratory issues: “For example, the Board’s procedural options include addressing the matters in this docket; holding another hearing before first notice; opening a different docket.” Hearing Officer Order, R06-10 (Mar. 7, 2006).

IAETL, of course, requested that the “analytical limitations of TACO be addressed in this rulemaking.” PC 1 at 2. IAETL stated that for the last four years it has tried without success to “work with the [Agency] to resolve several analytical problems inherent in the regulation.” *Id.*; Tr.1 at 58; Tr.2 at 62-64.

IERG believed that IAETL’s concerns would be better addressed in separate rulemaking. PC 2 at 6. TACO itself does not provide procedures for characterizing a site and evaluating the potential contamination at the site, according to IERG. *Id.* at 5. Rather, IERG continued, these details are found in each program’s regulatory requirements. *Id.* at 5-6. IERG maintained therefore that IAETL’s concerns are not appropriate for this rulemaking. *Id.* IERG recommended that:

ADL issues and concerns raised by the laboratory community be discussed between the Agency and interested parties. If necessary, amendments to the applicable regulatory programs may then be proposed to address any outstanding issues. *Id.*

The Agency also opposed having the Board hold further hearings or open a sub-docket to address the laboratory issues. PC 3 at 9. The Agency emphasized that Mr. Thomas and IAETL “addressed issues that were not part of the Agency’s original proposal.” *Id.* The Agency maintained:

If and when the laboratories can agree on a concrete approach that is technically justified, we would invite them to come to the Agency with that unified approach, and we would be amenable to giving them our input at that time. *Id.*

As the Board noted in its first-notice opinion, the Board greatly appreciates the participation of IAETL in this rulemaking, as well as that of all the other participants. To be clear, one of the Agency proposal’s main purposes, as articulated by the Agency, was to update and improve many technical aspects of TACO. Further, the Agency’s proposal did seek amendments to TACO tables that include ADLs. When the Board opened this rulemaking docket, IAETL and all other persons were free to suggest changes to the Board through testimony and comment, regardless of whether those suggestions might raise unexpected issues. To proceed otherwise, the Board stated at first notice, could stifle public participation in Board rulemakings. The Board found in its first-notice decision, however, that given the nature and scope of IAETL’s proposed changes, neither this docket nor a sub-docket would be appropriate to address the concerns raised by the laboratories. Nor is the Board, as noted at first notice, in a position to create a new advisory committee on TACO absent a statutory directive to do so. *Compare* 415 ILCS 5/58.11 (2004) (creating SRAC).

As stated at hearing and repeated in the first-notice opinion, any person may propose new rules or rule amendments to the Board. *See* 415 ILCS 5/27, 28 (2004); 35 Ill. Adm. Code 102. In the past, besides the Agency acting as a rulemaking proponent before the Board, the Board has received rulemaking proposals from industry associations both singly and jointly with the Agency. As the Board discussed at first notice, the Board encourages IAETL and the Agency, and all other interested persons, to work together cooperatively on the ADL issues and, if necessary, to return to the Board with one or more separate rulemaking proposals.

Correction Factor

The Agency’s original proposal in this rulemaking included these proposed amendments to Section 742.215(b)(1)(B):

- 1) *** The natural organic carbon fraction (f_{oc}) shall be either:
 - A) A default value of 6000 mg/kg for soils within the top meter and 2000 mg/kg for soils below one meter of the surface; or
 - B) A site-specific value as measured by the analytical method referenced in Appendix C, Table F, appropriately adjusted to estimate the fraction of organic carbon, as stated in ASTM D2974-87, Nelson and Sommers (1982); or by SW-846 Method 9060:

~~Total Organic Carbon, as incorporated by reference in Section 742.210;~~

As discussed in the first-notice opinion, the Agency is receptive to the Board adding a *specific* correction factor to the rules for converting total organic matter to total organic carbon, as suggested by IAETL. PC 3 at 6-7. Mr. Thomas testified that consultants want his laboratory to provide that correction factor. Tr.2 at 31. The Agency felt that this issue should be resolved between the laboratories and their clients, but would not object to having a precise factor in the rules. PC 3 at 6-7.

Specifically, the Agency agreed to modifying Section 742.215(b)(1)(B) by deleting the proposed words “appropriately adjusted” and replacing them with “multiplied by 0.58,” which figure is based on the Van Bemmelen correction factor from Nelson and Sommers (1982).⁴ PC 3 at 6-7; Tr.1 at 28, 34-35; Tr. 2 at 93-94, 96, 99. According to the Agency, if someone wishes to use an alternative correction factor, subsection (b)(3) of Section 742.215 allows for approval of other methods. PC 3 at 7. The Board included the suggested correction factor language in the first-notice amendments.

Technical Feasibility and Economic Reasonableness

The Agency maintained that the technical feasibility and economic reasonableness of the TACO rules were established when they were adopted in 1997 and are “only enhanced” with the updates from this rulemaking, which reflect “new science, technology, and experience.” Stat. of Reas. at 4. The Agency asserted that TACO has improved economic development by helping to put “innumerable sites back into productive use.” *Id.* Moreover, the Agency continued, because TACO is based on risk to human health, TACO has encouraged cleanups by minimizing costs: “more sites are being cleaned up, threats to human health are decreased, and the economy is given a boost.” *Id.* As noted, IERG and SRAC support the proposal. Martin PFT2 at 2.

Based on this record, the Board finds that the amendments proposed today are technically feasible and economically reasonable and will not have an adverse economic impact on the People of Illinois. *See* 415 ILCS 5/27(a), (b) (2004).

CONCLUSION

The Board proposes Part 742 TACO amendments for second notice review by JCAR. These changes are needed to update, improve, and correct many provisions of the TACO remediation rules, which are so critical to addressing the risks posed by contaminated properties in Illinois. Among today’s more significant amendments are the addition of background soil levels for PAHs, revisions to protect construction workers at properties cleaned up to residential

⁴ *See* Section 742.210, incorporating by reference Nelson, D.W., and L.E. Sommers. (1982). Total carbon, organic carbon, and organic matter. In: A.L. Page (ed.), *Methods of Soil Analysis*. Part 2. Chemical and Microbiological Properties. 2nd Edition, pp. 539-79, American Society of Agronomy. Madison, WI.

levels, and changes to enhance flexibility in using ordinances for excluding the groundwater ingestion exposure pathway.

Substantively, the Board at first notice adopted the Agency's proposed amendments, along with two other language changes suggested by other participants and agreed to by the Agency: IDOT's request to not be subject to the new mandatory HAA form; and IAETL's request for a specific correction factor to convert total organic matter to total organic carbon. For second notice, the Board makes several minor changes to the first-notice proposal, none of which merit discussion.

ORDER

The Board proposes for second notice the following amendments to the TACO rules (35 Ill. Adm. Code 742) and directs the Clerk to submit the proposal to JCAR. Proposed additions to the current rules are underlined; proposed deletions to the current rules appear stricken.

TITLE 35: ENVIRONMENTAL PROTECTION
 SUBTITLE G: WASTE DISPOSAL
 CHAPTER I: POLLUTION CONTROL BOARD
 SUBCHAPTER f: RISK BASED CLEANUP OBJECTIVES

PART 742
 TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES

SUBPART A: INTRODUCTION

Section	
742.100	Intent and Purpose
742.105	Applicability
742.110	Overview of Tiered Approach
742.115	Key Elements
742.120	Site Characterization

SUBPART B: GENERAL

Section	
742.200	Definitions
742.205	Severability
742.210	Incorporations by Reference
742.215	Determination of Soil Attenuation Capacity
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742.225	Demonstration of Compliance with Remediation Objectives
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SUBPART C: EXPOSURE ROUTE EVALUATIONS

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742.300	Exclusion of Exposure Route
742.305	Contaminant Source and Free Product Determination
742.310	Inhalation Exposure Route
742.315	Soil Ingestion Exposure Route
742.320	Groundwater Ingestion Exposure Route

SUBPART D: DETERMINING AREA BACKGROUND

Section	
742.400	Area Background
742.405	Determination of Area Background for Soil
742.410	Determination of Area Background for Groundwater
742.415	Use of Area Background Concentrations

SUBPART E: TIER 1 EVALUATION

Section	
742.500	Tier 1 Evaluation Overview
742.505	Tier 1 Soil and Groundwater Remediation Objectives
742.510	Tier 1 Remediation Objectives Tables

SUBPART F: TIER 2 GENERAL EVALUATION

Section	
742.600	Tier 2 Evaluation Overview
742.605	Land Use
742.610	Chemical and Site Properties

SUBPART G: TIER 2 SOIL EVALUATION

Section	
742.700	Tier 2 Soil Evaluation Overview
742.705	Parameters for Soil Remediation Objective Equations
742.710	SSL Soil Equations
742.715	RBCA Soil Equations
742.720	Chemicals with Cumulative Noncarcinogenic Effects

SUBPART H: TIER 2 GROUNDWATER EVALUATION

Section	
742.800	Tier 2 Groundwater Evaluation Overview
742.805	Tier 2 Groundwater Remediation Objectives
742.810	Calculations to Predict Impacts from Remaining Groundwater Contamination

SUBPART I: TIER 3 EVALUATION

Section	
742.900	Tier 3 Evaluation Overview
742.905	Modifications of Parameters
742.910	Alternative Models
742.915	Formal Risk Assessments
742.920	Impractical Remediation
742.925	Exposure Routes
742.930	Derivation of Toxicological Data

SUBPART J: INSTITUTIONAL CONTROLS

Section	
742.1000	Institutional Controls
742.1005	No Further Remediation Letters
742.1010	Environmental Land Use Controls
742.1012	Federally Owned Property: Land Use Control <u>Memoranda</u> Memorandums of Agreement
742.1015	Ordinances
742.1020	Highway Authority Agreements <u>and Highway Authority Agreement Memoranda of Agreement</u>

SUBPART K: ENGINEERED BARRIERS

Section	
742.1100	Engineered Barriers
742.1105	Engineered Barrier Requirements

APPENDIX A General

ILLUSTRATION A Developing Soil Remediation Objectives Under the Tiered Approach

ILLUSTRATION B Developing Groundwater Remediation Objectives Under the Tiered Approach

TABLE A Soil Saturation Limits (C_{sat}) for Chemicals Whose Melting Point is Less than 30°C

TABLE B Tolerance Factor (K)

TABLE C Coefficients $\{A_{N-1+1}\}$ for W Test of Normality, for $N=2(1)50$

TABLE D Percentage Points of the W Test for $n=3(1)50$

TABLE E Similar-Acting Noncarcinogenic Chemicals

TABLE F Similar-Acting Carcinogenic Chemicals

TABLE G Concentrations of Inorganic Chemicals in Background Soils

TABLE H Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils ~~Chemicals Whose Tier 1 Class I Groundwater Remediation Objective Exceeds the 1 in 1,000,000 Cancer Risk Concentration~~

TABLE I Chemicals Whose Tier 1 Class I Groundwater Remediation Objective Exceeds the 1 in 1,000,000 Cancer Risk Concentration

APPENDIX B Tier 1 Illustrations and Tables and Illustrations

ILLUSTRATION A Tier 1 Evaluation

TABLE A Tier 1 Soil Remediation Objectives for Residential Properties

TABLE B Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties

TABLE C pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater)

TABLE D pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater)

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

TABLE F Values Used to Calculate the Tier 1 Soil Remediation Objectives for the Soil Component of the Groundwater Ingestion Route

APPENDIX C Tier 2 Illustrations and Tables and Illustrations

ILLUSTRATION A Tier 2 Evaluation for Soil

ILLUSTRATION B Tier 2 Evaluation for Groundwater

ILLUSTRATION C US Department of Agriculture Soil Texture Classification

TABLE A SSL Equations

TABLE B SSL Parameters

TABLE C RBCA Equations

TABLE D RBCA Parameters

TABLE E Default Physical and Chemical Parameters

TABLE F Methods for Determining Physical Soil Parameters

TABLE G Error Function (erf)

TABLE H Q/C Values By Source Area

TABLE I K_{oc} Values for Ionizing Organics as a Function of pH (cm^3/g or L/kg or $\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$)

TABLE J Values to be Substituted for k_d or k_s when Evaluating Inorganics as a Function of pH (cm^3/g or L/kg or $\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$)

TABLE K Parameter Estimates for Calculating Water-Filled Soil Porosity (θ_w)

APPENDIX D Highway Authority Agreement

APPENDIX E Highway Authority Agreement Memorandum of Agreement

APPENDIX F Environmental Land Use Control

APPENDIX G Model Ordinance

APPENDIX H Memorandum of Understanding

AUTHORITY: Implementing Sections 22.4, 22.12, Title XVI, and Title XVII and authorized by Sections 27 and 58.5 of the Environmental Protection Act [415 ILCS 5/22.4, 22.12, 27, and 58.5 and Title XVI and Title XVII].

SOURCE: Adopted in R97-12(A) at 21 Ill. Reg. 7942, effective July 1, 1997; amended in R97-12(B) at 21 Ill. Reg. 16391, effective December 8, 1997; amended in R97-12(C) at 22 Ill. Reg. 10847, effective June 8, 1998; amended in R00-19(A) at 25 Ill. Reg. 651, effective January 6, 2001; amended in R00-19(B) at 25 Ill. Reg. 10374, effective August 15, 2001; amended in R00-19(C) at 26 Ill. Reg. 2683, effective February 5, 2002; amended at 30 Ill. Reg. _____, effective _____.

NOTE: Italics Capitalization indicates statutory language.

SUBPART A: INTRODUCTION

Section 742.105 Applicability

- a) Any person, including a person required to perform an investigation pursuant to the Illinois Environmental Protection Act [~~(415 ILCS 5)~~] (Act), may elect to proceed under this Part to the extent allowed by State or federal law and regulations and the provisions of this Part and subject to the exceptions listed in subsection (h) below. A person proceeding under this Part may do so to the extent such actions are consistent with the requirements of the program under which site remediation is being addressed.
- b) This Part is to be used in conjunction with the procedures and requirements applicable to the following programs:
 - 1) Leaking Underground Storage Tanks (35 Ill. Adm. Code 731, ~~and~~ 732, and 734);
 - 2) Site Remediation Program (35 Ill. Adm. Code 740); and
 - 3) RCRA Part B Permits and Closure Plans (35 Ill. Adm. Code 724 and 725).
- c) The procedures in this Part may not be used if their use would delay response action to address imminent and substantial threats to human health and the environment. This Part may only be used after actions to address such threats have been completed.
- d) This Part may be used to develop remediation objectives to protect surface waters, sediments or ecological concerns, when consistent with the regulations of other programs, and as approved by the Agency.
- e) A no further remediation determination issued by the Agency prior to July 1, 1997 pursuant to Section 4(y) of the Act or one of the programs listed in subsection (b) of this Section that approves completion of remedial action relative to a release shall remain in effect in accordance with the terms of that determination.

- f) Site specific groundwater remediation objectives determined under this Part for contaminants of concern may exceed the groundwater quality standards established pursuant to the rules promulgated under the Illinois Groundwater Protection Act [~~415 ILCS 55~~] as long as done in accordance with Sections 742.805 and 742.900(c)(9). (See 415 ILCS 5/58.5(d)(4))
- g) Where contaminants of concern include polychlorinated byphenyls (PCBs), a person may need to evaluate the applicability of regulations adopted under the Toxic Substances Control Act (15 U.S.C. 2601).
- h) This Part may not be used in lieu of the procedures and requirements applicable to landfills under 35 Ill. Adm. Code 807 or 811 through 814.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.110 Overview of Tiered Approach

- a) This Part presents an approach for developing remediation objectives (see Appendix A, Illustrations A and B) that include an option for exclusion of pathways from further consideration, use of area background concentrations as remediation objectives and three tiers for selecting applicable remediation objectives. An understanding of human exposure routes is necessary to properly conduct an evaluation under this approach. In some cases, applicable human exposure route(s) can be excluded from further consideration prior to any tier evaluation. Selecting which tier or combination of tiers to be used to develop remediation objectives is dependent on the site-specific conditions and remediation goals. Tier 1 evaluations and Tier 2 evaluations are not prerequisites to conducting Tier 3 evaluations.
- b) A Tier 1 evaluation compares the concentration of contaminants detected at a site to the corresponding remediation objectives for residential and industrial/commercial properties contained in Appendix B, Tables A, B, C, D and E. To complete a Tier 1 evaluation, the extent and concentrations of the contaminants of concern, the groundwater class, the land use classification, human exposure routes at the site, and, if appropriate, soil pH, must be known. If remediation objectives are developed based on industrial/commercial property use, then institutional controls under Subpart J are required.
- c) A Tier 2 evaluation uses the risk based equations from the Soil Screening Level (SSL) and Risk Based Corrective Action (RBCA) documents listed in Appendix C, Tables A and C, respectively. In addition to the information that is required for a Tier 1 evaluation, site-specific information is used to calculate Tier 2 remediation objectives. As in Tier 1, Tier 2 evaluates residential and industrial/commercial properties only. If remediation objectives are developed based on industrial/commercial property use, then institutional controls under Subpart J are required.

- d) A Tier 3 evaluation allows alternative parameters and factors, not available under a Tier 1 or Tier 2 evaluation, to be considered when developing remediation objectives. Remediation objectives developed for conservation and agricultural properties can only be developed under Tier 3.
- e) Remediation objectives may be developed using area background concentrations or any of the three tiers if the evaluation is conducted in accordance with applicable requirements in Subparts D through I. When contaminant concentrations do not exceed remediation objectives developed under one of the tiers or area background procedures under Subpart D, further evaluation under any of the other tiers is not required.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART B: GENERAL

Section 742.200 Definitions

Except as stated in this Section, or unless a different meaning of a word or term is clear from the context, the definition of words or terms in this Part shall be the same as that applied to the same words or terms in the Act.

"Act" means the Illinois Environmental Protection Act [415 ILCS 5] .

"ADL" means Acceptable Detection Limit, which is the detectable concentration of a substance that is equal to the lowest appropriate Practical Quantitation Limit (PQL) as defined in this Section.

"Agency" means the Illinois Environmental Protection Agency.

"Agricultural Property" means any real property for which its present or post-remediation use is for growing agricultural crops for food or feed either as harvested crops, cover crops or as pasture. This definition includes, but is not limited to, properties used for confinement or grazing of livestock or poultry and for silviculture operations. Excluded from this definition are farm residences, farm outbuildings and agrichemical facilities.

"Aquifer" means saturated (with groundwater) soils and geologic materials which are sufficiently permeable to readily yield economically useful quantities of water to wells, springs, or streams under ordinary hydraulic gradients. (Illinois Groundwater Protection Act [415 ILCS 55/3(a)])

"Area Background" means *concentrations of regulated substances that are consistently present in the environment in the vicinity of a site that are the result of natural conditions or human activities, and not the result solely of releases at the site.* [415 ILCS 5/58.2]

"ASTM" means the American Society for Testing and Materials.

"Board" means the Illinois Pollution Control Board.

"Cancer Risk" means a unitless probability of an individual developing cancer from a defined exposure rate and frequency.

"Cap" means a barrier designed to prevent the infiltration of precipitation or other surface water, or impede the ingestion or inhalation of contaminants.

"Carcinogen" means *a contaminant that is classified as a category A1 or A2 carcinogen by the American Conference of Governmental Industrial Hygienists; a category 1 or 2A/2B carcinogen by the World Health Organization's International Agency for Research on Cancer; a "human carcinogen" or "anticipated human carcinogen" by the United States Department of Health and Human Service National Toxicological Program; or a category A or B1/B2 carcinogen by the United States Environmental Protection Agency in the integrated risk information system or a final rule issued in a Federal Register notice by the USEPA.* [415 ILCS 5/58.2]

"Class I Groundwater" means groundwater that meets the Class I: Potable Resource Groundwater criteria set forth in 35 Ill. Adm. Code 620.

"Class II Groundwater" means groundwater that meets the Class II: General Resource Groundwater criteria set forth in 35 Ill. Adm. Code 620.

"Conservation Property" means any real property for which present or post-remediation use is primarily for wildlife habitat.

"Construction Worker" means a person engaged on a temporary basis to perform work involving invasive construction activities including, but not limited to, personnel performing demolition, earth-moving, building, and routine and emergency utility installation or repair activities.

"Contaminant of Concern" or "Regulated Substance of Concern" means *any contaminant that is expected to be present at the site based upon past and current land uses and associated releases that are known to the person conducting a remediation based upon reasonable inquiry* [415 ILCS 5/58.2]

"County Highway" means county highway as defined in the Illinois Highway Code [605 ILCS 5].

"District Road" means district road as defined in the Illinois Highway Code [605 ILCS 5].

"Engineered Barrier" means a barrier designed or verified using engineering practices that limits exposure to or controls migration of the contaminants of concern.

"Environmental Land Use Control" means an instrument that meets the requirements of this Part and is placed in the chain of title to real property that limits or places requirements upon the use of the property for the purpose of protecting human health or the environment, is binding upon the property owner, heirs, successors, assigns, and lessees, and runs in perpetuity or until the Agency approves, in writing, removal of the limitation or requirement from the chain of title.

"Exposure Route" means the transport mechanism by which a contaminant of concern reaches a receptor.

"Federally Owned Property" means real property owned in fee by the United States of America on which institutional controls are sought to be placed in accordance with this Subpart.

"Federal Landholding Entity" means that federal department, agency, or instrumentality with the authority to occupy and control the day-to-day use, operation and management of Federally Owned Property.

"Free Product" means a contaminant that is present as a non-aqueous phase liquid for chemicals whose melting point is less than 30° C (e.g., liquid not dissolved in water).

"GIS" means Geographic Information System.

"GPS" means Global Positioning System.

"Groundwater" means underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure. [415 ILCS 5/3.64]

"Groundwater Quality Standards" means the standards for groundwater as set forth in 35 Ill. Adm. Code 620.

"Hazard Quotient" means the ratio of a single substance exposure level during a specified time period to a reference dose for that substance derived from a similar exposure period.

"Highway" means any public way for vehicular travel which has been laid out in pursuance of any law of this State, or of the Territory of Illinois, or which has been established by dedication, or used by the public as a highway for 15 years, or which has been or may be laid out and connect a subdivision or platted land with a public highway and which has been dedicated for the use of the owners of the land included in the subdivision or platted land where there has been an acceptance and use under such dedication by such owners, and which has not been vacated in pursuance of law. The term "highway" includes rights of way, bridges, drainage structures, signs, guard rails, protective structures and all other structures and appurtenances necessary or convenient for vehicular traffic.

A highway in a rural area may be called a "road", while a highway in a municipal area may be called a "street". (Illinois Highway Code [605 ILCS 5/2-202])

"Highway Authority" means *the Department of Transportation with respect to a State highway; the Illinois State Toll Highway with respect to a toll highway; the County Board with respect to a county highway or a county unit district road if a discretionary function is involved and the County Superintendent of Highways if a ministerial function is involved; the Highway Commissioner with respect to a township or district road not in a county unit road district; or the corporate authorities of a municipality with respect to a municipal street.* (Illinois Highway Code [605 ILCS 5/2-213])

"Human Exposure Pathway" means a physical condition which may allow for a risk to human health based on the presence of all of the following: contaminants of concern; an exposure route; and a receptor activity at the point of exposure that could result in contaminant of concern intake.

"Industrial/Commercial Property" means any real property that does not meet the definition of residential property, conservation property or agricultural property.

"Infiltration" means the amount of water entering into the ground as a result of precipitation.

"Institutional Control" means a legal mechanism for imposing a restriction on land use, as described in Subpart J.

"Land Use Control Memoranda Memorandums of Agreement" mean agreements entered into between one or more agencies of the United States and the Illinois Environmental Protection Agency that limit or place requirements upon the use of Federally Owned Property for the purpose of protecting human health or the environment.

"Man-Made Pathways" means *constructed physical conditions that may allow for the transport of regulated substances including, but not limited to, sewers, utility lines, utility vaults, building foundations, basements, crawl spaces, drainage ditches, or previously excavated and filled areas.* [415 ILCS 5/58.2]

"Natural Pathways" means *natural physical conditions that may allow for the transport of regulated substances including, but not limited to, soil, groundwater, sand seams and lenses, and gravel seams and lenses.* [415 ILCS 5/58.2]

"Person" means an *individual, trust, firm, joint stock company, joint venture, consortium, commercial entity, corporation (including a government corporation), partnership, association, state, municipality, commission, political subdivision of a state, or any interstate body including the United States government and each department, agency, and instrumentality of the United States.* [415 ILCS 5/58.2]

"Point of Human Exposure" means the points at which human exposure to a contaminant of concern may reasonably be expected to occur. The point of human exposure is at the source, unless an institutional control limiting human exposure for the applicable exposure route has been or will be in place, in which case the point of human exposure will be the boundary of the institutional control. Point of human exposure may be at a different location than the point of compliance.

"Populated Area" means

an area within the boundaries of a municipality that has a population of 10,000 or greater based on the year 2000 or most recent census; or

an area less than three miles from the boundary of a municipality that has a population of 10,000 or greater based on the year 2000 or most recent census.

"Potable" means generally fit for human consumption in accordance with accepted water supply principles and practices. (Illinois Groundwater Protection Act [415 ILCS 55/3(h)])

"PQL" means practical quantitation limit or estimated quantitation limit, which is the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions in accordance with "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA Publication No. SW-846, incorporated by reference in Section 742.210. When applied to filtered water samples, PQL includes the method detection limit or estimated detection limit in accordance with the applicable method revision in: "Methods for the Determination of Organic Compounds in Drinking Water", Supplement II", EPA Publication No. EPA/600/4-88/039; "Methods for the Determination of Organic Compounds in Drinking Water, Supplement III", EPA Publication No. EPA/600/R-95/131, all of which are incorporated by reference in Section 742.210.

"RBCA" means Risk Based Corrective Action as defined in ASTM E-1739-95, as incorporated by reference in Section 742.210.

"RCRA" means the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6921).

"Reference Concentration" or "(RfC)" means an estimate of a daily exposure, in units of milligrams of chemical per cubic meter of air (mg/m³), to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a portion of a lifetime (up to approximately seven years, subchronic) or for a lifetime (chronic).

"Reference Dose" or " RfD " means an estimate of a daily exposure, in units of milligrams of chemical per kilogram of body weight per day (mg/kg/d), to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a portion of a lifetime (up to approximately seven years, subchronic) or for a lifetime (chronic).

"Regulated Substance" means *any hazardous substance as defined under Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510) and petroleum products including crude oil or any fraction thereof, natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas).* [415 ILCS 5/58.2]

"Residential Property" means *any real property that is used for habitation by individuals, or where children have the opportunity for exposure to contaminants through soil ingestion or inhalation at educational facilities, health care facilities, child care facilities or outdoor recreational areas.* [415 ILCS 5/58.2]

"Right of Way" means *the land, or interest therein, acquired for or devoted to a highway.* (Illinois Highway Code) [605 ILCS 5/2-217])

"Similar-Acting Chemicals" are chemical substances that have toxic or harmful effect on the same specific organ or organ system (see Appendix A.Tables E and F for a list of similar-acting chemicals with noncarcinogenic and carcinogenic effects).

"Site" means *any single location, place, tract of land or parcel of property, or portion thereof, including contiguous property separated by a public right-of-way.* [415 ILCS 5/58.2]

"Slurry Wall" means a man-made barrier made of geologic material which is constructed to prevent or impede the movement of contamination into a certain area.

"Soil Saturation Limit" or " C_{sat} " means the contaminant concentration at which soil pore air and pore water are saturated with the chemical and the adsorptive limits of the soil particles have been reached.

"Solubility" means a chemical specific maximum amount of solute that can dissolve in a specific amount of solvent (groundwater) at a specific temperature.

"SPLP" means Synthetic Precipitation Leaching Procedure (Method 1312) as published in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA Publication No. SW-846, as incorporated by reference in Section 742.210.

"SSL" means Soil Screening Levels as defined in USEPA's Soil Screening Guidance: User's Guide and Technical Background Document, as incorporated by reference in Section 742.210.

“State highway” means State highway as defined in the Illinois Highway Code [605 ILCS 5].

"Stratigraphic Unit" means a site-specific geologic unit of native deposited material and/or bedrock of varying thickness (e.g., sand, gravel, silt, clay, bedrock, etc.). A change in stratigraphic unit is recognized by a clearly distinct contrast in geologic material or a change in physical features within a zone of gradation. For the purposes of this Part, a change in stratigraphic unit is identified by one or a combination of differences in physical features such as texture, cementation, fabric, composition, density, and/or permeability of the native material and/or bedrock.

“Street” means street as defined in the Illinois Highway Code [605 ILCS 5].

"TCLP" means Toxicity Characteristic Leaching Procedure (Method 1311) as published in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA Publication No. SW-846, as incorporated by reference in Section 742.210.

“Toll highway” means toll highway as defined in the Illinois Highway Code [605 ILCS 5].

"Total Petroleum Hydrocarbon" or "(TPH)" means the additive total of all petroleum hydrocarbons found in an analytical sample.

“Township road” means township road as defined in the Illinois Highway Code [605 ILCS 5].

"Volatile Organic Compounds" or "(VOCs)" means organic chemical analytes identified as volatiles as published in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA Publication No. SW-846 (incorporated by reference in Section 742.210), method numbers ~~8010~~, 8011, ~~8015B~~8015, 8020, ~~8021B~~8021, 8030, 8031, 8240, ~~8260B~~8260, ~~8315A~~8315, and 8316. For analytes not listed in any category in those methods, those analytes which have a boiling point less than 200°C and a vapor pressure greater than 0.1 Torr (mm Hg) at 20° C.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.210 Incorporations by Reference

- a) The Board incorporates the following material by reference:

ASTM. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. (610) 832-9585. ~~1916 Race Street, Philadelphia, PA 19103 (215) 299-5400.~~

ASTM D 2974-~~0087~~, Standard Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils, approved August 10, 2000 ~~May 29, 1987 (reapproved 1995)~~.

ASTM D 2488-~~0093~~, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), approved February 10, 2000 ~~September 15, 1993~~.

ASTM D 1556-~~0090~~, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, approved March 10, 2000 ~~June 29, 1990~~.

ASTM D 2167-94, Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method, approved March 15, 1994.

ASTM D 2922-~~0194~~, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), approved June 10, 2001 ~~December 23, 1991~~.

ASTM D 2937-~~00e194~~, Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method, approved June 10, 2000 ~~June 15, 1994~~.

ASTM D 854-~~0292~~, Standard Test ~~Methods Method~~ for Specific Gravity of Soil Solids by Water Pycnometer ~~Soils~~, approved July 10, 2002 ~~November 15, 1992~~.

ASTM D 2216-~~9892~~, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass, approved February 10, 1998 ~~June 15, 1992~~.

ASTM D 4959-~~0089~~, Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating ~~Method~~, approved March 10, 2000 ~~June 30, 1989 (reapproved 1994)~~.

ASTM D 4643-~~0093~~, Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method, approved February 10, 2000 ~~July 15, 1993~~.

ASTM D 5084-~~0390~~, Standard Test ~~Methods Method~~ for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter, approved November 1, 2003 ~~June 29, 1990~~.

ASTM D 422-63 (2002), Standard Test Method for Particle-Size Analysis of Soils, approved November 10, 2002 ~~November 21, 1963 (reapproved 1990)~~.

ASTM D 1140-~~0092~~, Standard Test ~~Methods~~ Method for Amount of Material in Soils Finer than the No. 200 (75 μ m) Sieve, approved June 10, 2000 ~~November 15, 1992~~.

ASTM D 3017-~~0188~~, Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth), approved June 10, 2001 ~~May 27, 1988~~.

ASTM D 4525-90 (2001), Standard Test Method for Permeability of Rocks by Flowing Air, approved May 25, 1990.

ASTM D 2487-~~0093~~, Standard ~~Test Method~~ for Classification of Soils for Engineering Purposes (Unified Soil Classification System), approved March 10, 2000 ~~September 15, 1993~~.

ASTM E 1527-~~0093~~, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, approved May 10, 2000 ~~March 15, 1993~~. Vol. 11.04.

ASTM E 1739-95 (2002), Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, approved September 10, 1995.

Barnes, Donald G. and Dourson, Michael. (1988). Reference Dose (RfD): Description and Use in Health Risk Assessments. Regulatory Toxicology and Pharmacology. 8, 471-486.

GPO. Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20401, (202) 783-3238.

USEPA Guidelines for Carcinogenic Risk Assessment, 51 Fed. Reg. 33992-34003 (September 24, 1986).

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA Publication number SW-846 (Third Edition, Final Update IIIA, April 1998), as amended by Updates I, IIA, III, and IIIA (Document No. 955-001-00000-1).

"Methods for the Determination of Organic Compounds in Drinking Water", EPA Publication No. EPA/600/4-88/039 (December 1988 (Revised July 1991)).

"Methods for the Determination of Organic Compounds in Drinking Water, Supplement I", EPA Publication No. EPA/600/4-90/020 (July 1990).

"Methods for the Determination of Organic Compounds in Drinking Water, Supplement II", EPA Publication No. EPA/600/R-92/129 (August 1992).

"Methods for the Determination of Organic Compounds in Drinking Water, Supplement III", EPA Publication No. EPA/600/R-95/131 (August 1995).

"Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, QAOO Update," EPA/600/R-96/084 (July 2000). Available at www.epa.gov/quality/qs-docs/g9-final.pdf.

IRIS. Integrated Risk Information System, National Center for Environmental Assessment, U.S. Environmental Protection Agency, 26 West Martin Luther King Drive, MS-190, Cincinnati, OH 45268, (513) 569-7254.

"Reference Dose (RfD): Description and Use in Health Risk Assessments", Background Document 1A (March 15, 1993).

"EPA Approach for Assessing the Risks Associated with Chronic Exposures to Carcinogens", Background Document 2 (January 17, 1992).

Nelson, D.W., and L.E. Sommers: (1982). Total carbon, organic carbon, and organic matter. In: A.L. Page (ed.), Methods of Soil Analysis. Part 2. Chemical and Microbiological Properties. 2nd Edition, pp. 539-579, American Society of Agronomy. Madison, WI.

NTIS. National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, (703) 487-4600.

"Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites," USEPA Office of Emergency and Remedial Response, OSWER 9285.6-10 (December 2002), PB 2003-104982.

~~"Dermal Exposure Assessment: Principles and Applications", EPA Publication No. EPA/600/8-91/011B (January 1992).~~

~~"Exposure Factors Handbook", EPA Publication No. EPA/600/8-89/043 (July 1989).~~

"Exposures Factors Handbook, Vol. I: General Factors", EPA Publication No. EPA/600/P-95/002Fa (August 1997).

"Exposures Factors Handbook, Vol. II: Food Ingestion Factors", EPA Publication No. EPA/600/P-95/002Fb (August 1997).

"Exposures Factors Handbook, Vol. III: Activity Factors", EPA Publication No. EPA/600/P-95/002Fc (August 1997).

"Risk Assessment Guidance for Superfund, Vol. I: Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors", OSWER Directive 9285.6-03 (March 1991).

"Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites," EPA Publication No. EPA/600/8-85/002 (February 1985), PB 85-192219.

"Risk Assessment Guidance for Superfund, Volume I; Human Health Evaluation Manual (Part A)", Interim Final, EPA Publication No. EPA/540/1-89/002 (December 1989).

"Risk Assessment Guidance for Superfund, Volume I; Human Health Evaluation Manual, Supplemental Guidance, Dermal Risk Assessment Interim Guidance", Draft (August 18, 1992).

"Risk Assessment Guidance for Superfund, Vol. I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Interim", EPA Publication No. EPA/540/R/99/005 (September 2001).

"Soil Screening Guidance: Technical Background Document", EPA Publication No. EPA/540/R-95/128, PB 96-963502 (May 1996).

"Soil Screening Guidance: User's Guide", EPA Publication No. EPA/540/R-96/018, PB 96-963505 (April 1996).

"Superfund Exposure Assessment Manual", EPA Publication No. EPA/540/1-88/001 (April 1988).

"Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites", OSWER Directive 9355.4-24 (December 2002).

Polynuclear Aromatic Hydrocarbon Background Study, City of Chicago, Illinois, Tetra Tech Em Inc., 200 E. Randolph Drive, Suite 4700, Chicago, IL 60601, February 24, 2003.

Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Soil in Illinois: Background PAHs, EPRI, Palo Alto, CA, We Energies, Milwaukee, WI, and IEPA, Springfield, IL: 2004. 1011376. EPRI, 3412 Hillview Avenue, Palo Alto, CA 94304, (800) 313-3774.

RCRA Facility Investigation Guidance, Interim Final, developed by USEPA (EPA 530/SW-89-031), 4 volumes (May 1989).

United States Environmental Protection Agency, Office of Environmental Information (2000). "Guidance for Data Quality Assessment, Practical Methods for Data Analysis," EPA QA/G-9, QAOO update. EPA Publication No. EPA/600/R-96-084. (Available online at www.epa.gov/oswer/riskassessment/pdf/ucl.pdf).

- b) CFR (Code of Federal Regulations). Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (202)783-3238:

40 CFR 761 (1998).

- c) This Section incorporates no later editions or amendments.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.215 Determination of Soil Attenuation Capacity

- a) The concentrations of organic contaminants of concern remaining in the soil shall not exceed the attenuation capacity of the soil, as determined under subsection (b) of this Section.
- b) The soil attenuation capacity is not exceeded if:
- 1) The sum of the organic contaminant residual concentrations analyzed for the purposes of the remediation program for which the analysis is performed, at each discrete sampling point, is less than the natural organic carbon fraction of the soil. If the information relative to the concentration of other organic contaminants is available, such information shall be included in the sum. The natural organic carbon fraction (f_{oc}) shall be either:
 - A) A default value of 6000 mg/kg for soils within the top meter and 2000 mg/kg for soils below one meter of the surface; or
 - B) A site-specific value as measured by the analytical method referenced in Appendix C, Table F, multiplied by 0.58 to estimate the fraction of organic carbon, as stated in ASTM D2974-87, Nelson and Sommers (1982) or by SW-846 Method 9060: Total Organic Carbon, as incorporated by reference in Section 742.210;
 - 2) The total petroleum hydrocarbon concentration is less than the natural organic carbon fraction of the soil as demonstrated using a method approved by the Agency. The method selected shall be appropriate for the contaminants of concern to be addressed; or
 - 3) Another method, approved by the Agency, shows that the soil attenuation capacity is not exceeded.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.220 Determination of Soil Saturation Limit

- a) For any organic contaminant that has a melting point below 30°C, the remediation objective for the inhalation exposure route developed under Tier 2 shall not exceed the soil saturation limit, as determined under subsection (c) of this Section.
- b) For any organic contaminant that has a melting point below 30°C, the remediation objective under Tier 2 for the soil component of the groundwater ingestion exposure route shall not exceed the soil saturation limit, as determined under subsection (c) of this Section.
- c) The soil saturation limit shall be:
 - 1) The value listed in Appendix A, Table A for that specific contaminant;
 - 2) A value derived from Equation S29 in Appendix C, Table A; or
 - 3) A value derived from another method approved by the Agency.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.225 Demonstration of Compliance with Remediation Objectives

Compliance is achieved if each sample result does not exceed that respective remediation objective unless a person elects to proceed under subsections (c), (d) and (e) of this Section.

- a) Compliance with groundwater remediation objectives developed under Subparts D through F and H through I shall be demonstrated by comparing the contaminant concentrations of discrete samples at each sample point to the applicable groundwater remediation objective. Sample points shall be determined by the program under which remediation is performed.
- b) Unless the person elects to composite samples or average sampling results as provided in subsections (c) and (d) of this Section, compliance with soil remediation objectives developed under Subparts D through G and I shall be demonstrated by comparing the contaminant concentrations of discrete samples to the applicable soil remediation objective.
 - 1) Except as provided in subsections (c) and (d) of this Section, compositing of samples is not allowed.
 - 2) Except as provided in subsections (c) and (d) of this Section, averaging of sample results is not allowed.
 - 3) Notwithstanding subsections (c) and (d) of this Section, compositing of samples and averaging of sample results is not allowed for the construction worker population.

- 4) The number of sampling points required to demonstrate compliance is determined by the requirements applicable to the program under which remediation is performed.
- c) If a person chooses to composite soil samples or average soil sample results to demonstrate compliance relative to the soil component of the groundwater ingestion exposure route, the following requirements apply:
- 1) A minimum of two sampling locations for every 0.5 acre of contaminated area is required, with discrete samples at each sample location obtained at every two feet of depth, beginning at six inches below the ground surface for surface contamination and at the upper limit of contamination for subsurface contamination and continuing through the zone of contamination. Alternatively, a sampling method may be approved by the Agency based on an appropriately designed site-specific evaluation. Samples obtained at or below the water table shall not be used in compositing or averaging.
 - 2) For contaminants of concern other than volatile organic contaminants:
 - A) Discrete samples from the same boring may be composited; or-
 - B) Discrete sample results from the same boring may be averaged.
 - 3) For volatile organic contaminants:
 - A) Compositing of samples is not allowed.
 - B) Discrete sample results from the same boring may be averaged.
 - 4) Composite samples may not be averaged. An arithmetic average may be calculated for discrete samples collected at every two feet of depth through the zone of contamination as specified above in subsection (c)(1) of this Section.
- d) If a person chooses to composite soil samples or average soil sample results to demonstrate compliance relative to the inhalation exposure route or ingestion exposure route, the following requirements apply:
- 1) A person shall submit a sampling plan for Agency approval, based upon a site-specific evaluation;
 - 2) For volatile organic compounds, compositing of samples is not allowed; and
 - 3) All samples shall be collected within the contaminated area.

- 4) Composite samples may not be averaged. Procedures specified in “Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites”, USEPA Office of Emergency and Remedial Response, OSWER 9285.6-10 (December 2002), as incorporated by reference in Section 742.210, or an alternative procedure approved by the Agency, shall be used to determine sample averages.
- e) When averaging under this Section, if no more than ~~15%~~~~50%~~ of sample results are reported as "non-detect", "no contamination", "below detection limits", or similar terms, such results shall be included in the averaging calculations ~~calculation~~ as one-half of the reported analytical detection limit for the contaminant. However, when performing a test for normal or lognormal distribution for the purpose of calculating a 95% Upper Confidence Limit of the mean for a contaminant, a person may substitute for each non-detect value a randomly generated value between, but not including, zero and the reported analytical detection limit. If more than ~~15%~~~~50%~~ of sample results are "non-detect", procedures specified in “Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, QA00 Update”, EPA/600/R-96/084 (July 2000), as incorporated by reference in Section 742.210, or an alternative procedure approved by the Agency shall be used to address the non-detect values, or another statistically valid procedure approved by the Agency may be used to determine an average.
- f) All soil samples collected after August 15, 2001, shall be reported on a dry weight basis for the purpose of demonstrating compliance, with the exception of the TCLP and SPLP and the property pH.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART C: EXPOSURE ROUTE EVALUATIONS

Section 742.305 Contaminant Source and Free Product Determination

No exposure route shall be excluded from consideration relative to a contaminant of concern unless the following requirements are met:

- a) The sum of the concentrations of all organic contaminants of concern shall not exceed the attenuation capacity of the soil as determined under Section 742.215;
- b) The concentrations of any organic contaminants of concern remaining in the soil shall not exceed the soil saturation limit as determined under Section 742.220;
- c) Any soil which contains contaminants of concern shall not exhibit any of the characteristics of reactivity for hazardous waste as determined under 35 Ill. Adm. Code 721.123;
- d) Any soil which contains contaminants of concern shall not exhibit a pH less than or equal to 2.0 or greater than or equal to 12.5, as determined by SW-846 Method

9040B: pH Electrometric for soils with 20% or greater aqueous (moisture) content or by SW-846 Method 9045C: Soil pH for soils with less than 20% aqueous (moisture) content as incorporated by reference in Section 742.210;

- e) Any soil which contains contaminants of concern in the following list of inorganic chemicals or their salts shall not exhibit any of the characteristics of toxicity for hazardous waste as determined by 35 Ill. Adm. Code 721.124, ~~or an alternative method approved by the Agency~~: arsenic, barium, cadmium, chromium, lead, mercury, selenium or silver; and
- f) If contaminants of concern include polychlorinated biphenyls (PCBs), the concentration of any PCBs in the soil shall not exceed 50 parts per million as determined by SW-846 Methods.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.320 Groundwater Ingestion Exposure Route

The groundwater ingestion exposure route may be excluded from consideration if:

- a) The requirements of Sections 742.300 and 742.305 are met;
- b) The corrective action measures have been completed to remove any free product to the maximum extent practicable;
- c) The source of the release is not located within the minimum or designated maximum setback zone or within a regulated recharge area of a potable water supply well;
- d) As demonstrated in accordance with Section 742.1015, for any area within the measured and modeled extent of groundwater contamination above what would otherwise be the applicable Tier 1 groundwater remediation objectives, for any area within 2500 feet from the source of the release, an ordinance adopted by a unit of local government is in place that effectively prohibits the installation of potable water supply wells (and the use of such wells);
- e) As demonstrated using Equation R26, in Appendix C, Table C, in accordance with Section 742.810, the concentration of any contaminant of concern in groundwater within the minimum or designated maximum setback zone of an existing potable water supply well will meet the applicable Tier 1 groundwater remediation objective; and
- f) As demonstrated using Equation R26, in Appendix C, Table C, in accordance with Section 742.810, the concentration of any contaminant of concern in groundwater discharging into a surface water will meet the applicable surface water quality standard under 35 Ill. Adm. Code 302.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART D: DETERMINING AREA BACKGROUND

Section 742.415 Use of Area Background Concentrations

- a) A person may request that area background concentration determined pursuant to Sections 742.405 and 742.410 be used according to the provisions of subsection (b) of this Section. Such request shall address the following:
- 1) The natural or man-made pathways of any suspected off-site contamination reaching the site;
 - 2) Physical and chemical properties of suspected off-site contaminants of concern reaching the site; and
 - 3) The location and justification of all background sampling points.
- b) Except as specified in subsections (c) and (d) of this Section, an area background concentration may be used as follows:
- 1) To support a request to exclude a chemical as a contaminant of concern from further consideration for remediation at a site due to its presence as a result of background conditions; or
 - 2) As a remediation objective for a contaminant of concern at a site in lieu of an objective developed pursuant to the other procedures of this Part.
- c) An area background concentration shall not be used *in the event that the Agency has determined in writing that the background level for a regulated substance poses an acute threat to human health or the environment at the site when considering the post-remedial action land use.* ~~IN THE EVENT THAT THE AGENCY HAS DETERMINED IN WRITING THAT THE BACKGROUND LEVEL FOR A REGULATED SUBSTANCE POSES AN ACUTE THREAT TO HUMAN HEALTH OR THE ENVIRONMENT AT THE SITE WHEN CONSIDERING THE POST-REMEDIATION ACTION LAND USE.~~ (Section 58.5(b)(3) of the Act)
- d) *In the event that the concentration of a regulated substance of concern on the site exceeds a remediation objective adopted by the Board for residential land use, the property may not be converted to residential use unless such remediation objective or an alternative risk-based remediation objective for that regulated substance of concern is first achieved.* ~~IN THE EVENT THAT THE CONCENTRATION OF A REGULATED SUBSTANCE OF CONCERN ON THE SITE EXCEEDS A REMEDIATION OBJECTIVE ADOPTED BY THE BOARD FOR RESIDENTIAL LAND USE, THE PROPERTY MAY NOT BE CONVERTED TO RESIDENTIAL USE UNLESS SUCH REMEDIATION OBJECTIVE OR AN ALTERNATIVE RISK-BASED REMEDIATION OBJECTIVE FOR THAT REGULATED SUBSTANCE OF CONCERN IS~~

~~FIRST ACHIEVED.~~ If the land use is restricted, there shall be an institutional control in place in accordance with Subpart J. (Section 58.5(b)(2) of the Act)

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART E: TIER 1 EVALUATION

Section 742.505 Tier 1 Soil and Groundwater Remediation Objectives

- a) Soil
 - 1) Inhalation Exposure Route
 - A) The Tier 1 soil remediation objectives for this exposure route based upon residential property use are listed in Appendix B, Table A.
 - B) The Tier 1 soil remediation objectives for this exposure route based upon industrial/commercial property use are listed in Appendix B, Table B. Soil remediation objective determinations relying on this table require use of institutional controls in accordance with Subpart J.
 - 2) Ingestion Exposure Route
 - A) The Tier 1 soil remediation objectives for this exposure route based upon residential property use are listed in Appendix B, Table A.
 - B) The Tier 1 soil remediation objectives for this exposure route based upon industrial/commercial property use are listed in Appendix B, Table B. Soil remediation objective determinations relying on this table require use of institutional controls in accordance with Subpart J.
 - 3) Soil Component of the Groundwater Ingestion Route
 - A) The Tier 1 soil remediation objectives for this exposure route based upon residential property use are listed in Appendix B, Table A.
 - B) The Tier 1 soil remediation objectives for this exposure route based upon industrial/commercial property use are listed in Appendix B, Table B.

- C) The pH-dependent Tier 1 soil remediation objectives for identified ionizable organics or inorganics for the soil component of the groundwater ingestion exposure route (based on the total amount of contaminants present in the soil sample results and groundwater classification) are provided in Appendix B, Tables C and D.
 - D) Values used to calculate the Tier 1 soil remediation objectives for this exposure route are listed in Appendix B, Table F.
- 4) Evaluation of the dermal contact with soil exposure route is not required under Tier 1.
- b) Groundwater
- 1) The Tier 1 groundwater remediation objectives for the groundwater component of the groundwater ingestion route are listed in Appendix B, Table E.
 - 2) The Tier 1 groundwater remediation objectives for this exposure route are given for Class I and Class II groundwaters, respectively.
 - 3) The evaluation of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals shall be considered satisfied for Class I groundwater at the point of human exposure if:
 - A) No more than one similar-acting noncarcinogenic chemical as listed in Appendix A, Table E is detected in the groundwater at the site; and
 - B) No carcinogenic contaminant of concern as listed in Appendix A, Table I H is detected in any groundwater sample associated with the site, using analytical procedures capable of achieving either the 1 in 1,000,000 cancer risk concentration or the ADL, whichever is greater.
 - 4) If the conditions of subsection (b)(3) of this Section are not met, the Class I groundwater remediation objectives set forth in Appendix B, Table E shall be corrected for the cumulative effect of mixtures of similar-acting chemicals using the following methodologies:
 - A) For noncarcinogenic chemicals, the methodologies set forth at Section 742.805(c) or Section 742.915(h) shall be used; and
 - B) For carcinogenic chemicals, the methodologies set forth at Section 742.805(d) or Section 742.915(h) shall be used.

SOURCE: Amended at 30 Ill. Reg. _____, effective _____.

Section 742.510 Tier 1 Remediation Objectives Tables

- a) Soil remediation objectives are listed in Appendix B, Tables A, B, C and D.
 - 1) Appendix B, Table A is based upon residential property use.
 - A) The first column to the right of the chemical name lists soil remediation objectives for the soil ingestion exposure route.
 - B) The second column lists the soil remediation objectives for the inhalation exposure route.
 - C) The third and fourth columns list soil remediation objectives for the soil component of the groundwater ingestion exposure route for the respective classes of groundwater:
 - i) Class I groundwater; and
 - ii) Class II groundwater.
 - D) The final column lists the Acceptable Detection Limit (ADL), only where applicable.
 - 2) Appendix B, Table B is based upon industrial/commercial property use.
 - A) The first and third columns to the right of the chemical name list the soil remediation objectives for the soil ingestion exposure route based on two receptor populations:
 - i) Industrial/commercial; and
 - ii) Construction worker.
 - B) The second and fourth columns to the right of the chemical name list the soil remediation objectives for the inhalation exposure route based on two receptor populations:
 - i) Industrial/commercial; and
 - ii) Construction worker.
 - C) The fifth and sixth columns to the right of the chemical name list the soil remediation objectives for the soil component of the groundwater ingestion exposure route for two classes of groundwater:

- i) Class I groundwater; and
 - ii) Class II groundwater.
- 3) Appendix B, Tables C and D set forth pH specific soil remediation objectives for inorganic and ionizing organic chemicals for the soil component of the groundwater ingestion route.
 - A) Table C sets forth remediation objectives based on Class I groundwater and Table D sets forth remediation objectives based on Class II groundwater.
 - B) The first column in Tables C and D lists the chemical names.
 - C) The second through ninth columns to the right of the chemical names list the pH based soil remediation objectives.
- 4) For the inorganic chemicals listed in Appendix B, Tables A and B, the soil component of the groundwater ingestion exposure route shall be evaluated using TCLP (SW-846 Method 1311) or SPLP (SW-846 Method 1312), incorporated by reference at Section 742.210 unless a person chooses to evaluate the soil component on the basis of the total amount of contaminant in a soil sample result in accordance with subsection (a)(5) of this Section.
- 5) For those inorganic and ionizing organic chemicals listed in Appendix B, Tables C and D, if a person elects to evaluate the soil component of the groundwater ingestion exposure route based on the total amount of contaminant in a soil sample result (rather than TCLP or SPLP analysis), the person shall determine the soil pH at the site and then select the appropriate soil remediation objectives based on Class I and Class II groundwaters from Tables C and D, respectively. If the soil pH is less than 4.5 or greater than 9.0 ~~8.0~~, then Tables C and D cannot be used.
- 6) Unless one or more exposure routes are excluded from consideration under Subpart C, the most stringent soil remediation objective of the exposure routes (i.e., soil ingestion exposure route, inhalation exposure route, and soil component of the groundwater ingestion exposure route) shall be compared to the concentrations of soil contaminants of concern measured at the site. When using Appendix B, Table B to select soil remediation objectives for the ingestion exposure route and inhalation exposure route, the remediation objective shall be the more stringent soil remediation objective of the industrial/commercial populations and construction worker populations.
- 7) Confirmation sample results may be averaged or soil samples may be composited in accordance with Section 742.225.

- 8) If a soil remediation objective for a chemical is less than the ADL, the ADL shall serve as the soil remediation objective.
- b) Groundwater remediation objectives for the groundwater component of the groundwater ingestion exposure route are listed in Appendix B, Table E. However, Appendix B, Table E must be corrected for cumulative effect of mixtures of similar-acting noncarcinogenic chemicals as set forth in Section 742.505(b)(3).
 - 1) The first column to the right of the chemical name lists groundwater remediation objectives for Class I groundwater, and the second column lists the groundwater remediation objectives for Class II groundwater.
 - 2) To use Appendix B, Table E of this Part, the 35 Ill. Adm. Code 620 classification for groundwater at the site shall be determined. The concentrations of groundwater contaminants of concern at the site are compared to the applicable Tier 1 groundwater remediation objectives for the groundwater component of the groundwater ingestion exposure route in Appendix B, Table E.
 - c) For contaminants of concern not listed in Appendix B, Tables A, B and E, a person may request site-specific remediation objectives from the Agency or propose site-specific remediation objectives in accordance with 35 Ill. Adm. Code 620, Subpart I of this Part, or both.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART H: TIER 2 GROUNDWATER EVALUATION

Section 742.805 Tier 2 Groundwater Remediation Objectives

- a) To develop a groundwater remediation objective under this Section that exceeds the applicable Tier 1 groundwater remediation objective, or for which there is no Tier I groundwater remediation objective, a person may request approval from the Agency if the person has performed the following:
 - 1) Identified the horizontal and vertical extent of groundwater for which the Tier 2 groundwater remediation objective is sought;
 - 2) Taken corrective action, to the maximum extent practicable to remove any free product;
 - 3) Using Equation R26 in accordance with Section 742.810, demonstrated that the concentration of any contaminant of concern in groundwater will meet:
 - A) The applicable Tier 1 groundwater remediation objective at the point of human exposure; or

- B) For any contaminant of concern for which there is no Tier 1 groundwater remediation objective, the concentration determined according to the procedures specified in 35 Ill. Adm. Code 620 at the point of human exposure. A person may request the Agency to provide these concentrations or may propose these concentrations under Subpart I;
- 4) Using Equation R26 in accordance with Section 742.810, demonstrated that the concentration of any contaminant of concern in groundwater within the minimum or designated maximum setback zone of an existing potable water supply well will meet the applicable Tier 1 groundwater remediation objective or, if there is no Tier 1 groundwater remediation objective, the concentration determined according to the procedures specified in 35 Ill. Adm. Code 620. A person may request the Agency to provide these concentrations or may propose these concentrations under Subpart I;
- 5) Using Equation R26 in accordance with Section 742.810, demonstrated that the concentration of any contaminant of concern in groundwater discharging into a surface water will meet the applicable water quality standard under 35 Ill. Adm. Code 302;
- 6) Demonstrated that the source of the release is not located within the minimum or designated maximum setback zone or within a regulated recharge area of an existing potable water supply well; and
- 7) If the selected corrective action includes an engineered barrier as set forth in Subpart K to minimize migration of contaminant of concern from the soil to the groundwater, demonstrated that the engineered barrier will remain in place for post-remediation land use through an institutional control as set forth in Subpart J.
- b) A groundwater remediation objective that exceeds the water solubility of that chemical (refer to Appendix C, Table E for solubility values) is not allowed.
- c) The contaminants of concern for which a Tier 1 remediation objective has been developed shall be included in any mixture of similar-acting chemicals under consideration in Tier 2. The evaluation of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals shall be considered satisfied for Class I groundwater at the point of human exposure if either of the following requirements are achieved:
- 1) Calculate the weighted average using the following equations:

$$W_{ave} = \frac{x_1}{CUOx_1} + \frac{x_2}{CUOx_2} + \frac{x_3}{CUOx_3} + \dots + \frac{x_a}{CUOx_a}$$

where:

W_{ave} = Weighted Average

x_1 through x_a = Concentration of each individual contaminant at the location of concern. Note that, depending on the target organ, the actual number of contaminants will range from 2 to 3314.

CUO_{x_a} = A Tier 1 or Tier 2 remediation objective must be developed for each x_a .

- A) If the value of the weighted average calculated in accordance with the equations above is less than or equal to 1.0, then the remediation objectives are met for those chemicals.
 - B) If the value of the weighted average calculated in accordance with the equations above is greater than 1.0, then additional remediation must be carried out until the level of contaminants remaining in the remediated area ~~has~~ have a weighted average calculated in accordance with the equation above less than or equal to one; or
- 2) Divide each individual chemical's remediation objective by the number of chemicals in that specific target organ group that were detected at the site. Each of the contaminant concentrations at the site is then compared to the remediation objectives that have been adjusted to account for this potential additivity.
- d) The evaluation of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals are considered satisfied if the cumulative risk from any contaminant(s) of concern listed in Appendix A, Table I H, plus any other contaminant(s) of concern detected in groundwater and listed in Appendix A, Table F as affecting the same target organ/organ system as the contaminant(s) of concern detected from Appendix A, Table I H, does not exceed 1 in 10,000.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART I: TIER 3 EVALUATION

Section 742.900 Tier 3 Evaluation Overview

- a) Tier 3 sets forth a flexible framework to develop remediation objectives outside of the requirements of Tiers 1 and 2. Although Tier 1 and Tier 2 evaluations are not prerequisites to conduct Tier 3 evaluations, data from Tier 1 and Tier 2 can assist in developing remediation objectives under a Tier 3 evaluation.
- b) The level of detail required to adequately characterize a site depends on the particular use of Tier 3. Tier 3 can require additional investigative efforts beyond those described in Tier 2 to characterize the physical setting of the site. However,

in situations where remedial efforts have simply reached a physical obstruction additional investigation may not be necessary for a Tier 3 submittal.

- c) Situations that can be considered for a Tier 3 evaluation include, but are not limited to:
- 1) Modification of parameters not allowed under Tier 2;
 - 2) Use of models different from those used in Tier 2;
 - 3) Use of additional site data to improve or confirm predictions of exposed receptors to contaminants of concern;
 - 4) Analysis of site-specific risks using formal risk assessment, probabilistic data analysis, and sophisticated fate and transport models (e.g., requesting a target hazard quotient greater than 1 or a target cancer risk greater than 1 in 1,000,000);
 - 5) Requests for site-specific remediation objectives because an assessment indicates further remediation is not practical;
 - 6) Incomplete human exposure pathway(s) not excluded under Subpart C;
 - 7) Use of toxicological-specific information not available from the sources listed in Tier 2;
 - 8) Land uses which are substantially different from the assumed residential or industrial/commercial property uses of a site (e.g., a site will be used for recreation in the future and cannot be evaluated in Tier ~~Tiers~~ 1 or 2); and
 - 9) Requests for site-specific remediation objectives that ~~which~~ exceed Tier 1 groundwater remediation objectives so long as the following is demonstrated:
 - A) *To the extent practical, the exceedance of the groundwater quality standard has been minimized and beneficial use appropriate to the groundwater that was impacted has been returned; and*
 - B) *Any threat to human health or the environment has been minimized. [415 ILCS 5/58.5(d ~~D~~)(4)(A)]*
- d) For requests of a target cancer risk ranging between 1 in 1,000,000 and 1 in 10,000 at the point of human exposure or a target hazard quotient greater than 1 at the point of human exposure, the requirements of Section 742.915 shall be followed. Requests for a target cancer risk exceeding 1 in 10,000 at the point of human exposure are not allowed.

- e) Requests for approval of a Tier 3 evaluation must be submitted to the Agency for review under the specific program under which remediation is performed. When reviewing a submittal under Tier 3, the Agency shall consider *whether the interpretations and conclusions reached are supported by the information gathered*. [415 ILCS 58.7(e)(1)]. The Agency shall approve a Tier 3 evaluation if the person submits the information required under this Part and establishes through such information that public health is protected and that specified risks to human health and the environment have been minimized.
- f) If contaminants of concern include polychlorinated biphenyls (PCBs), requests for approval of a Tier 3 evaluation must additionally address the applicability of 40 CFR 761.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

SUBPART J: INSTITUTIONAL CONTROLS

Section 742.1000 Institutional Controls

- a) Institutional controls in accordance with this Subpart must be placed on the property when remediation objectives are based on any of the following assumptions:
 - 1) Industrial/Commercial property use;
 - 2) Target cancer risk greater than 1 in 1,000,000;
 - 3) Target hazard quotient greater than 1;
 - 4) Engineered barriers;
 - 5) The point of human exposure is located at a place other than at the source;
 - 6) Exclusion of exposure routes; or
 - 7) Any combination of the above.
- b) The Agency shall not approve any remediation objective under this Part that is based on the use of institutional controls unless the person has proposed institutional controls meeting the requirements of this Subpart and the requirements of the specific program under which the institutional control is proposed. A proposal for approval of institutional controls shall provide identification of the selected institutional controls from among the types recognized in this Subpart.
- c) The following instruments may be institutional controls subject to the requirements of this Subpart J and the requirements of the specific program under which the institutional control is proposed:

- 1) No Further Remediation Letters;
 - 2) Environmental Land Use Controls;
 - 3) Land Use Control ~~Memoranda~~ Memorandums of Agreement;
 - 4) Ordinances adopted and administered by a unit of local government; ~~and~~
 - 5) Agreements between a property owner (or, in the case of a petroleum leaking underground storage tank, the owner or operator of the tank) and a highway authority with respect to any contamination remaining under highways; and-
 - 6) Agreements between a highway authority that is also the property owner (or, in the case of a petroleum leaking underground storage tank, the owner or operator of the tank) and the Agency with respect to any contamination remaining under the highways.
- d) No Further Remediation Letters and Environmental Land Use Controls that meet the requirements of this Subpart and the recording requirements of the program under which remediation is being performed are transferred with the property.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.1010 Environmental Land Use Controls

- a) An Environmental Land Use Control (ELUC) is an institutional control that may be used under this Part to impose land use limitations or requirements related to environmental contamination. ELUCs are only effective when approved by the Agency in accordance with this Part. Activities or uses that may be limited or required include, but are not limited to, prohibition of use of groundwater for potable purposes, restriction to industrial/commercial uses, operation or maintenance of engineered barriers, or worker safety plans. ELUCs may be used in the following circumstances:
 - 1) When No Further Remediation Letters are not available, including but not limited to when contamination has migrated off-site or outside the remediation site; or
 - 2) When No Further Remediation Letters are not issued under the program for which a person is undergoing ~~remediation~~ remediation.
- b) Recording requirements:
 - 1) An ELUC approved by the Agency pursuant to this Section must be recorded in the Office of the Recorder or Registrar of Titles for the county in which the property that is the subject of the ELUC is located. A copy of the ELUC demonstrating that it has been recorded must be submitted to

the Agency before the Agency will issue a no further remediation determination.

- 2) An ELUC approved under this Section will not become effective until officially recorded in the chain of title for the property that is the subject of the ELUC in accordance with subsection (b)(1) of this Section.
- 3) Reference to the recorded ELUC must be made in the instrument memorializing the Agency's no further remediation determination. Recording of the no further remediation determination and confirmation of recording must be in accordance with the requirements of the program under which the determination was issued.
- 4) The requirements of this Section do not apply to Federally Owned Property for which the Federal Landholding Entity does not have the authority under federal law to record land use limitations on the chain of title.
- 5) The requirements of this Section apply only to those sites for which a request for a no further remediation determination has not yet been made to the Agency by January 6, 2001.

c) Duration:

- 1) Except as provided in this subsection (c), an ELUC shall remain in effect in perpetuity.
- 2) *At no time shall any site for which an ELUC has been imposed as a result of remediation activities under this Part be used in a manner inconsistent with the land use limitation unless attainment of objectives appropriate for the new land use is achieved and a new no further remediation determination has been obtained and recorded in accordance with the program under which the ELUC was first imposed or the Site Remediation Program (35 Ill. Adm. Code 740). [415 ILCS 58.8(c)]. In addition, the appropriate release or modification of the ELUC must be prepared by the Agency and filed on the chain of title for the property that is the subject of the ELUC.*
 - A) For a Leaking Underground Storage Tank (LUST) site under 35 Ill. Adm. Code 731 or 732 or a Site Remediation Program site under 35 Ill. Adm. Code 740, an ELUC may be released or modified only if the NFR Letter is also modified under the ~~LUST~~ ~~or~~ Site Remediation Program to reflect the change;
 - B) For a RCRA site under 35 Ill. Adm. Code 721-730, an ELUC may be released or modified only if there is also ~~by~~ an amended certification of closure or a permit modification.

- 3) In addition to any other remedies that may be available, a failure to comply with the limitations or requirements of an ELUC may result in avoidance of an Agency no further remediation determination in accordance with the program under which the determination was made. The failure to comply with the limitations or requirements of an ELUC may also be grounds for an enforcement action pursuant to Title VIII of the Act.

- d) An ELUC submitted to the Agency must match the form and contain the same substance, except for variable elements (e.g., name of property owner), as the model in Appendix F and must contain the following elements:
 - 1) Name of property owners and declaration of property ownership;
 - 2) Identification of the property to which the ELUC applies by common address, legal description, and Real Estate Tax Index/Parcel Index Number;
 - 3) A reference to the Bureau of Land LPC numbers or 10-digit identification numbers under which the remediation was conducted;
 - 4) A statement of the reason for the land use limitation or requirement relative to protecting human health and the surrounding environment from soil, groundwater, and/or other environmental contamination;
 - 5) The language instituting such land use limitations or requirements;
 - 6) A statement that the limitations or requirements apply to the current owners, occupants, and all heirs, successors, assigns, and lessees;
 - 7) A statement that the limitations or requirements apply in perpetuity or until:
 - A) The Agency determines that there is no longer a need for the ELUC; The Agency issues a new no further remediation determination approving modification or removal of the limitations or requirements; and
 - B) The Agency, upon written request, issues to the site that received the no further remediation determination that relies on the ELUC a new no further remediation determination approving modification or removal of the limitations or requirements; and A release or modification of the land use limitation is filed on the chain of title for the property that is the subject of the ELUC;
 - C) The new no further remediation determination is filed on the chain of title of the site subject to the no further remediation determination; and

- D) A release or modification of the land use limitation is filed on the chain of title for the property that is the subject of the ELUC;
- 8) Scaled site maps showing:
- A) The legal boundary of the property to which the ELUC applies;
 - B) The horizontal and vertical extent of contaminants of concern above applicable remediation objectives for soil and groundwater to which the ELUC applies;
 - C) Any physical features to which an ELUC applies (e.g., engineered barriers, monitoring wells, caps); and
 - D) The nature, location of the source, and direction of movement of the contaminants of concern;
- 9) A statement that any information regarding the remediation performed on the property for which the ELUC is necessary may be obtained from the Agency through a request under the Freedom of Information Act [5 ILCS 140] and rules promulgated thereunder; and
- 10) The dated, notarized signatures of the property owners or authorized agent.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.1012 Federally Owned Property: Land Use Control Memoranda ~~Memorandums~~ of Agreement

- a) A Land Use Control Memorandum of Agreement (LUC MOA) between one or more agencies of the federal government and the Illinois Environmental Protection Agency is the ~~an~~ institutional control that shall ~~may~~ be used under this Part to impose land use limitations or restrictions related to environmental contamination on Federally Owned Property. A LUC MOA may be used only for Federally Owned Property. Each LUC MOA, at a minimum, must require that the Federal Landholding Entities responsible for the Federally Owned Property do the following:
- 1) Provide adequate identification of the location on the Federally Owned Property of each site with land use limitations or requirements. Such identification shall be by means of common address, notations in any available facility master land use plan, site specific GIS or GPS coordinates, plat maps, or any other means which identifies the site in question with particularity;

- 2) Implement periodic site inspection procedures to ensure adequate oversight by the Federal Landholding Entities of such land use limitation or requirement;
 - 3) Implement procedures for the Federal Landholding Entities to periodically advise the Agency of continued compliance with the maintenance of the land use control and site inspection requirements included in the LUC MOA;
 - 4) Implement procedures for the Federal Landholding Entities to notify the Agency of any planned or emergency changes in land use that may adversely impact any site with land use limitations or requirements; and
 - 5) Notify the Agency at least 60 days in advance of a conveyance by deed or fee simple title, by the Federal Landholding Entities, of a site site(s) with land use limitations or requirements, to any entity that will not remain or become a Federal Landholding Entity, and provide the Agency with information about how the Federal Landholding Entities will ensure that the requirements of Section 742.1010-are to be satisfied upon conveyance of that site site(s).
- b) Any LUC MOA entered into pursuant to this Section remains effective only so long as title to the affected property is retained by the United States.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.1015 Ordinances

- a) An ordinance adopted by a unit of local government that effectively prohibits the installation of potable water supply wells (and the use of such wells) may be used as an institutional control to meet the requirements of Section 742.320(d) or 742.805(a)(3) if the requirements of this Section are met. A model ordinance is found in Appendix G. Ordinances prohibiting the installation of potable water supply wells (and the use of such wells) that do not expressly prohibit the installation of potable water supply wells (and the use of such wells) by units of local government may be acceptable as institutional controls if the requirements of this Section are met and a Memorandum of Understanding (MOU) is entered into under subsection (i) of this Section. For purposes of this Section, a unit of local government is considered to be expressly prohibited from installing and using potable water supply wells only if the unit of local government is included in the prohibition provision by name. The prohibition required by this Section shall satisfy the following requirements at a minimum:
 - 1) The prohibition shall not allow exceptions for potable water well installation and use other than for the adopting unit of local government;
 - 2) The prohibition shall apply at all depths and shall not be limited to particular aquifers or other geologic formations;

- 3) If the prohibition does not apply everywhere within the boundaries of the unit of local government, the limited area to which the prohibition applies shall be easily identifiable and clearly defined by the ordinance (e.g., narrative descriptions accompanied by maps with legends or labels showing prohibition boundaries or narrative descriptions using fixed, common reference points such as street names). Boundaries of prohibitions limited by area shall be fixed by the terms of the ordinance and shall not be subject to change without amending the ordinance in which the prohibition has been adopted (e.g., no boundaries defined with reference to zoning districts or the availability of the public water supply); and
 - 4) The prohibition shall not in any way restrict or limit the Agency's approval of the use of the ordinance as an institutional control pursuant to this Part (e.g., no restrictions based on remediation program participation or no restrictions on persons performing remediation within the prohibition area who may use the ordinance).
- b) A request for approval of a local ordinance as an institutional control shall provide the following:
- 1) A copy of the ordinance restricting groundwater use certified by an official of the unit of local government in which the site is located that it is a true and accurate copy of the ordinance, unless the Agency and the unit of local government have entered an agreement under subsection (i) of this Section, in which case the request may alternatively reference the MOU. The ordinance must demonstrate that potable use of groundwater from potable water supply wells is prohibited;
 - 2) A scaled map(s) delineating the area and extent of groundwater contamination modeled above the applicable remediation objectives including any measured data showing concentrations of contaminants of concern in which the applicable remediation objectives are exceeded;
 - 3) A scaled map delineating the boundaries of all properties under which groundwater is located which exceeds the applicable groundwater remediation objectives;
 - 4) Information identifying the current owner(s) of each property identified in subsection (b)(3) of this Section; and
 - 5) A copy of the proposed written notification submission to the unit of local government that adopted the ordinance and to the current owners identified in subsection (b)(4) of this Section that includes the following information: of the information required in subsections (b)(1) through (b)(4). Within 45 days from the date the Agency's no further remediation determination is recorded, the person who requested to use the ordinance

~~as an institutional control must submit proof to the Agency of the notice to the property owners identified in subsection (b)(4).~~

- A) The name and address of the unit of local government that adopted the ordinance;
 - B) The ordinance's citation;
 - C) A description of the property being sent notice by adequate legal description, reference to a plat showing the boundaries of the property, or accurate street address;
 - D) Identification of the party requesting to use the groundwater ordinance as an institutional control, and a statement that the party has requested approval from the Agency to use the ordinance as an institutional control;
 - E) A statement that use of the ordinance as an institutional control allows contamination above groundwater ingestion remediation objectives to remain in groundwater beneath the affected properties, and that the ordinance strictly prohibits human and domestic consumption of the groundwater;
 - F) A statement as to the nature of the release and response action with the site name, site address, and Agency site number or Illinois inventory identification number; and
 - G) A statement that more information about the remediation site may be obtained by contacting the party requesting the use of the groundwater ordinance as an institutional control or by submitting a FOIA request to the Agency.
- c) Written notification proposed pursuant to subsection (b)(5) of this Section must be sent to the unit of local government that adopted the ordinance, as well as to all current property owners identified in subsection (b)(4). Each of the property owners identified in subsection (b)(4) of this Section and the unit of local government must receive written notification from the party desiring to use the institutional control that groundwater remediation objectives have been approved by the Agency. Written proof that the notification was sent to the unit of local government and the property owners of this notification shall be submitted to the Agency within 45 days from the date the Agency's no further remediation determination is recorded. Such proof may consist of the return card from certified mail, return receipt requested, a notarized certificate of service, or a notarized affidavit. The notification shall include:
- 1) ~~The name and address of the unit of local government;~~
 - 2) ~~The citation to the ordinance;~~

- 3) ~~A description of the property being sent notice by adequate legal description or by reference to a plat showing the boundaries;~~
 - 4) ~~A statement that the ordinance restricting groundwater use has been used by the Agency in reviewing a request for a groundwater remediation objective;~~
 - 5) ~~A statement as to the nature of the release and response action with the site name, address, and Agency site number or Illinois inventory identification number; and~~
 - 6) ~~A statement as to where more information may be obtained regarding the ordinance.~~
- d) Unless the Agency and the unit of local government have entered into a MOU under subsection (i) of this Section, the current owner or successors in interest of a site who have received approval of use of an ordinance as an institutional control under this Section shall:
- 1) Monitor activities of the unit of local government relative to variance requests or changes in the ordinance relative to the use of potable groundwater at properties identified in subsection (b)(3) of this Section; and
 - 2) Notify the Agency of any approved variance requests or ordinance changes within 30 days after the date such action has been approved.
- e) The information required in subsections (b)(1) through (b)(5) of this Section and the Agency letter approving the groundwater remediation objective shall be submitted to the unit of local government. Proof that the information has been filed with the unit of local government shall be provided to the Agency.
- f) Any ordinance or MOU used as an institutional control pursuant to this Section shall be recorded in the Office of the Recorder or Registrar of Titles of the county in which the site is located together with the instrument memorializing the Agency's no further remediation determination pursuant to the specific program within 45 days after receipt of the Agency's no further remediation determination.
- g) An institutional control approved under this Section shall not become effective until officially recorded in accordance with subsection (f) of this Section. The person receiving the approval shall obtain and submit to the Agency within 30 days after recording a copy of the institutional control demonstrating that it has been recorded.
- h) The following shall be grounds for voidance of the ordinance as an institutional control and the instrument memorializing the Agency's no further remediation determination:

- 1) Modification of the ordinance by the unit of local government to allow potable use of groundwater;
 - 2) Approval of a site-specific request, such as a variance, to allow potable use of groundwater at a site identified in subsection (b)(3) of this Section;
~~or~~
 - 3) Violation of the terms of an institutional control recorded under Section 742.1005 or Section 742.1010; or-
 - 4) Failure to provide notification and proof of such notification pursuant to subsection (c) of this Section.
- i) The Agency and a unit of local government may enter into a MOU under this Section if the unit of local government has adopted an ordinance satisfying subsection (a) of this Section and if the requirements of this subsection are met. The MOU submitted to the Agency must match the form and contain the same substance as the model in Appendix H and shall include the following:
- 1) Identification of the authority of the unit of local government to enter the MOU;
 - 2) Identification of the legal boundaries, or equivalent, under which the ordinance is applicable;
 - 3) A certified copy of the ordinance;
 - 4) A commitment by the unit of local government to notify the Agency of any variance requests or proposed ordinance changes at least 30 days prior to the date the local government is scheduled to take action on the request or proposed change;
 - 5) A commitment by the unit of local government to maintain a registry of all sites within the unit of local government that have received no further remediation determinations pursuant to specific programs; and
 - 6) If the ordinance does not expressly prohibit the installation of potable water supply wells (and the use of such wells) by units of local government, a commitment by the unit of local government:
 - A) To review the registry of sites established under subsection (i)(5) of this Section prior to siting potable water supply wells within the area covered by the ordinance;
 - B) To determine whether the potential source of potable water may be or has been affected by contamination left in place at those sites; and

- C) To take whatever steps are necessary to ensure that the potential source of potable water is protected from the contamination or treated before it is used as a potable water supply.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.1020 Highway Authority Agreements and Highway Authority Agreement Memoranda of Agreement

- a) An agreement with a highway authority may be used as an institutional control where the requirements of this Section are met and the Agency has determined that no further remediation is required as to the property(ies) to which the agreement is to apply. Highway Authority Agreements submitted to the Agency, except for those agreements with the Illinois Department of Transportation, must match the form and contain the same substance, except for variable elements, as the model in Appendix D.
- b) As part of the agreement the highway authority shall agree to:
- 1) Prohibit the use of groundwater under the highway right of way that is contaminated above residential Tier 1 remediation objectives from the release as a potable supply of water; and
 - 2) Limit access to soil contamination under the highway right of way that is contaminated above residential Tier 1 or construction worker remediation objectives, whichever is less, from the release. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected.
- c) The agreement shall provide the following:
- 1) Fully executed signature blocks by the highway authority and the owner of the property (or, in the case of a petroleum leaking underground storage tank, the owner or operator of the tank) from which the release occurred;
 - 2) A scaled map delineating the area and extent of soil and groundwater contamination above the applicable Tier 1 remediation objectives or a statement that either soil or groundwater is not contaminated above the applicable Tier 1 residential remediation objectives;
 - 3) Information showing the concentration of contaminants of concern within the zone in which the applicable Tier 1 remediation objectives are exceeded;
 - 4) A stipulation of the information required by subsections (c)(2) and (3) of this Section in the agreement if it is not practical to obtain the information by sampling the highway right-of-way; and

- 5) Information identifying the highway authority having jurisdiction.
- d) Highway Authority Agreements must be referenced in the instrument that is to be recorded on the chain of title for the remediation property.
- e) Violation of the terms of an Agreement approved by the Agency as an institutional control under this Section shall be grounds for voidance of the Agreement as an institutional control and the instrument memorializing the Agency's no further remediation determination.
- f) Failure to provide all of the information required in subsections (b) and (c) of this Section will be grounds for denial of the Highway Authority Agreement as an institutional control.
- g) In instances in which the highway authority is also the property owner of the site, a Highway Authority Agreement may not be used. In such cases, the highway authority shall instead enter into a Highway Authority Agreement Memorandum of Agreement (HAA MOA) between the highway authority and the Agency. An HAA MOA may be used as an institutional control where the requirements of this Section are met and the Agency has determined that no further remediation is required as to the property(ies) to which the agreement is to apply. HAA MOAs submitted to the Agency must match the form and contain the same substance, except for variable elements, as the model in Appendix E.
- h) As part of the HAA MOA the highway authority shall agree to:
- 1) Prohibit the use of groundwater under the highway right of way that is contaminated above residential Tier 1 or construction worker remediation objectives, whichever are less, from the release as a potable supply of water; and
 - 2) Limit access to soil contamination under the highway right of way that is contaminated above residential Tier 1 or construction worker remediation objectives, whichever are less, from the release. Access to soil contamination may be allowed if, during and after any access, public health and the environment are protected.
- i) The HAA MOA shall provide the following:
- 1) Information identifying the site by common address or legal description or both;
 - 2) The Illinois Emergency Management Agency's (IEMA) incident number for the site, if one has been assigned;
 - 3) A scaled map delineating the current and estimated future area and extent of soil and groundwater contamination above the applicable Tier 1 or construction worker remediation objectives, whichever are less, or a

statement that either soil or groundwater is not contaminated above the applicable Tier 1 residential remediation objectives;

- 4) Information prepared by the highway authority that lists each contaminant of concern that exceeds its Tier 1 residential or construction worker remediation objective, its Tier 1 residential remediation objective, and its concentrations within the zone where Tier 1 residential or construction worker remediation objectives, whichever is less, are exceeded;
- 5) A scaled map prepared by the highway authority showing the area of the highway authority's right of way that is governed by the HAA MOA;
- 6) If samples have not been collected within the right of way because of impracticability, a stipulation by the parties that, based on modeling, soil and groundwater contamination exceeding Tier 1 residential or construction worker remediation objectives, whichever is less, does not and will not extend beyond the boundaries of the right-of-way;
- 7) A stipulation by the highway authority that it has jurisdiction over the right of way that gives it sole control over the use of the groundwater and access to the soil located within or beneath the right of way;
- 8) A stipulation by the highway authority that it agrees to limit access by itself and others to soil within the right of way exceeding Tier 1 residential or construction worker remediation objectives, whichever is less. Access may only be allowed if human health (including worker safety) and the environment are protected during and after any access. The highway authority may construct, reconstruct, improve, repair, maintain, and operate a highway upon the right of way, or allow others to do the same by permit. The highway authority and others using or working in the right of way under permit have the right to remove soil or groundwater from the right of way and dispose of the same in accordance with applicable environmental laws and regulations. The highway authority agrees to issue all permits for work in the right of way, and make all existing permits for work in the right of way, subject to the following or substantially similar conditions:
 - A) As a condition of this permit the permittee shall request the office issuing this permit to identify sites in the right of way where a HAA MOA governs access to soil that exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742; and
 - B) The permittee shall take all measures necessary to protect human health (including worker safety) and the environment during and after any access to such soil;
- 9) A stipulation that the HAA MOA shall be referenced in the Agency's no further remediation determination issued for the release(s);

- 10) A stipulation that the highway authority shall notify the Agency of any transfer of jurisdiction over the right of way at least 30 days prior to the date the transfer takes effect. The HAA MOA shall be null and void upon the transfer unless the transferee agrees to be bound by the agreement as if the transferee were an original party to the agreement. The transferee's agreement to be bound by the terms of the agreement shall be memorialized at the time of transfer as a rider to this agreement that references the HAA MOA and is signed by the highway authority, or subsequent transferor, and the transferee;
- 11) A stipulation that the HAA MOA will become effective on the date the Agency issues a no further remediation determination for the release(s). It shall remain effective until the right of way is demonstrated to be suitable for unrestricted use and the Agency issues a new no further remediation determination to reflect there is no longer a need for the HAA MOA, or until the agreement is otherwise terminated or voided;
- 12) A stipulation that in addition to any other remedies that may be available, the Agency may bring suit to enforce the terms of the HAA MOA or may, at its sole discretion, declare the HAA MOA null and void if the highway authority or a transferee violates any term of the HAA MOA. The highway authority or transferee shall be notified in writing of any such declaration; and
- 13) A fully executed signature block by the highway authority and a block for the Agency's Director.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX A General

Section 742.TABLE E Similar-Acting Noncarcinogenic Chemicals

Adrenal Gland

Nitrobenzene
1,2,4-Trichlorobenzene (Ingestion only)

Kidney

Acetone (Ingestion only)
Cadmium (Ingestion only)
Chlorobenzene
Dalapon
1,1-Dichloroethane
Di-n-octyl phthalate (Ingestion only)
Endosulfan
Ethylbenzene
Fluoranthene
Methyl tertiary-butyl ether (Inhalation only)
Nitrobenzene
Pyrene
Toluene (Ingestion only)
2,4,5-Trichlorophenol
Vinyl acetate (Ingestion only)

Liver

Acenaphthene
Acetone (Ingestion only)
Butylbenzyl phthalate (Ingestion only)
Chlorobenzene (Ingestion only)
1,1-Dichloroethylene (Ingestion only)
Di-n-octyl phthalate (Ingestion only)
Endrin
Ethylbenzene
Fluoranthene
Methyl tertiary-butyl ether (Inhalation only)
Nitrobenzene
Picloram
Styrene (Ingestion only)
2,4,5-TP (Silvex)
Toluene (Ingestion only)
1,2,4-Trichlorobenzene (Inhalation only)
2,4,5-Trichlorophenol

Central Nervous System

Butanol (Ingestion only)
Cyanide (amenable)
2,4-Dimethylphenol
Endrin
Manganese
2-Methylphenol
Mercury (Inhalation only)
Styrene (Inhalation only)
Toluene (Inhalation only)
Xylenes (Ingestion only)

Circulatory System

Antimony
Barium (Ingestion only)
2,4-D
cis-1,2-Dichloroethylene (Ingestion only)
Nitrobenzene
trans-1,2-Dichloroethylene (Ingestion only)
2,4-Dimethylphenol
Fluoranthene
Fluorene
Styrene (Ingestion only)
Zinc

Gastrointestinal System

Beryllium (Ingestion only)
Endothall
Hexachlorocyclopentadiene (Ingestion only)
Methyl bromide (Ingestion only)
Methyl ~~tertiary~~ tertiary-butyl ether (Ingestion only)

Immune System

2,4-Dichlorophenol

p-Chloroaniline

Mercury (Ingestion only)

Reproductive System

Barium (Inhalation only)

Boron (Ingestion only)

Carbon disulfide

2-Chlorophenol (Ingestion only)

1,2 Dibromo-3-Chloropropane (Inhalation only)

Dinoseb

Ethylbenzene (Inhalation only)

Methoxychlor

Phenol

Respiratory System

1,2-Dichloropropane (Inhalation only)

1,3-Dichloropropylene (Inhalation only)

Hexachlorocyclopentadiene (Inhalation only)

Methyl bromide (Inhalation only)

Naphthalene (Inhalation only)

Toluene (Inhalation only)

Vinyl acetate (Inhalation only)

Cholinesterase Inhibition

Aldicarb

Carbofuran

**Decreased Body Weight Gains
and Circulatory System Effects**

Atrazine

Simazine

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX A General

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

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

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

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX A: General

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

<u>Chemical Name</u>	<u>Chicago^a mg/kg</u>	<u>Metropolitan Areas^b (mg/kg)</u>	<u>Non-Metropolitan Areas^c (mg/kg)</u>
<u>2-Methylnaphthalene</u>	<u>-----</u>	<u>0.14</u>	<u>0.29</u>
<u>Acenaphthene</u>	<u>0.09</u>	<u>0.13</u>	<u>0.04</u>
<u>Acenaphthylene</u>	<u>0.03</u>	<u>0.07</u>	<u>0.04</u>
<u>Anthracene</u>	<u>0.25</u>	<u>0.40</u>	<u>0.14</u>
<u>Benzo(a)anthracene</u>	<u>1.1</u>	<u>1.8</u>	<u>0.72</u>
<u>Benzo(a)pyrene</u>	<u>1.3</u>	<u>2.1</u>	<u>0.98</u>
<u>Benzo(b)fluoranthene</u>	<u>1.5</u>	<u>2.1</u>	<u>0.70</u>
<u>Benzo(g,h,i)perylene</u>	<u>0.68</u>	<u>1.7</u>	<u>0.84</u>
<u>Benzo(k)fluoranthene</u>	<u>0.99</u>	<u>1.7</u>	<u>0.63</u>
<u>Chrysene</u>	<u>1.2</u>	<u>2.7</u>	<u>1.1</u>
<u>Dibenzo(a,h)anthracene</u>	<u>0.20</u>	<u>0.42</u>	<u>0.15</u>
<u>Fluoranthene</u>	<u>2.7</u>	<u>4.1</u>	<u>1.8</u>
<u>Fluorene</u>	<u>0.10</u>	<u>0.18</u>	<u>0.04</u>
<u>Indeno(1,2,3-c,d)pyrene</u>	<u>0.86</u>	<u>1.6</u>	<u>0.51</u>
<u>Naphthalene</u>	<u>0.04</u>	<u>0.20</u>	<u>0.17</u>
<u>Phenanthrene</u>	<u>1.3</u>	<u>2.5</u>	<u>0.99</u>
<u>Pyrene</u>	<u>1.9</u>	<u>3.0</u>	<u>1.2</u>
<p>^a<u>Chicago means within the corporate limits of the City of Chicago.</u></p> <p>^b<u>Metropolitan area means a populated area, as defined in Section 742.200, (other than the City of Chicago) that is located within any county in a Metropolitan Statistical Area listed in Appendix A, Table G, footnote a.</u></p> <p>^c<u>Non-Metropolitan area means a populated area, as defined in Section 742.200, that is not located within any county in a Metropolitan Statistical Area listed in Appendix A, Table G, footnote a.</u></p>			

(Source: Appendix A, Table H renumbered to Appendix A, Table I and new Appendix A, Table H Added at __ Ill. Reg. _____, effective _____)

Section 742.APPENDIX A General

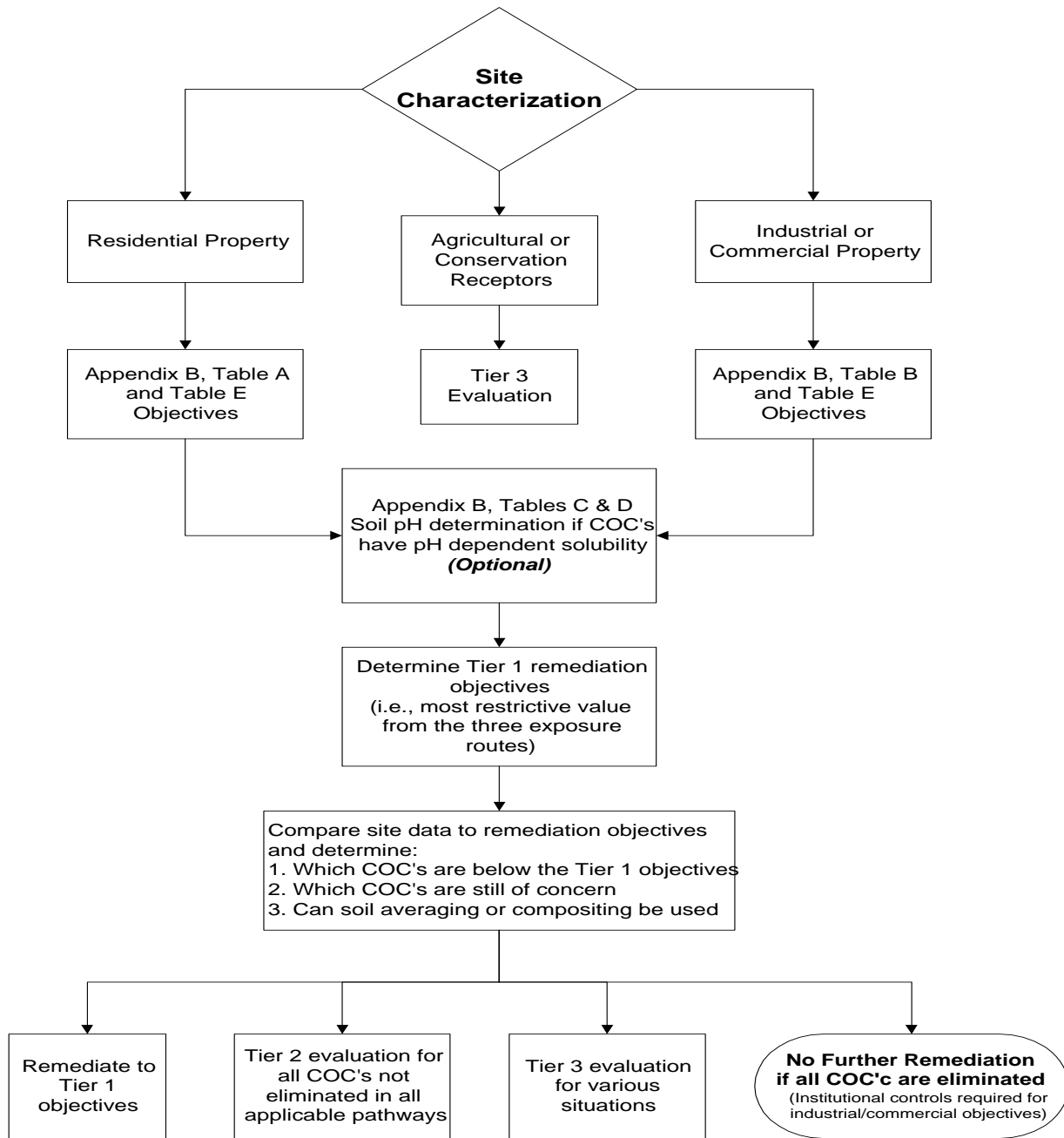
Section 742.TABLE I Chemicals Whose Tier 1 Class I Groundwater Remediation Objective Exceeds the 1 in 1,000,000 Cancer Risk Concentration

<u>Chemical</u>	<u>Class I Groundwater Remediation Objective (mg/L)</u>	<u>1 in 1,000,000 Cancer Risk Concentration (mg/L)</u>	<u>ADL (mg/L)</u>
Aldrin	0.014	0.000005	0.014
Benzo(a)pyrene	0.0002	0.000012	0.00023
Bis(2-chloroethyl)ether	0.01	0.000077	0.01
Bis(2-ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	0.006	0.0061	0.0027
Carbon Tetrachloride	0.005	0.00066	0.0001
Chlordane	0.002	0.000066	0.00014
DDD	0.014	0.00023	0.014
DDE	0.01	0.00023	0.01
DDT	0.006	0.00023	0.006
Dibenzo(a,h)anthracene	0.0003	0.000012	0.0003
1,2-Dibromo-3-chloropropane	0.0002	0.000061	0.001
1,2-Dibromoethane 1,2-dibromoethane	0.00005	0.00002 0.000010	0.001
3,3'-Dichlorobenzidine	0.02	0.00019	0.02
1,2-Dichloroethane	0.005	0.00094	0.0003
Dieldrin	0.009	0.000053	0.009
2,6-Dinitrotoluene	0.00031	0.0001	0.00031
Heptachlor	0.0004	0.000019	0.013
Heptachlor epoxide	0.0002	0.000094	0.015
Hexachlorobenzene	0.00006	0.000053	0.00006
Alpha-HCH	0.00011	0.000014	0.000111
Tetrachloroethylene	0.005	0.0016	0.0004
Toxaphene	0.003	0.000077	0.00086
Vinyl chloride	0.002	0.000045	0.0002
<u>Ionizable Organics</u>			
N-Nitrosodi-n-propylamine	0.0018	0.000012	0.0018
Pentachlorophenol	0.001	0.00071	0.000076
2,4,6-Trichlorophenol	0.01	0.007	0.01
<u>Inorganics</u> Organics			
Arsenic	0.05	0.000057	0.001
Beryllium	0.004	0.00002	0.004

(Source: Appendix A, Table I renumbered from Appendix A, Table H and amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and Illustrations

Section 742.Illustration A Tier 1 Evaluation



(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and IllustrationsSection 742.TABLE A Tier 1 Soil Remediation Objectives^a for Residential Properties

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	
83-32-9	Acenaphthene	4,700 ^b	--- ^c	570 ^b	2,900	*
67-64-1	Acetone	70,000^b 7,800 ^b	100,000 ^d	25^b 16 ^b	25 16	*
15972-60-8	Alachlor ^o	8 ^e	--- ^c	0.04	0.2	NA
116-06-3	Aldicarb ^o	78 ^b	--- ^c	0.013	0.07	NA
309-00-2	Aldrin	0.04 ^e	3 ^e	0.5 ^e	2.5	0.94
120-12-7	Anthracene	23,000 ^b	--- ^c	12,000 ^b	59,000	*
1912-24-9	Atrazine ^o	2700 ^b	--- ^c	0.066	0.33	NA
71-43-2	Benzene	12 ^e	0.8 ^e	0.03	0.17	*
56-55-3	Benzo(<i>a</i>)anthracene	0.9 ^{e,w}	--- ^c	2	8	*
205-99-2	Benzo(<i>b</i>)fluoranthene	0.9 ^{e,w}	--- ^c	5	25	*

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

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	
50-29-3	DDT	2 ^e	--- ^{g,x}	32 ^e	160	*
53-70-3	Dibenzo(<i>a,h</i>)anthracene	0.09 ^{e,f,w}	--- ^c	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	0.46 ^e	11 ^{b,x}	0.002	0.020 0.002	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.32 ^e 0.0075 ^e	0.06 ^e 0.17 ^e	0.0004	0.004	0.005
84-74-2	Di- <i>n</i> -butyl phthalate	7,800 ^b	2,300 ^d	2,300 ^d	2,300 ^d	*
95-50-1	1,2-Dichlorobenzene (<i>o</i> – Dichlorobenzene)	7,000 ^b	560 ^{d,x}	17	43	*
106-46-7	1,4-Dichlorobenzene (<i>p</i> – Dichlorobenzene)	--- ^c	11,000 ^{b,x}	2	11	*
91-94-1	3,3'-Dichlorobenzidine	1 ^e	--- ^c	0.007 ^{e,f}	0.033	1.3
75-34-3	1,1-Dichloroethane	7,800 ^b	1,300 ^{b,x}	23 ^b	110	*

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	7 ^e	0.4 ^e	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	3,900^b 700 ^b	290^{b,x} 1,500 ^d	0.06	0.3	*
156-59-2	<i>cis</i> -1,2-Dichloroethylene	780 ^b	1,200 ^d	0.4	1.1	*
156-60-5	<i>trans</i> -1,2-Dichloroethylene	1,600 ^b	3,100 ^d	0.7	3.4	*
78-87-5	1,2-Dichloropropane	9 ^e	15 ^{b,x}	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, <i>cis</i> + <i>trans</i>)	6.4 ^e	1.1 ^{e,x}	0.004 ^e	0.02	0.005
60-57-1	Dieldrin ⁿ	0.04 ^e	1 ^e	0.004 ^e	0.02	0.603
84-66-2	Diethyl phthalate	63,000 ^b	2,000 ^d	470 ^b	470	*
105-67-9	2,4-Dimethylphenol	1,600 ^b	--- ^c	9 ^b	9	*
121-14-2	2,4-Dinitrotoluene	0.9 ^e	--- ^c	0.0008 ^{e,f}	0.0008	0.250

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

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	ADL (mg/kg)
86-30-6	<i>N</i> -Nitrosodiphenylamine	130 ^e	--- ^c	1 ^e	5.6	*
621-64-7	<i>N</i> -Nitrosodi- <i>n</i> -propylamine	0.09 ^{e,f}	--- ^c	0.00005 ^{e,f}	0.00005	0.0018
108-95-2	Phenol	23,000 ^b - 47,000 ^b	--- ^c	100 ^b	100	*
1918-02-1	Picloram ^o	5,500 ^b	--- ^c	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs) ⁿ	1 ^h	--- ^{c,h}	--- ^h	--- ^h	*
129-00-0	Pyrene	2,300 ^b	--- ^c	4,200 ^b	21,000	*
122-34-9	Simazine ^o	390 ^b	--- ^c	0.04	0.37	NA
100-42-5	Styrene	16,000 ^b	1,500 ^{d,x}	4	18	*
127-18-4	Tetrachloroethylene (Perchloroethylene)	12 ^e	11 ^e	0.06	0.3	*
108-88-3	Toluene	16,000 ^b	650 ^{d,x}	12	29	*

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	Class II (mg/kg)	
8001-35-2	Toxaphene ^a	0.6 ^e	89 ^e	31	150	*
120-82-1	1,2,4-Trichlorobenzene	780 ^b	3,200 ^{b,x}	5	53	*
71-55-6	1,1,1-Trichloroethane	--- ^c	1,200 ^d	2	9.6	*
79-00-5	1,1,2-Trichloroethane	310 ^b	1,800 ^d	0.02	0.3	*
79-01-6	Trichloroethylene	58 ^e	5 ^e	0.06	0.3	*
108-05-4	Vinyl acetate	78,000 ^b	1,000 ^{b,x}	170 ^b	170	*
75-01-4	Vinyl chloride	0.46 ^e	0.28 ^e	0.01 ^f	0.07	*
108-38-3	m-Xylene	<u>16,000</u> ^b 160,000 ^b	420 ^{d,x}	210	210	*
95-47-6	o-Xylene	<u>16,000</u> ^b 160,000 ^b	410 ^{d,x}	190	190	*
106-42-3	p-Xylene	<u>16,000</u> ^b 160,000 ^b	460 ^{d,x}	200	200	*

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

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

CAS No.	Chemical Name	Exposure Route-specific Values for Soils		Soil Component of the Groundwater Ingestion Exposure Route Values		
		Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/L)	Class II (mg/L)	ADL (mg/kg)
7440-48-4	Cobalt	4,700 ^b	--- ^c	1.0 ^m	1.0 ^m	*
7440-50-8	Copper ⁿ	2,900 ^b	--- ^c	0.65 ^m	0.65 ^m	*
57-12-5	Cyanide (amenable)	1,600 ^b	--- ^c	0.2 ^{q,m}	0.6 ^{q,m}	*
7782-41-4	Fluoride	4,700 ^b	--- ^c	4.0 ^m	4.0 ^m	*
15438-31-0	Iron	--- ^c	--- ^c	5.0 ^m	5.0 ^m	*
7439-92-1	Lead	400 ^k	--- ^c	0.0075 ^m	0.1 ^m	*
7439-95-4	<u>Magnesium</u> ⁿ	<u>325,000</u>	--- ^c	--- ^c	--- ^c	*
7439-96-5	Manganese	<u>1,600</u> ^{b,v} 3,700 ^b	69,000 ^{b,x}	0.15 ^m	10.0 ^m	*
7439-97-6	Mercury ^{l,n,s}	23 ^b	10 ^{b,x}	0.002 ^m	0.01 ^m	*
7440-02-0	Nickel ^l	1,600 ^b	13,000 ^e	0.1 ^m	2.0 ^m	*
14797-55-8	Nitrate as N ^p	130,000 ^b	--- ^c	10.0 ^{q,m}	100 ^q	*
7723-14-0	<u>Phosphorus</u> ⁿ	--- ^g	--- ^c	--- ^c	--- ^c	*

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

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

Chemical Name and Soil Remediation Objective Notations

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

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and Illustrations

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/kg)	ClassII (mg/kg)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
83-32-9	Acenaphthene	120,000 ^b	----- ^c	120,000 ^b	----- ^c	570 ^b	2,900	*
67-64-1	Acetone	-----^e 200,000^b	100,000 ^d	-----^e 200,000^b	100,000 ^d	25^b166	2516	*
15972-60-8	Alachlor ^o	72 ^e	----- ^c	1,600 ^e	----- ^c	0.04	0.2	NA
116-06-3	Aldicarb ^o	2,000 ^b	----- ^c	200 ^b	----- ^c	0.013	0.07	NA
309-00-2	Aldrin	0.3 ^e	6.6 ^e	6.1 ^b	9.3 ^e	0.5 ^e	2.5	0.94
120-12-7	Anthracene	610,000 ^b	----- ^c	610,000 ^b	----- ^c	12,000 ^b	59,000	*
1912-24-9	Atrazine ^o	72,000 ^b	----- ^c	7,100 ^b	----- ^c	0.066	0.33	NA
71-43-2	Benzene	100 ^e	1.6 ^e	2,300 ^e	2.2 ^e	0.03	0.17	*

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/kg)	ClassII (mg/kg)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
1563-66-2	Carbofuran ^o	10,000 ^b	----- ^c	1,000 ^b	----- ^c	0.22	1.1	NA
75-15-0	Carbon disulfide	200,000 ^b	720 ^d	20,000 ^b	9.0 ^b	32 ^b	160	*
56-23-5	Carbon tetrachloride	44 ^e	0.64 ^e	410 ^b	0.90 ^e	0.07	0.33	*
57-74-9	Chlordane	161.6 ^e	140 ^e	100 ^b	22 ^b	10	48	*
106-47-8	4 – Chloroaniline (<i>p</i> -Chloroaniline)	8,200 ^b	----- ^c	820 ^b	----- ^c	0.7 ^b	0.7	*
108-90-7	Chlorobenzene (Monochlorobenzene)	41,000 ^b	210 ^b	4,100 ^b	1.3 ^b	1	6.5	*
124-48-1	Chlorodibromomethane (Dibromochloromethane)	41,000 ^b	1,300 ^d	41,000 ^b	1,300 ^d	0.4	0.4	*
67-66-3	Chloroform	940 ^e	0.54 ^e	2,000 ^b	0.76 ^e	0.6	2.9	*
218-01-9	Chrysene	780 ^e	----- ^c	17,000 ^e	----- ^e	160	800	*
94-75-7	2,4-D ^o	20,000 ^b	----- ^c	2,000 ^b	----- ^c	1.5	7.7	*

		Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		
		Industrial-Commercial		Construction Worker				
CAS No.	Chemical Name	Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)	Class I (mg/kg)	ClassII (mg/kg)	ADL (mg/kg)
75-99-0	Dalapon ^o	61,000 ^b	----- ^c	6,100 ^b	----- ^c	0.85	8.5	*
72-54-8	DDD	24 ^e	----- ^c	520 ^e	----- ^c	16 ^e	80	*
72-55-9	DDE	17 ^e	----- ^c	370 ^e	----- ^c	54 ^e	270	*
50-29-3	DDT	17 ^e	1,500 ^e	100 ^b	2,100 ^e	32 ^e	160	*
53-70-3	Dibenzo(<i>a,h</i>)anthracene	0.8 ^e	----- ^c	17 ^e	----- ^c	2	7.6	*
96-12-8	1,2-Dibromo-3-chloropropane	4 ^e	17 ^b	89 ^e	0.11 ^b	0.002	0.02 0.002	*
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	2.9 0.07 ^e	0.12 0.32 ^e	62 1.5 ^e	0.16 0.45 ^e	0.0004	0.004	0.005
84-74-2	Di- <i>n</i> -butyl phthalate	200,000 ^b	2,300 ^d	200,000 ^b	2,300 ^d	2,300 ^d	2,300 ^d	*
95-50-1	1,2-Dichlorobenzene (<i>o</i> -Dichlorobenzene)	180,000 ^b	560 ^d	18,000 ^b	310 ^b	17	43	*
106-46-7	1,4-Dichlorobenzene (<i>p</i> -Dichlorobenzene)	----- ^c	17,000 ^b	----- ^c	340 ^b	2	11	*

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/kg)	ClassII (mg/kg)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
91-94-1	3,3'-Dichlorobenzidine	13 ^e	----- ^c	280 ^e	----- ^c	0.007 ^{e,f}	0.033	1.3
75-34-3	1,1-Dichloroethane	200,000 ^b	1,700 ^d	200,000 ^b	130 ^b	23 ^b	110	*
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	63 ^e	0.70 ^e	1,400 ^e	0.99 ^e	0.02	0.1	*
75-35-4	1,1-Dichloroethylene	100,000^b 18,000 ^b	470 ^b 1,500 ^d	10,000^b 1,800 ^b	3.0 ^b 300 ^w	0.06	0.3	*
156-59-2	<i>cis</i> -1,2-Dichloroethylene	20,000 ^b	1,200 ^d	20,000 ^b	1,200 ^d	0.4	1.1	*
156-60-5	<i>Trans</i> -1,2-Dichloroethylene	41,000 ^b	3,100 ^d	41,000 ^b	3,100 ^d	0.7	3.4	*
78-87-5	1,2-Dichloropropane	84 ^e	23 ^b	1,800 ^e	0.50 ^b	0.03	0.15	*
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, <i>cis</i> + <i>trans</i>)	57 ^e	2.1 ^e	1,200 ^e	0.39 ^b	0.004 ^e	0.02	0.005
60-57-1	Dieldrin ⁿ	0.4 ^e	2.2 ^e	7.8 ^e	3.1 ^e	0.004 ^e	0.02	0.603
84-66-2	Diethyl phthalate	1,000,000 ^b	2,000 ^d	1,000,000 ^b	2,000 ^d	470 ^b	470	*

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

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/kg)	ClassII (mg/kg)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
1634-04-4	Methyl tertiary-butyl ether	20,000 ^b	8,800 ^d	2,000 ^b	140 ^b	0.32	0.32	*
75-09-2	Methylene chloride (Dichloromethane)	760 ^e	24 ^e	12,000 ^b	34 ^e	0.02 ^e	0.2	*
95-48-7	2-Methylphenol (<i>o</i> - Cresol)	100,000 ^b	----- ^c	100,000 ^b	----- ^c	15 ^b	15	*
86-30-6	<i>N</i> -Nitrosodiphenylamine	1,200 ^e	----- ^c	25,000 ^e	----- ^c	1 ^e	5.6	*
621-64-7	<i>N</i> -Nitrosodi- <i>n</i> -propylamine	0.8 ^e	----- ^c	18 ^e	----- ^c	0.00005 ^{ef}	0.00005	0.0018
91-20-3	Naphthalene	41,000 ^b	270 ^b	4,100 ^b	1.8 ^b	12 ^b	18	*
98-95-3	Nitrobenzene	1,000 ^b	140 ^b	1,000 ^b	9.4 ^b	0.1 ^{bf}	0.1	0.26
108-95-2	Phenol	610,000^b 1,000,000 ^b	----- ^c	61,000^b 120,000 ^b	----- ^c	100 ^b	100	*
1918-02-1	Picloram ^o	140,000 ^b	----- ^c	14,000 ^b	----- ^c	2	20	NA
1336-36-3	Polychlorinated biphenyls (PCBs) ⁿ	1 ^h	----- ^{c,h}	1 ^h	----- ^{c,h}	----- ^h	----- ^h	*
129-00-0	Pyrene	61,000 ^b	----- ^c	61,000 ^b	----- ^c	4,200 ^b	21,000	*

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

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

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

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/L)	Class II (mg/L)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
	Inorganics							
7440-36-0	Antimony	820 ^b	---- ^c	82 ^b	---- ^c	0.006 ^m	0.024 ^m	*
7440-38-2	Arsenic ^{l,n}	--- ^t	1,200 ^e	61 ^b	25,000 ^e	0.05 ^m	0.2 ^m	*
7440-39-3	Barium	140,000 ^b	910,000 ^b	14,000 ^b	870,000 ^b	2.0 ^m	2.0 ^m	*
7440-41-7	Beryllium	4,100 ^b	2,100 ^e	410 ^b	44,000 ^e	0.004 ^m	0.5 ^m	*
7440-42-8	Boron	410,000^b 180,000 ^b	---^c 1,000,000	41,000^b 18,000^b	---^c 1,000,000	2.0 ^m	2.0 ^m	*
7440-43-9	Cadmium ^{l,n}	2,000 ^{b,r}	2,800 ^e	200 ^{b,r}	59,000 ^e	0.005 ^m	0.05 ^m	*
<u>7440-70-2</u>	<u>Calciumⁿ</u>	--- ^g	--- ^e	--- ^g	--- ^e	--- ^e	--- ^e	*
16887-00-6	Chloride	----- ^c	---- ^c	---- ^c	---- ^c	200 ^m	200 ^m	*
7440-47-3	Chromium, total	6,100 ^b	420 ^e	4,100 ^b	690 ^b	0.1 ^m	1.0 ^m	*
16065-83-1	Chromium, ion, trivalent	1,000,000 ^b	---- ^c	310,000 ^b	---- ^c	---- ^g	---- ^g	*
18540-29-9	Chromium, ion, hexavalent	6,100 ^b	420 ^e	4,100 ^b	690 ^b	----	----	*

CAS No.	Chemical Name	Exposure Route-Specific Values for Soils				Soil Component of the Groundwater Ingestion Exposure Route Values		ADL (mg/kg)
		Industrial-Commercial		Construction Worker		Class I (mg/L)	Class II (mg/L)	
		Ingestion (mg/kg)	Inhalation (mg/kg)	Ingestion (mg/kg)	Inhalation (mg/kg)			
7440-48-4	Cobalt	120,000 ^b	---- ^c	12,000 ^b	---- ^c	1.0 ^m	1.0 ^m	*
7440-50-8	Copper ⁿ	82,000 ^b	---- ^c	8,200 ^b	---- ^c	0.65 ^m	0.65 ^m	*
57-12-5	Cyanide (amenable)	41,000 ^b	---- ^c	4,100 ^b	---- ^c	0.2 ^{q,m}	0.6 ^{q,m}	*
7782-41-4	Fluoride	120,000 ^b	---- ^c	12,000 ^b	---- ^c	4.0 ^m	4.0 ^m	*
15438-31-0	Iron	---- ^c	---- ^c	---- ^c	---- ^c	5.0 ^m	5.0 ^m	*
7439-92-1	Lead	800 ^y 400 ^k	---- ^c	700 ^y 400 ^k	---- ^c	0.0075 ^m	0.1 ^m	*
7439-95-4	Magnesium ⁿ	--- ^g	--- ^c	730,000	--- ^c	--- ^c	--- ^c	*
7439-96-5	Manganese	41,000 ^{b,w} 96,000 ^b	91,000 ^b	4,100 ^{b,w} 9,600 ^b	8,700 ^b	0.15 ^m	10.0 ^m	*
7439-97-6	Mercury ^{l,n,s}	610 ^b	16 ^b 540,000 ^b	61 ^b	0.1 ^b 52,000 ^b	0.002 ^m	0.01 ^m	*
7440-02-0	Nickel ^l	41,000 ^b	21,000 ^e	4,100 ^b	440,000 ^e	0.1 ^m	2.0 ^m	*
14797-55-8	Nitrate as N ^p	1,000,000 ^b	---- ^c	330,000 ^b	---- ^c	10.0 ^{q,m}	100 ^q	*
7723-14-0	Phosphorus ⁿ	--- ^g	--- ^c	--- ^g	--- ^c	--- ^c	--- ^c	*

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

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

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

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

- ^a oil remediation objectives based on human health criteria only.
- ^b Calculated values correspond to a target hazard quotient of 1.
- ^c No toxicity criteria available for this route of exposure.
- ^d Soil saturation concentration ($C_{[sat]}$) = the concentration at which the absorptive limits of the soil particles, the solubility limits of the available soil moisture, and saturation of soil pore air have been reached. Above the soil saturation concentration, the assumptions regarding vapor transport to air and/or dissolved phase transport to groundwater (for chemicals which are liquid at ambient soil temperatures) have been violated, and alternative modeling approaches are required.
- ^e Calculated values correspond to a cancer risk level of 1 in 1,000,000.
- ^f ~~Level is at or below Contract Laboratory Program required quantitation limit for Regular Analytical Services (RAS).~~
- ^g Chemical-specific properties are such that this route is not of concern at any soil contaminant concentration.
- ^h 40 CFR 761 contains applicability requirements and methodologies for the development of PCB remediation objectives. Requests for approval of a Tier 3 evaluation must address the applicability of 40 CFR 761.
- ⁱ¹ Soil remediation objective for pH of 6.8. If soil pH is other than 6.8, refer to Appendix B, Tables C and D in this Part.
- ^j Ingestion soil remediation objective adjusted by a factor of 0.5 to account for dermal route.
- ^k ~~A preliminary remediation goal of 400 mg/kg has been set for lead based on Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, OSWER Directive #9355.4-12.~~
- ^l Potential for soil-plant-human exposure.
- ^m The person conducting the remediation has the option to use: (1) TCLP or SPLP test results to compare with the remediation objectives listed in this Table; ~~or~~ (2) the total amount of contaminant in the soil sample results to compare with pH specific remediation objectives listed in Appendix B, Table C or D of this Part. (~~see~~ ~~See~~ Section 742.510-); or (3) the appropriate background value listed in Appendix A, Table G. If the person conducting the remediation wishes to calculate soil remediation objectives based on background concentrations, this should be done in accordance with Subpart D of this Part.
- ⁿ The Agency reserves the right to evaluate the potential for remaining contaminant concentrations to pose significant threats to crops, livestock, or wildlife.
- ^o For agrichemical facilities, remediation objectives for surficial soils which are based on field application rates may be more appropriate for currently registered pesticides. Consult the Agency for further information.
- ^p For agrichemical facilities, soil remediation objectives based on site-specific background concentrations of Nitrate as N may be more appropriate. Such determinations shall be conducted in accordance with the procedures set forth in Subparts D and I of this Part.
- ^q The TCLP extraction must be done using water at a pH of 7.0.
- ^r Value based on dietary Reference Dose.
- ^s Value for Ingestion based on Reference Dose for Mercuric chloride (CAS No. 7487-94-7); value for Inhalation based on Reference Concentration for elemental Mercury (CAS No. 7439-97-6). Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.
- ^t For the ingestion route for arsenic for industrial/commercial, see 742.Appendix A, Table G.
- ^u Value based on Reference Dose for Thallium sulfate (CAS No. 7446-18-6).
- ^v ~~Calculated values correspond to soil concentrations that should not result in air concentrations that exceed criteria for workplace air.~~
- ^w Value based on Reference Dose adjusted for dietary intake.
- ^x For any populated areas as defined in Section 742.200, Appendix A, Table H may be used.
- ^y Value based on maintaining fetal blood lead below 10 ug/dl, using the USEPA adults Blood Lead Model.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and ~~Illustrations~~

Section 742.Table C pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater)

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.24	pH 8.25 to 8.74	pH 8.75 to 9.0
Inorganics											
Antimony	5	5	5	5	5	5	5	5	5	5	5
Arsenic	25	26	27	28	29	29	29	30	31	32	33
Barium	260	490	850	1,200	1,500	1,600	1,700	1,800	2,100	___ ^a	___ ^a
Beryllium	1.1	2.1	3.4	6.6	22	63	140	1,000	8,000	___ ^a	___ ^a
Cadmium	1.0	1.7	2.7	3.7	5.2	7.5	11	59	430	___ ^a	___ ^a
Chromium (+6)	70	62	54	46	40	38	36	32	28	24	21
Copper	330	580	2,100	11,000	59,000	130,000	200,000	330,000	330,000	___ ^a	___ ^a
Cyanide	40	40	40	40	40	40	40	40	40	40	40
<u>Lead</u>	<u>23</u>	<u>23</u>	<u>23</u>	<u>23</u>	<u>107</u>	<u>107</u>	<u>107</u>	<u>107</u>	<u>107</u>	<u>107</u>	<u>282</u>
Mercury	0.01	0.01 [`]	0.03	0.15	0.89	2.1	3.3	6.4	8.0	___ ^a	___ ^a
Nickel	20	36	56	76	100	130	180	700	3,800	___ ^a	___ ^a
Selenium	24	17	12	8.8	6.3	5.2	4.5	3.3	2.4	1.8	1.3
Silver	0.24	0.33	0.62	1.5	4.4	8.5	13	39	110	___ ^a	___ ^a

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.24	pH 8.25 to 8.74	pH 8.75 to 9.0
Thallium	1.6	1.8	2.0	2.4	2.6	2.8	3.0	3.4	3.8	4.4	4.9
Vanadium	980	980	980	980	980	980	980	980	980	980	980
Zinc	1,000	1,800	2,600	3,600	5,100	6,200	7,500	16,000	53,000	— ^a	— ^a
Organics											
Benzoic Acid	440	420	410	400	400	400	400	400	400	400	400
2-Chlorophenol	4.0	4.0	4.0	4.0	3.9	3.9	3.9	3.6	3.1	2.2	1.5
2,4-Dichlorophenol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.86	0.69	0.56	0.48
Dinoseb	8.4	4.5	1.9	0.82	0.43	0.34	0.31	0.27	0.25	0.25	0.25
Pentachlorophenol	0.54	0.32	0.15	0.07	0.04	0.03	0.02	0.02	0.02	0.02	0.02
2,4,5-TP (Silvex)	26	16	12	11	11	11	11	11	11	11	11
2,4,5- Trichlorophenol	400	390	390	370	320	270	230	130	64	36	26
2,4,6- Trichlorophenol	0.37	0.36	0.34	0.29	0.20	0.15	0.13	0.09	0.07	0.07	0.07

^a No data available for this pH range.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables ~~and Illustrations~~

Section 742.Table D pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class II Groundwater)

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.24	pH 8.25 to 8.74	pH 8.75 to 9.0
Inorganics											
Antimony	20	20	20	20	20	20	20	20	20	20	20
Arsenic	100	100	100	110	110	120	120	120	120	130	130
Barium	260	490	850	1,200	1,500	1,600	1,700	1,800	2,100	___ ^a	___ ^a
Beryllium	140	260	420	820	2,800	7,900	17,000	130,000	1,000,000	___ ^a	___ ^a
Cadmium	10	17	27	37	52	75	110	590	4,300	___ ^a	___ ^a
Chromium (+6)	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Copper	330	580	2,100	11,000	59,000	130,000	200,000	330,000	330,000	___ ^a	___ ^a
Cyanide	120	120	120	120	120	120	120	120	120	120	120
<u>Lead</u>	<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>	<u>1,420</u>	<u>1,420</u>	<u>1,420</u>	<u>1,420</u>	<u>1,420</u>	<u>1,420</u>	<u>3,760</u>
Mercury	0.05	0.06	0.14	0.75	4.4	10	16	32	40	___ ^a	___ ^a
Nickel	400	730	1,100	1,500	2,000	2,600	3,500	14,000	76,000	___ ^a	___ ^a
Selenium	24	17	12	8.8	6.3	5.2	4.5	3.3	2.4	1.8	1.3
Thallium	16	18	20	24	26	28	30	34	38	44	49
Zinc	2,000	3,600	5,200	7,200	10,000	12,000	15,000	32,000	110,000	___ ^a	___ ^a

Chemical (totals) (mg/kg)	pH 4.5 to 4.74	pH 4.75 to 5.24	pH 5.25 to 5.74	pH 5.75 to 6.24	pH 6.25 to 6.64	pH 6.65 to 6.89	pH 6.9 to 7.24	pH 7.25 to 7.74	pH 7.75 to 8.24	pH 8.25 to 8.74	pH 8.75 to 9.0
Organics											
Benzoic Acid	440	420	410	400	400	400	400	400	400	400	400
2-Chlorophenol	20	20	20	20	20	20	19	3.6	3.1	2.2	1.5
2,4-Dichlorophenol	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.86	0.69	0.56	0.48
Dinoseb	84	45	19	8.2	4.3	3.4	3.1	2.7	2.5	2.5	2.5
Pentachlorophenol	2.7	1.6	0.75	0.33	0.18	0.15	0.12	0.11	0.10	0.10	0.10
2,4,5-TP (Silvex)	130	79	62	57	55	55	55	55	55	55	55
2,4,5- Trichlorophenol	2,000	2,000	1,900	1,800	1,600	1,400	1,200	640	64	36	26
2,4,6- Trichlorophenol	1.9	1.8	1.7	1.4	1.0	0.77	0.13	0.09	0.07	0.07	0.07

^a No data available for this pH range.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and Illustrations

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

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

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

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

CAS No.	Chemical Name	Groundwater Remediation Objective	
		Class I (mg/L)	Class II (mg/L)
86-30-6	<i>N</i> -Nitrosodiphenylamine	0.0032 ^a	0.016
621-64-7	<i>N</i> -Nitrosodi- <i>n</i> -propylamine	0.0018 ^a	0.0018
87-86-5	Pentachlorophenol	0.001 ^c	0.005 ^c
108-95-2	Phenol	0.1 ^c	0.1 ^c
1918-02-1	Picloram	0.5 ^c	5.0 ^c
1336-36-3	Polychlorinated biphenyls (PCBs)	0.0005 ^c	0.0025 ^c
129-00-0	Pyrene	0.21	1.05
122-34-9	Simazine	0.004 ^c	0.04 ^c
100-42-5	Styrene	0.1 ^c	0.5 ^c
93-72-1	2,4,5-TP (Silvex)	0.05 ^c	0.25 ^c
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.005 ^c	0.025 ^c
108-88-3	Toluene	1.0 ^c	2.5 ^c
8001-35-2	Toxaphene	0.003 ^c	0.015 ^c
120-82-1	1,2,4-Trichlorobenzene	0.07 ^c	0.7 ^c
71-55-6	1,1,1-Trichloroethane ^b	0.2 ^c	1.0 ^c
79-00-5	1,1,2-Trichloroethane	0.005 ^c	0.05 ^c
79-01-6	Trichloroethylene	0.005 ^c	0.025 ^c
<u>95-95-4</u>	<u>2,4,5-Trichlorophenol (pH 4.9-7.8)</u>	<u>0.7</u>	<u>3.5</u>
	<u>2,4,5-Trichlorophenol (pH 7.9-8.0)</u>	<u>0.7</u>	<u>0.7</u>
<u>88-06-2</u>	<u>2,4,6-Trichlorophenol (pH 4.9-6.8)</u>	<u>0.01^a</u>	<u>0.05</u>
	<u>2,4,6-Trichlorophenol (pH 6.9-8.0)</u>	<u>0.01</u>	<u>0.01</u>
108-05-4	Vinyl acetate	7.0	7.0
75-01-4	Vinyl chloride	0.002 ^c	0.01 ^c
1330-20-7	Xylenes (total)	10.0 ^c	10.0 ^c
	Ionizable Organics		
65-85-0	Benzoic Acid	28	28
106-47-8	4-Chloroaniline (<i>p</i> -Chloroaniline)	0.028	0.028
95-57-8	2-Chlorophenol	0.035	0.175
120-83-2	2,4-Dichlorophenol	0.021	0.021

CAS No.	Chemical Name	Groundwater Remediation Objective	
		Class I (mg/L)	Class II (mg/L)
105-67-9	2,4-Dimethylphenol	0.14	0.14
51-28-5	2,4-Dinitrophenol	0.014	0.014
95-48-7	2-Methylphenol (o-Cresol)	0.35	0.35
95-95-4	2,4,5-Trichlorophenol	0.7	3.5
88-06-2	2,4,6-Trichlorophenol	0.01 ^a	0.05
	Inorganics		
7440-36-0	Antimony	0.006 ^c	0.024 ^c
7440-38-2	Arsenic	0.05 ^c	0.2 ^c
7440-39-3	Barium	2.0 ^c	2.0 ^c
7440-41-7	Beryllium	0.004 ^c	0.5 ^c
7440-42-8	Boron	2.0 ^c	2.0 ^c
7440-43-9	Cadmium	0.005 ^c	0.05 ^c
7440-70-2	Calcium	--- ^d	--- ^d
16887-00-6	Chloride	200 ^c	200 ^c
7440-47-3	Chromium, total	0.1 ^c	1.0 ^c
18540-29-9	Chromium, ion, hexavalent	---	---
7440-48-4	Cobalt	1.0 ^c	1.0 ^c
7440-50-8	Copper	0.65 ^c	0.65 ^c
57-12-5	Cyanide	0.2 ^c	0.6 ^c
7782-41-4	Fluoride	4.0 ^c	4.0 ^c
15438-31-0	Iron	5.0 ^c	5.0 ^c
7439-92-1	Lead	0.0075 ^c	0.1 ^c
7439-95-4	Magnesium	--- ^d	--- ^d
7439-96-5	Manganese	0.15 ^c	10.0 ^c
7439-97-6	Mercury	0.002 ^c	0.01 ^c
7440-02-0	Nickel	0.1 ^c	2.0 ^c
14797-55-8	Nitrate as N	10.0 ^c	100 ^c
7723-14-0	Phosphorus	--- ^d	--- ^d
7440-09-7	Potassium	--- ^d	--- ^d
7782-49-2	Selenium	0.05 ^c	0.05 ^c

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

Chemical Name and Groundwater Remediation Objective Notations

- ^a The groundwater remediation objective is equal to the ADL for carcinogens according to the procedures specified in 35 Ill. Adm. Code 620.
- ^b Oral Reference Dose and/or Reference Concentration under review by USEPA. Listed values subject to change.
- ^c Value listed is also the Groundwater Quality Standard for this chemical pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.
- ^d This chemical is included in the Total Dissolved Solids (TDS) Groundwater Quality Standard of 1,200 mg/l pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX B Tier 1 Illustrations and Tables and Illustrations

Section 742.TABLE F Values Used to Calculate the Tier 1 Soil Remediation Objectives for the Soil Component of the Groundwater Ingestion Route

CAS No.	Chemical Name <u>Organics</u>	GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
		Class I (mg/L)	Class II (mg/L)
83-32-9	Acenaphthene	2.0 ^b	10
67-64-1	Acetone	6.3 4.0 ^b	6.3 4.0
15972-60-8	Alachlor	0.002 ^c	0.01 ^c
116-06-3	Aldicarb	0.003 ^c	0.015 ^c
309-00-2	Aldrin	5.0E-6 ^b	2.5E-5
120-12-7	Anthracene	10 ^b	50
1912-24-9	Atrazine	0.003 ^c	0.015 ^c
71-43-2	Benzene	0.005 ^c	0.025 ^c
56-55-3	Benzo(a)anthracene	0.0001 ^b	0.0005
205-99-2	Benzo(b)fluoranthene	0.0001 ^b	0.0005
207-08-9	Benzo(k)fluoroanthene	0.001 ^b	0.005
50-32-8	Benzo(a)pyrene	0.0002 ^{a,c}	0.002 ^c
65-85-0	Benzoic Acid	100 ^b	100
111-44-4	Bis(2-chloroethyl)ether	8.0E-5 ^b	8.0E-5
117-81-7	Bis(2-ethylhexyl)phthalate (Di(2-ethylhexyl)phthalate)	0.006 ^{a,c}	0.06 ^c
75-27-4	Bromodichloromethane (Dichlorobromomethane)	0.1 ^b	0.1
75-25-2	Bromoform	0.1 ^b	0.01
71-36-3	Butanol	4.0 ^b	4.0
85-68-7	Butyl benzyl phthalate	7.0 ^b	35
86-74-8	Carbazole	0.004 ^b	0.02
1563-66-2	Carbofuran	0.04 ^c	0.2 ^c
75-15-0	Carbon disulfide	4.0 ^b	20
56-23-5	Carbon tetrachloride	0.005 ^c	0.025 ^c
57-74-9	Chlordane	0.002 ^c	0.01 ^c

		GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
<u>106-47-8</u>	<u>4-Chloroaniline (p-Chloroaniline)</u>	<u>0.1^b</u>	<u>0.1</u>
108-90-7	Chlorobenzene (Monochlorobenzene)	0.1 ^c	0.5 ^c
124-48-1	Chlorodibromomethane (Dibromochloromethane)	0.06 ^b	0.06
67-66-3	Chloroform	0.1 ^b	0.5
<u>95-57-8</u>	<u>2-Chlorophenol (pH 4.9-7.3)</u>	<u>0.2^b</u>	<u>1.0</u>
	<u>2-Chlorophenol (pH 7.4-8.0)</u>	<u>0.2</u>	<u>0.2</u>
218-01-9	Chrysene	0.1 ^b	0.05
94-75-7	2,4-D	0.07 ^c	0.35 ^c
75-99-0	Dalapon	0.2 ^c	2.0 ^c
72-54-8	DDD	0.0004 ^b	0.002
72-55-9	DDE	0.0003 ^b	0.0015
50-29-3	DDT	0.0003 ^b	0.0015
53-70-3	Dibenzo(a,h)anthracene	1.0E-5 ^b	5.0E-5
96-12-8	1,2-Dibromo-3-chloropropane	0.0002 ^c	<u>0.002</u> 0.0002 ^c
106-93-4	1,2-Dibromoethane (Ethylene dibromide)	0.00005 ^{a,c}	0.0005 ^c
84-74-2	Di-n-butyl phthalate	4.0 ^b	20
95-50-1	1,2-Dichlorobenzene (o - Dichlorobenzene)	0.6 ^c	1.5 ^c
106-46-7	1,4-Dichlorobenzene (p - Dichlorobenzene)	0.075 ^c	0.375 ^c
91-94-1	3,3'-Dichlorobenzidine	0.0002 ^b	0.001
75-34-3	1,1-Dichloroethane	4.0 ^b	20
107-06-2	1,2-Dichloroethane (Ethylene dichloride)	0.005 ^c	0.025 ^c
75-35-4	1,1-Dichloroethylene	0.007 ^c	0.035 ^c
156-59-2	cis-1,2-Dichloroethylene	0.07 ^c	0.2 ^c
156-60-5	trans-1,2-Dichloroethylene	0.1 ^c	0.5 ^c
<u>120-83-2</u>	<u>2,4-Dichlorophenol</u>	<u>0.1^b</u>	<u>0.1</u>
78-97-5	1,2-Dichloropropane	0.005 ^c	0.025 ^c
542-75-6	1,3-Dichloropropene (1,3-Dichloropropylene, cis + trans)	0.0005 ^b	0.0025
		GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)

60-57-1	Dieldrin	5.0E-6 ^b	2.5E-5
84-66-2	Diethyl phthalate	30 ^b	30
<u>105-67-9</u>	<u>2,4-Dimethylphenol</u>	<u>0.7^b</u>	<u>0.7</u>
<u>51-28-5</u>	<u>2,4-Dinitrophenol</u>	<u>0.04^b</u>	<u>0.04</u>
121-14-2	2,4-Dinitrotoluene	0.0001 ^b	0.0001
606-20-2	2,6-Dinitrotoluene	0.0001	0.0001
88-85-7	Dinoseb	0.007 ^c	0.07 ^c
117-84-0	Di- <i>n</i> -octyl phthalate	0.7 ^b	3.5
115-29-7	Endosulfan	0.2 ^b	1.0
145-73-3	Endothall	0.1 ^c	0.1 ^c
72-20-8	Endrin	0.002 ^c	0.01 ^c
100-41-4	Ethylbenzene	0.7 ^c	1.0 ^c
206-44-0	Fluoranthene	1.0 ^b	5.0
86-73-7	Fluorene	1.0 ^b	5.0
76-44-8	Heptachlor	0.0004 ^c	0.002 ^c
1024-57-3	Heptachlor epoxide	0.0002 ^c	0.001 ^c
118-74-1	Hexachlorobenzene	0.001 ^b	0.005
319-84-6	<i>alpha</i> -HCH (<i>alpha</i> -BHC)	1.0E-5 ^b	5.0E-5
58-89-9	<i>Gamma</i> -HCH (Lindane)	0.0002 ^c	0.001 ^c
77-47-4	Hexachlorocyclopentadiene	0.05 ^c	0.5 ^c
67-72-1	Hexachloroethane	0.007	0.035
193-39-5	Indeno(1,2,3- <i>c,d</i>)pyrene	0.0001 ^b	0.0005
78-59-1	Isophorone	1.4	1.4
72-43-5	Methoxychlor	0.04 ^c	0.2 ^c
74-83-9	Methyl bromide (Bromomethane)	0.05 ^b	0.25
1634-04-4	Methyl tertiary-butyl ether	0.07	0.07
75-09-2	Methylene chloride (Dichloromethane)	0.005 ^c	0.05 ^c
<u>95-48-7</u>	<u>2-Methylphenol (<i>o</i>-Cresol)</u>	<u>2.0^b</u>	<u>2.0</u>
91-20-3	Naphthalene	0.14 ^c	0.22 ^c
98-95-3	Nitrobenzene	0.02 ^b	0.02
		GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
<u>86-30-6</u>	<u><i>N</i>-Nitrosodiphenylamine</u>	<u>0.02^b</u>	<u>0.1</u>
<u>621-64-7</u>	<u><i>N</i>-Nitrosodi-<i>n</i>-propylamine</u>	<u>1.0E-5^b</u>	<u>1.0E-5</u>
<u>87-86-5</u>	<u>Pentachlorophenol</u>	<u>0.001^{a,c}</u>	<u>0.005^c</u>
<u>108-95-2</u>	<u>Phenol</u>	<u>0.1^c</u>	<u>0.1^c</u>

1918-02-1	Picloram	0.5 ^c	5.0 ^c
1336-36-3	Polychlorinated biphenyls (PCBs)	---	---
129-00-0	Pyrene	1.0 ^b	5.0
122-34-9	Simazine	0.004 ^c	0.04 ^c
100-42-5	Styrene	0.1 ^c	0.5 ^c
93-72-1	2,4,5-TP (Silvex)	0.05 ^c	0.25 ^c
127-18-4	Tetrachloroethylene (Perchloroethylene)	0.005 ^c	0.025 ^c
108-88-3	Toluene	1.0 ^c	2.5 ^c
8001-35-2	Toxaphene	0.003 ^c	0.015 ^c
120-82-1	1,2,4-Trichlorobenzene	0.07 ^c	0.7 ^c
71-55-6	1,1,1-Trichloroethane	0.2 ^c	1.0 ^c
79-00-5	1,1,2-Trichloroethane	0.005 ^c	0.05 ^c
79-01-6	Trichloroethylene	0.005 ^c	0.025 ^c
<u>95-95-4</u>	<u>2,4,5-Trichlorophenol (pH 4.9-7.8)</u>	<u>4.0^b</u>	<u>20</u>
	<u>2,4,5-Trichlorophenol (pH 7.9-8.0)</u>	<u>4.0</u>	<u>4.0</u>
<u>88-06-2</u>	<u>2,4,6-Trichlorophenol (pH 4.9-6.8)</u>	<u>0.008^b</u>	<u>0.04</u>
	<u>2,4,6-Trichlorophenol (pH 6.9-8.0)</u>	<u>0.008</u>	<u>0.008</u>
108-05-4	Vinyl acetate	40 ^b	40
75-01-4	Vinyl chloride	0.002 ^c	0.01 ^c
1330-20-7	Xylenes (total)	10.0 ^c	10.0 ^c
	Ionizable Organics		
<u>65-85-0</u>	<u>Benzoic Acid</u>	<u>100^b</u>	<u>100</u>
<u>106-47-8</u>	<u>4-Chloroaniline (<i>p</i>-Chloroaniline)</u>	<u>0.1^b</u>	<u>0.1</u>
<u>95-57-8</u>	<u>2-Chlorophenol</u>	<u>0.2^b</u>	<u>1.0</u>
<u>120-83-2</u>	<u>2,4-Dichlorophenol</u>	<u>0.1^b</u>	<u>0.1</u>
		GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
CAS No.	Chemical Name	Class I (mg/L)	Class II (mg/L)
<u>105-67-9</u>	<u>2,4-Dimethylphenol</u>	<u>0.7^b</u>	<u>0.7</u>
<u>51-28-5</u>	<u>2,4-Dinitrophenol</u>	<u>0.04^b</u>	<u>0.04</u>
<u>95-48-7</u>	<u>2-Methylphenol (<i>o</i>-Cresol)</u>	<u>2.0^b</u>	<u>2.0</u>
<u>86-30-6</u>	<u><i>N</i>-Nitrosodiphenylamine</u>	<u>0.02^b</u>	<u>0.1</u>
<u>621-64-7</u>	<u><i>N</i>-Nitrosodi-<i>n</i>-propylamine</u>	<u>1.0E-5^b</u>	<u>1.0E-5</u>
<u>87-86-5</u>	<u>Pentachlorophenol</u>	<u>0.001^{a,c}</u>	<u>0.005^c</u>
<u>108-95-2</u>	<u>Phenol</u>	<u>0.1^e</u>	<u>0.1^e</u>
<u>95-95-4</u>	<u>2,4,5-Trichlorophenol</u>	<u>4.0^b</u>	<u>20</u>
<u>88-06-2</u>	<u>2,4,6-Trichlorophenol</u>	<u>0.008^b</u>	<u>0.04</u>

	Inorganics		
7440-36-0	Antimony	0.006 ^c	0.024 ^c
7440-38-2	Arsenic	0.05 ^c	0.2 ^c
7440-39-3	Barium	2.0 ^c	2.0 ^c
7440-41-7	Beryllium	0.004 ^c	0.5 ^c
7440-42-8	Boron	2.0 ^c	2.0 ^c
7440-43-9	Cadmium	0.005 ^c	0.05 ^c
<u>7440-70-2</u>	<u>Calcium</u>	---	---
16887-00-6	Chloride	200 ^c	200 ^c
7440-47-3	Chromium, total	0.1 ^c	1.0 ^c
18540-29-9	Chromium, ion, hexavalent	---	---
7440-48-4	Cobalt	1.0 ^c	1.0 ^c
7440-50-8	Copper	0.65 ^c	0.65 ^c
57-12-5	Cyanide	0.2 ^c	0.6 ^c
7782-41-4	Fluoride	4.0 ^c	4.0 ^c
15438-31-0	Iron	5.0 ^c	5.0 ^c
7439-92-1	Lead	0.0075 ^c	0.1 ^c
<u>7439-95-4</u>	<u>Magnesium</u>	---	---
7439-96-5	Manganese	0.15 ^c	10.0 ^c
7439-97-6	Mercury	0.002 ^c	0.01 ^c
7440-02-0	Nickel	0.1 ^c	2.0 ^c
14797-55-8	Nitrate as N	10.0 ^c	100 ^c

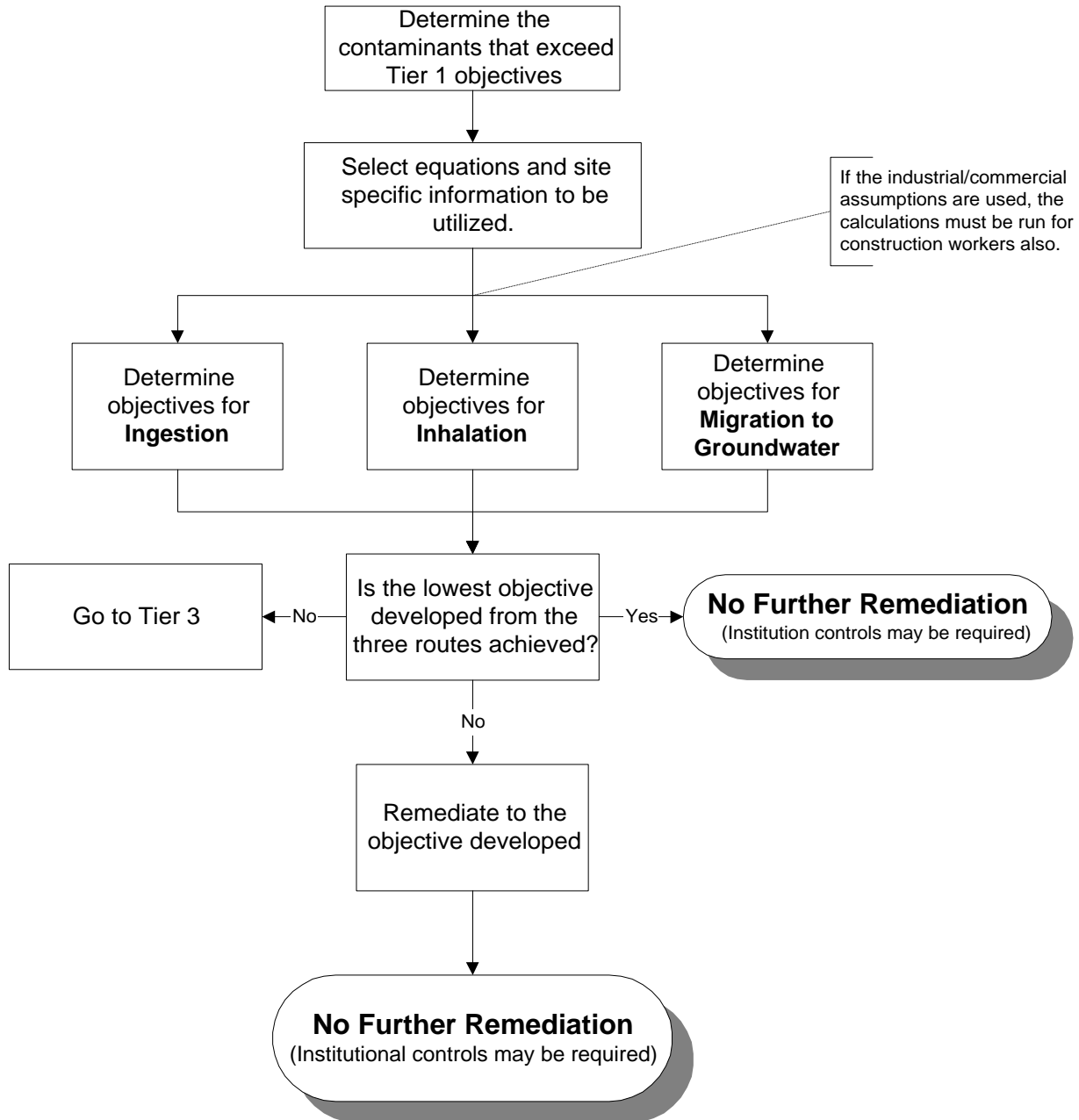
CAS No.	Chemical Name	GW _{obj} Concentration used to Calculate Tier 1 Soil Remediation Objectives ^a	
		Class I (mg/L)	Class II (mg/L)
7723-14-0	Phosphorus	---	---
7440-09-7	Potassium	---	---
7782-49-2	Selenium	0.05 ^c	0.05 ^c
7440-22-4	Silver	0.05 ^c	---
7440-23-5	Sodium	---	---
14808-79-8	Sulfate	400 ^c	400 ^c
7440-28-0	Thallium	0.002 ^c	0.02 ^c
7440-62-2	Vanadium	0.049	0.1
7440-66-6	Zinc	5.0 ^c	10 ^c

Chemical Name and Groundwater Remediation Objective Notations

- ^a The Equation S17 is used to calculate the Soil Remediation Objective for the Soil Component of the Groundwater Ingestion Route; this equation requires calculation of the Target Soil Leachate Concentration (C_w) from Equation S18: C_w = DF x GW_{obj}.
- ^b Value listed is the Water Health Based Limit (HBL) for this chemical from Soil Screening Guidance: User's Guide, incorporated by reference at Section 742.210. The HBL is equal to the non-zero MCLG (if available); the MCL (if available); or, for carcinogens, a cancer risk of 1.0E-6, and for noncarcinogens is equal to a Hazard Quotient of 1.0. NOTE: These GW_{obj} concentrations are not equal to the Tier 1 Groundwater Remediation Objectives for the Direct Ingestion of Groundwater Component of the Groundwater Ingestion Route, listed in Section 742.Appendix B, Table E.
- ^c Value listed is also the Groundwater Quality Standard for this chemical pursuant to 35 Ill. Adm. Code 620.410 for Class I Groundwater or 35 Ill. Adm. Code 620.420 for Class II Groundwater.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

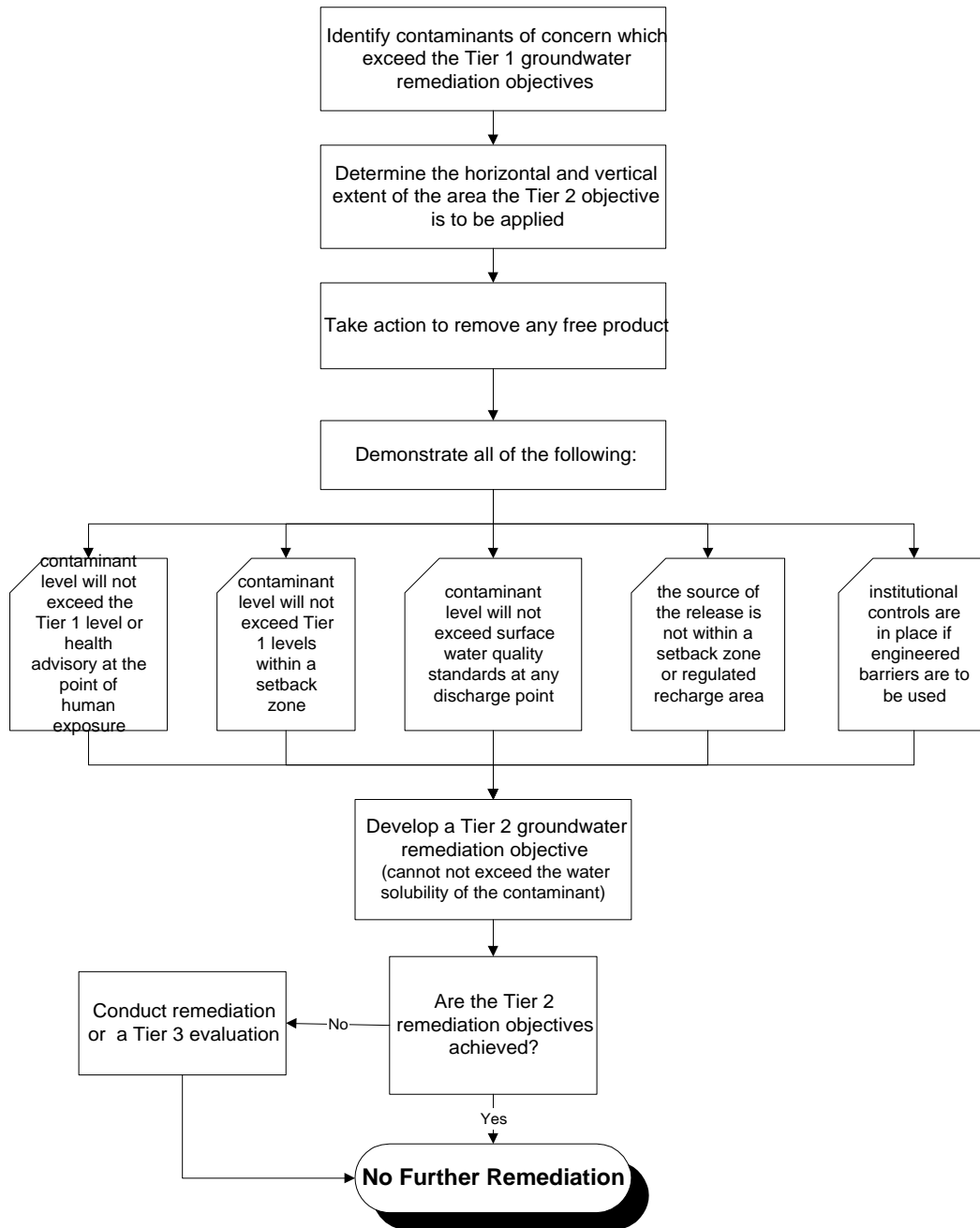
Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations
 Section 742.Illustration A Tier 2 Evaluation for Soil



(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

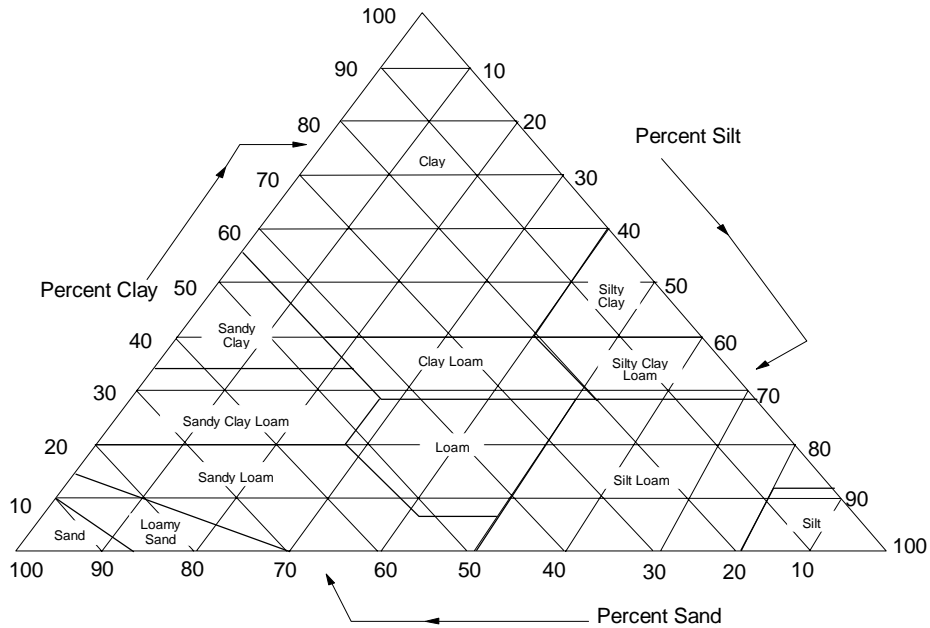
Section 742.Illustration B Tier 2 Evaluation for Groundwater



(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Illustration C U.S. Department of Agriculture Soil Texture Classification



Criteria Used with the Field Method for Determining Soil Texture Classes

Criterion	Sand	Sandy loam	Loam	Slit loam	Clay loam	Clay
1. Individual grains visible to eye	Yes	Yes	Some	Few	No	No
2. Stability of dry clods	Do not form	Do not form	Easily broken	Moderately easily broken	Hard and stable	Very hard and stable
3. Stability of wet clods	Unstable	Slightyl stable	Moderately stable	Stable	Very stable	Very stable
4. Stability of "ribbon" when wet soil rubbed between thumb and fingers	Does not form	Does not form	Does not form	Broken appearance	Thin, will break	Very long, flexible

Particle Size, mm							
0.002	0.05	0.10	0.25	0.5	1.0	2.0	
Clay	Silt	Very Fine	Fine	Med.	Coarse	Very Coarse	Gravel
		Sand					

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table A SSL Equations

Equations for Soil Ingestion Exposure Route	Remediation Objectives for Noncarcinogenic Contaminants (mg/kg)	$\frac{THQ \cdot BW \cdot AT \cdot 365 \frac{d}{yr}}{\frac{1}{RfD_o} \cdot 10^{-6} \frac{kg}{mg} \cdot EF \cdot ED \cdot IR_{soil}}$	S1
	Remediation Objectives for Carcinogenic Contaminants - Residential (mg/kg)	$\frac{TR \cdot AT_c \cdot 365 \frac{d}{yr}}{SF_o \cdot 10^{-6} \frac{kg}{mg} \cdot EF \cdot IF_{soil-adj}}$	S2
	Remediation Objectives for Carcinogenic Contaminants - Industrial/ Commercial, Construction Worker (mg/kg)	$\frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr}}{SF_o \cdot 10^{-6} \frac{kg}{mg} \cdot EF \cdot ED \cdot IR_{soil}}$	S3
Equations for Inhalation Exposure Route (Organic Contaminants and Mercury)	Remediation Objectives for Noncarcinogenic Contaminants - Residential, Industrial/Commercial (mg/kg)	$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF} \right)}$	S4

Remediation Objectives for Noncarcinogenic Contaminants - Construction Worker (mg/kg)	$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{VF'} \right)}$	S5
Remediation Objectives for Carcinogenic Contaminants - Residential, Industrial/ Commercial (mg/kg)	$\frac{TR \cdot AT_c \cdot 365 \frac{d}{yr}}{URF \cdot 1,000 \frac{ug}{mg} \cdot EF \cdot ED \cdot \frac{1}{VF}}$	S6
Remediation Objectives for Carcinogenic Contaminants - Construction Worker (mg/kg)	$\frac{TR \cdot AT_c \cdot 365 \frac{d}{yr}}{URF \cdot 1,000 \frac{ug}{mg} \cdot EF \cdot ED \cdot \frac{1}{VF'}}$	S7
Equation for Derivation of the Volatilization Factor - Residential, Industrial/ Commercial, VF (m ³ /kg)	$VF = \frac{Q}{C} \cdot \frac{(314 \cdot D_A \cdot T)^{1/2}}{(2 \cdot \rho_b \cdot D_A)} \cdot 10^{-4} \frac{m^2}{cm^2}$	S8
Equation for Derivation of the Volatilization Factor - Construction Worker, VF' (m ³ /kg)	$VF' = \frac{VF}{10}$	S9
Equation for Derivation of Apparent Diffusivity, D _A (cm ² /s)	$D_A = \frac{(\theta_a^{3.33} \cdot D_i \cdot H') + (\theta_w^{3.33} \cdot D_w)}{\eta^2} \cdot \frac{1}{(\rho_b \cdot K_d) + \theta_w + (\theta_a \cdot H')}$	S10

Equations for Inhalation Exposure Route (Fugitive Dusts)	Remediation Objectives for Noncarcinogenic Contaminants - Residential, Industrial/Commercial (mg/kg)	$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{PEF} \right)}$	S11
	Remediation Objectives for Noncarcinogenic Contaminants - Construction Worker (mg/kg)	$\frac{THQ \cdot AT \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left(\frac{1}{RfC} \cdot \frac{1}{PEF'} \right)}$	S12
	Remediation Objectives for Carcinogenic Contaminants - Residential, Industrial/Commercial (mg/kg)	$\frac{TR \cdot AT_c \cdot 365 \frac{d}{yr}}{URF \cdot 1,000 \frac{ug}{mg} \cdot EF \cdot ED \cdot \frac{1}{PEF}}$	S13
	Remediation Objectives for Carcinogenic Contaminants - Construction Worker (mg/kg)	$\frac{TR \cdot AT_c \cdot 365 \frac{d}{yr}}{URF \cdot 1,000 \frac{ug}{mg} \cdot EF \cdot ED \cdot \frac{1}{PEF'}}$	S14
	Equation for Derivation of Particulate Emission Factor, PEF (m ³ /kg)	$PEF = \frac{Q}{C} \cdot \frac{3,600 \frac{s}{hr}}{0.036 \cdot (1-V) \cdot \left(\frac{U_m}{U_t} \right)^3 \cdot F(x)}$	S15

	Equation for Derivation of Particulate Emission Factor, PEF' - Construction Worker (m ³ /kg)	$PEF' = \frac{PEF}{10}$ <p>NOTE: PEF must be the industrial/commercial value</p>	S16
Equations for the Soil Component of the Groundwater Ingestion Exposure Route	Remediation Objective (mg/kg)	$C_w \cdot \left[K_d + \frac{(\theta_w + \theta_a \cdot H')}{\rho_b} \right]$ <p>NOTE: This equation can only be used to model contaminant migration not in the water bearing unit.</p>	S17
	Target Soil Leachate Concentration, C _w (mg/L)	$C_w = DF \cdot GW_{obj}$	S18
	Soil-Water Partition Coefficient, K _d (cm ³ /g)	$K_d = K_{oc} \cdot f_{oc}$	S19
	Water-Filled Soil Porosity, θ _w (L _{water} /L _{soil})	$\theta_w = \eta \cdot \left(\frac{I}{K_s} \right)^{1/(2b+3)}$	S20
	Air-Filled Soil Porosity, θ _a (L _{air} /L _{soil})	$\theta_a = \eta - \theta_w$	S21
	Dilution Factor, DF (unitless)	$DF = 1 + \frac{K \cdot i \cdot d}{I \cdot L}$	S22

	Groundwater Remediation Objective for Carcinogenic Contaminants, GW_{obj} (mg/L)	$\frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr}}{SF_o \cdot IR_w \cdot EF \cdot ED}$	S23
	Total Soil Porosity, η (L_{pore}/L_{soil})	$\eta = 1 - \frac{\rho_b}{\rho_s}$	S24
	Equation for Estimation of Mixing Zone Depth, d (m)	$d = (0.0112 \cdot L^2)^{0.5} + d_a \left[1 - \exp\left(\frac{-L \cdot I}{K \cdot i \cdot d_a}\right) \right]$	S25
Mass-Limit Equations for Inhalation Exposure Route and Soil Component of the Groundwater Ingestion Exposure Route	Mass-Limit Volatilization Factor for the Inhalation Exposure Route - Residential, Industrial/Commercial, VF (m^3/kg)	$VF_{M-L} = \frac{Q}{C} \cdot \frac{\left[T_{M-L} \cdot \left(3.15 \cdot 10^7 \frac{s}{yr} \right) \right]}{\rho_b \cdot d_s \cdot 10^6 \frac{cm^3}{m^3}}$ <p>NOTE: This equation may be used when vertical thickness of contamination is known or can be estimated reliably.</p>	S26
	Mass-Limit Volatilization Factor for Inhalation Exposure Route - Construction Worker, VF' (m^3/kg)	$VF'_{M-L} = \frac{VF_{M-L}}{10}$	S27

	Mass-Limit Remediation Objective for Soil Component of the Groundwater Ingestion Exposure Route (mg/kg)	$\frac{(C_w \cdot I_{M-L} \cdot ED_{M-L})}{\rho_b \cdot d_s}$ <p>NOTE: This equation may be used when vertical thickness is known or can be estimated reliably.</p>	S28
Equation for Derivation of the Soil Saturation Limit, C_{sat}	$C_{sat} = \frac{S}{\rho_b} \cdot [(K_d \cdot \rho_b) + \theta_w + (H' \cdot \theta_a)]$	S29	

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table B SSL Parameters

Symbol	Parameter	Units	Source	Parameter Value(s)
AT	Averaging Time for Noncarcinogens in Ingestion Equation	yr		Residential = 6 Industrial/Commercial = 25 Construction Worker = 0.115
AT	Averaging Time for Noncarcinogens in Inhalation Equation	yr		Residential = 30 Industrial/Commercial = 25 Construction Worker = 0.115
AT _c	Averaging Time for Carcinogens	yr	SSL	70
BW	Body Weight	kg		Residential = 15, noncarcinogens 70, carcinogens Industrial/Commercial = 70 Construction Worker = 70
C _{sat}	Soil Saturation Concentration	mg/kg	Appendix A, Table A or Equation S29 in Appendix C, Table A	Chemical-Specific or Calculated Value
C _w	Target Soil Leachate Concentration	mg/L	Equation S18 in Appendix C, Table A	Groundwater Standard, Health Advisory concentration, or Calculated Value
d	Mixing Zone Depth	m	SSL or Equation S25 in Appendix C, Table A	2 m or Calculated Value
d _a	Aquifer Thickness	m	Field Measurement	Site-Specific

Symbol	Parameter	Units	Source	Parameter Value(s)
d_s	Depth of Source (Vertical thickness of contamination)	m	Field Measurement or Estimation	Site-Specific
D_A	Apparent Diffusivity	cm^2/s	Equation S10 in Appendix C, Table A	Calculated Value
D_i	Diffusivity in Air	cm^2/s	Appendix C, Table E	Chemical-Specific
D_w	Diffusivity in Water	cm^2/s	Appendix C, Table E	Chemical-Specific
DF	Dilution Factor	unitless	Equation S22 in Appendix C, Table A	20 or Calculated Value
ED	Exposure Duration for Ingestion of Carcinogens	yr		Industrial/Commercial = 25 Construction Worker = 1
ED	Exposure Duration for Inhalation of Carcinogens	yr		Residential = 30 Industrial/Commercial = 25 Construction Worker = 1
ED	Exposure Duration for Ingestion of Noncarcinogens	yr		Residential = 6 Industrial/Commercial = 25 Construction Worker = 1
ED	Exposure Duration for Inhalation of Noncarcinogens	yr		Residential = 30 Industrial/Commercial = 25 Construction Worker = 1
ED	Exposure Duration for the Direct Ingestion of Groundwater	yr		Residential = 30 Industrial/Commercial = 25 Construction Worker = 1

Symbol	Parameter	Units	Source	Parameter Value(s)
ED_{M-L}	Exposure Duration for Migration to Groundwater Mass-Limit Equation S28	yr	SSL	70
EF	Exposure Frequency	d/yr		Residential = 350 Industrial/Commercial = 250 Construction Worker = 30
F(x)	Function dependent on U_m/U_t	unitless	SSL	0.194
f_{oc}	Organic Carbon Content of Soil	g/g	SSL or Field Measurement (See Appendix C, Table F)	Surface Soil = 0.006 Subsurface soil = 0.002, or Site-Specific
GW_{obj}	Groundwater Remediation Remediation Objective	mg/L	Appendix B, Table E, 35 IAC 620.Subpart F, or Equation S23 in Appendix C, Table A	Chemical-Specific or Calculated
H'	Henry's Law Constant	unitless	Appendix C, Table E	Chemical-Specific
i	Hydraulic Gradient	m/m	Field Measurement (See Appendix C, Table F)	Site-Specific
I	Infiltration Rate	m/yr	SSL	0.3
I_{M-L}	Infiltration Rate for Migration to Groundwater Mass-Limit Equation S28	m/yr	SSL	0.18

Symbol	Parameter	Units	Source	Parameter Value(s)
IF _{soil-adj} (residential)	Age Adjusted Soil Ingestion Factor for Carcinogens	(mg-yr)/(kg-d)	SSL	114
IR _{soil}	Soil Ingestion Rate	mg/d		Residential = 200 Industrial/Commercial = 50 Construction Worker = 480
IR _w	Daily Water Ingestion Rate	L/d		Residential = 2 Industrial/Commercial = 1
K	Aquifer Hydraulic Conductivity	m/yr	Field Measurement (See Appendix C, Table F)	Site-Specific
K _d (Non-ionizing organics)	Soil-Water Partition Coefficient	cm ³ /g or L/kg	Equation S19 in Appendix C, Table A	Calculated Value
K _d (Ionizing organics)	Soil-Water Partition Coefficient	cm ³ /g or L/kg	Equation S19 in Appendix C, Table A	Chemical and pH-Specific (see Appendix C, Table I)
K _d (Inorganics)	Soil-Water Partition Coefficient	cm ³ /g or L/kg	Appendix C, Table J	Chemical and pH-Specific
K _{oc}	Organic Carbon Partition Coefficient	cm ³ /g or L/kg	Appendix C, Table E or Appendix C, Table I	Chemical-Specific
K _s	Saturated Hydraulic Conductivity	m/yr	Appendix C, Table K Appendix C, Illustration C	Site-Specific
L	Source Length Parallel to Groundwater Flow	m	Field Measurement	Site-Specific
PEF	Particulate Emission Factor	m ³ /kg	SSL or Equation S15 in Appendix C, Table A	Residential = 1.32 • 10 ⁹ or Site-Specific Industrial/Commercial = 1.24 • 10 ⁹ or Site-Specific

Symbol	Parameter	Units	Source	Parameter Value(s)
PEF'	Particulate Emission Factor adjusted for Agitation (construction worker)	m ³ /kg	Equation S16 in Appendix C, Table A using PEF (industrial/commercial)	1.24 • 10 ⁸ or Site-Specific
Q/C (used in VF equations)	Inverse of the mean concentration at the center of a square source	(g/m ² -s)/(kg/m ³)	Appendix C, Table H	Residential = 68.81 Industrial/Commercial = 85.81 Construction Worker = 85.81
Q/C (used in PEF equations)	Inverse of the mean concentration at the center of a square source	(g/m ² -s)/(kg/m ³)	SSL or Appendix C, Table H	Residential = 90.80 Industrial/Commercial = 85.81 Construction Worker = 85.81
RfC	Inhalation Reference Concentration	mg/m ³	IEPA (IRIS/HEAST ^a)	Toxicological-Specific (Note: for Construction Workers use subchronic reference concentrations)
RfD _o	Oral Reference Dose	mg/(kg-d)	IEPA (IRIS/HEAST ^a)	Toxicological-Specific (Note: for Construction Worker use subchronic reference doses)
S	Solubility in Water	mg/L	Appendix C, Table E	Chemical-Specific
SF _o	Oral Slope Factor	(mg/kg-d) ⁻¹	IEPA (IRIS/HEAST ^a)	Toxicological-Specific
T	Exposure Interval	s		Residential = 9.5 • 10 ⁸ Industrial/Commercial = 7.9 • 10 ⁸ Construction Worker = 3.6 • 10 ⁶

Symbol	Parameter	Units	Source	Parameter Value(s)
T_{M-L}	Exposure Interval for Mass-Limit Volatilization Factor Equation S26	yr	SSL	30
THQ	Target Hazard Quotient	unitless	SSL	1
TR	Target Cancer Risk	unitless		Residential = 10^{-6} at the point of human exposure Industrial/Commercial = 10^{-6} at the point of human exposure Construction Worker = 10^{-6} at the point of human exposure
U_m	Mean Annual Windspeed	m/s	SSL	4.69
URF	Inhalation Unit Risk Factor	$(\mu\text{g}/\text{m}^3)^{-1}$	IEPA (IRIS/HEAST ^a)	Toxicological-Specific
U_t	Equivalent Threshold Value of Windspeed at 7 m	m/s	SSL	11.32
V	Fraction of Vegetative Cover	unitless	SSL or Field Measurement	0.5 or Site-Specific
VF	Volatilization Factor	m^3/kg	Equation S8 in Appendix C, Table A	Calculated Value
VF'	Volatilization Factor adjusted for Agitation	m^3/kg	Equation S9 in Appendix C, Table A	Calculated Value

Symbol	Parameter	Units	Source	Parameter Value(s)
VF_{M-L}	Mass-Limit Volatilization Factor	m^3/kg	Equation S26 in Appendix C, Table A	Calculated Value
VF'_{M-L}	Mass-Limit Volatilization Factor adjusted for Agitation	m^3/kg	Equation S27 in Appendix C, Table A	Calculated Value
η	Total Soil Porosity	L_{pore}/L_{soil}	SSL or Equation S24 in Appendix C, Table A	0.43, or Gravel = 0.25 Sand = 0.32 Silt = 0.40 Clay = 0.36, or Calculated Value
θ_a	Air-Filled Soil Porosity	L_{air}/L_{soil}	SSL or Equation S21 in Appendix C, Table A	Surface Soil (top 1 meter) = 0.28 Subsurface Soil (below 1 meter) = 0.13, or Gravel = 0.05 Sand = 0.14 Silt = 0.24 Clay = 0.19, or Calculated Value
θ_w	Water-Filled Soil Porosity	L_{water}/L_{soil}	SSL or Equation S20 in Appendix C, Table A	Surface Soil (top 1 meter) = 0.15 Subsurface Soil (below 1 meter) = 0.30, or Gravel = 0.20 Sand = 0.18 Silt = 0.16 Clay = 0.17, or Calculated Value

Symbol	Parameter	Units	Source	Parameter Value(s)
ρ_b	Dry Soil Bulk Density	kg/L or g/cm ³	SSL or Field Measurement (See Appendix C, Table F)	1.5, or Gravel = 2.0 Sand = 1.8 Silt = 1.6 Clay = 1.7, or Site-Specific
ρ_s	Soil Particle Density	g/cm ³	SSL or Field Measurement (See Appendix C, Table F)	2.65, or Site-Specific
ρ_w	Water Density	g/cm ³	SSL	1
1/(2b+3)	Exponential in Equation S20	unitless	Appendix C, Table K Appendix C, Illustration C	Site-Specific

a HEAST = Health Effects Assessment Summary Tables. USEPA, Office of Solid Waste and Emergency Response. EPA/SQO/R-95/036. Updated Quarterly.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table C RBCA Equations

Equations for the combined exposures routes of soil ingestion inhalation of vapors and particulates, and dermal contact with soil	Remediation Objectives for Carcinogenic Contaminants (mg/kg)	$\frac{TR \cdot BW \cdot AT_C \cdot 365 \frac{d}{yr}}{EF \cdot ED \cdot \left\{ \left[SF_o \cdot 10^{-6} \frac{kg}{mg} \cdot \left((IR_{soil} \cdot RAF_o) + (SA \cdot M \cdot RAF_d) \right) \right] + \left[SF_i \cdot IR_{air} \cdot (VF_{ss} + VF_p) \right] \right\}}$	R1
	Remediation Objectives for Non-carcinogenic Contaminants (mg/kg)	$EF \cdot ED \cdot \left[\frac{10^{-6} \frac{kg}{mg} \left[(IR_{soil} \cdot RAF_o) + (SA \cdot M \cdot RAF_d) \right]}{RfD_o} + \frac{IR_{air} \cdot (VF_{ss} + VF_p)}{RfD_i} \right]$	R2
	Volatilization Factor for Surficial Soils, VF_{ss} (kg/m ³) Whichever is less between R3 and R4	$VF_{ss} = \frac{2 \cdot W \cdot \rho_s \cdot 10^3 \frac{cm^3 \cdot kg}{m^3 \cdot g}}{U_{air} \cdot \delta_{air}} \cdot \sqrt{\frac{D_s^{eff} \cdot H'}{\pi \cdot [\theta_{ws} + (k_s \cdot \rho_s) + (H' \cdot \theta_{as})] \cdot \tau}}$	R3
	$VF_{ss} = \frac{W \cdot \rho_s \cdot d \cdot 10^3 \frac{cm^3 \cdot kg}{m^3 \cdot g}}{U_{air} \cdot \delta_{air} \cdot \tau}$	R4	

	Volatilization Factor for Surficial Soils Regarding Particulates, VF_p (kg/m ³)	$VF_p = \frac{P_e \cdot W \cdot 10^3 \frac{cm^3 \cdot kg}{m^3 \cdot g}}{U_{air} \cdot \delta_{air}}$	R5
	Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration D_s^{eff} (cm ² /s)	$D_s^{eff} = \frac{D^{air} \cdot \theta_{as}^{3.33}}{\theta_T^2} + \frac{D^{water} \cdot \theta_{ws}^{3.33}}{H' \cdot \theta_T^2}$	R6
Equations for the ambient vapor inhalation (outdoor) route from subsurface soils	Remediation Objectives for Carcinogenic Contaminants (mg/kg)	$\frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$	R7
	Remediation Objectives for Non-carcinogenic Contaminants (mg/kg)	$\frac{RBSL_{air} \cdot 10^{-3}}{VF_{samb}}$	R8

<p>Carcinogenic Risk-Based Screening Level for Air, $RBSL_{air}$ (ug/m^3)</p>	$RBSL_{air} = \frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{SF_i \cdot IR_{air} \cdot EF \cdot ED}$	<p>R9</p>
<p>Noncarcinogenic Risk-Based Screening Level for Air, $RBSL_{air}$ (ug/m^3)</p>	$RBSL_{air} = \frac{THQ \cdot RfD_i \cdot BW \cdot AT_n \cdot 365 \frac{d}{yr} \cdot 10^3 \frac{ug}{mg}}{IR_{air} \cdot EF \cdot ED}$	<p>R10</p>
<p>Volatilization Factor - Subsurface Soil to Ambient Air, VF_{samb} (mg/m^3)/(mg/kg_{soil})</p>	$VF_{samb} = \frac{H' \cdot \rho_s \cdot 10^3 \frac{cm^3 \cdot kg}{m^3 \cdot g}}{\left[\theta_{ws} + (k_s \cdot \rho_s) + (H' \cdot \theta_{as}) \right] \cdot \left[1 + \frac{(U_{air} \cdot \delta_{air} \cdot L_s)}{(D_s^{eff} \cdot W)} \right]}$	<p>R11</p>

Equations for the Soil Component of the Groundwater Ingestion Exposure Route	Remediation Objective (mg/kg)	$\frac{GW_{source}}{LF_{sw}}$	R12
		NOTE: This equation can only be used to model contaminant migration not in the water bearing unit.	
	Groundwater at the source, GW_{source} (mg/L)	$GW_{source} = \frac{GW_{comp}}{C_{(x)}/C_{source}}$	R13
	Leaching Factor, LF_{sw} (mg/L _{water})/(mg/kg _{soil})	$LF_{sw} = \frac{\rho_s \cdot \frac{cm^3 \cdot kg}{L \cdot g}}{[\theta_{ws} + (k_s \cdot \rho_s) + (H' \cdot \theta_{as})] \cdot \left[1 + \frac{(U_{gw} \cdot \delta_{gw})}{(I \cdot W)} \right]}$	R14
	Steady-State Attenuation Along the Centerline of a Dissolved Plume, $C_{(x)}/C_{source}$	$C_{(x)}/C_{source} = \exp \left[\left(\frac{X}{2\alpha_x} \right) \cdot \left(1 - \sqrt{1 + \frac{4\lambda \cdot \alpha_x}{U}} \right) \right] \cdot erf \left[\frac{S_w}{4 \cdot \sqrt{\alpha_y \cdot X}} \right] \cdot erf \left[\frac{S_d}{2 \cdot \sqrt{\alpha_z \cdot X}} \right]$	R15
	NOTE: 1. This equation does not predict the contaminant flow within bedrock and may not accurately predict downgradient concentrations in the presence of a confining layer. 2. If the value of the First Order Degradation Constant (λ) is not readily available, then set $\lambda = 0$.		
Longitudinal Dispersivity, α_x (cm)	$\alpha_x = 0.10 \cdot X$	R16	

Transverse Dispersivity, α_y (cm)	$\alpha_y = \frac{\alpha_x}{3}$	R17
Vertical Dispersivity, α_z (cm)	$\alpha_z = \frac{\alpha_x}{20}$	R18
Specific Discharge, U (cm/d)	$U = \frac{K \cdot i}{\theta_T}$	R19
Soil-Water Sorption Coefficient, k_s	$k_s = K_{oc} \cdot f_{oc}$	R20
Volumetric Air Content in Vadose Zone Soils, θ_{as} (cm ³ _{air} /cm ³ _{soil})	$\theta_{as} = \theta_T - \frac{(w \cdot \rho_s)}{\rho_w}$	R21
Volumetric Water Content in Vadose Zone Soils, θ_{ws} (cm ³ _{water} /cm ³ _{soil})	$\theta_{ws} = \frac{w \cdot \rho_s}{\rho_w}$	R22
Total Soil Porosity, θ_T (cm ³ /cm ³ _{soil})	$\theta_T = \theta_{as} + \theta_{ws}$	R23

	Groundwater Darcy Velocity, U_{gw} (cm/yr)	$U_{gw} = K \cdot i$	R24
Equations for the Groundwater Ingestion Exposure Route	Remediation Objective for Carcinogenic Contaminants (mg/L)	$\frac{TR \cdot BW \cdot AT_c \cdot 365 \frac{d}{yr}}{SF_o \cdot IR_w \cdot EF \cdot ED}$	R25
	Dissolved Hydrocarbon Concentration along Centerline, $C_{(x)}$ (mg/L _{water})	$C_{(x)} = C_{source} \cdot \exp \left[\left(\frac{X}{2\alpha_x} \right) \cdot \left(1 - \sqrt{1 + \frac{4\lambda \cdot \alpha_x}{U}} \right) \right] \cdot \operatorname{erf} \left[\frac{S_w}{4 \cdot \sqrt{\alpha_y \cdot X}} \right] \cdot \operatorname{erf} \left[\frac{S_d}{2 \cdot \sqrt{\alpha_z \cdot X}} \right]$ <p>NOTE:</p> <ol style="list-style-type: none"> 1. This equation does not predict the contaminant flow within bedrock and may not accurately predict downgradient concentrations in the presence of a confining layer. 2. If the value of the First Order Degradation Constant (λ) is not readily available, then set $\lambda = 0$. 	R26

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table D RBCA Parameters

Symbol	Parameter	Units	Source	Parameter Value(s)
AT_c	Averaging Time for Carcinogens	yr	RBCA	70
AT_n	Averaging Time for Noncarcinogens	yr	RBCA	Residential = 30 Industrial/Commercial = 25 Construction Worker = 0.115
BW	Adult Body Weight	kg	RBCA	70
C_{source}	The greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, based on the concentrations of contaminants in groundwater due to the release and the projected concentration of the contaminant migrating from the soil to the groundwater.	mg/L	Field Measurement	Site-Specific
$C_{(x)}$	Concentration of Contaminant in Groundwater at Distance X from the source	mg/L	Equation R26 in Appendix C, Table C	Calculated Value

Symbol	Parameter	Units	Source	Parameter Value(s)
$C_{(x)}/C_{\text{source}}$	Steady-State Attenuation Along the Centerline of a Dissolved Plume	unitless	Equation R15 in Appendix C, Table C	Calculated Value
d	Lower Depth of Surficial Soil Zone	cm	Field Measurement	100 or Site-Specific (not to exceed 100)
D^{air}	Diffusion Coefficient in Air	cm^2/s	Appendix C, Table E	Chemical-Specific
D^{water}	Diffusion Coefficient in Water	cm^2/s	Appendix C, Table E	Chemical-Specific
D_s^{eff}	Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration	cm^2/s	Equation R6 in Appendix C, Table C	Calculated Value
ED	Exposure Duration	yr	RBCA	Residential = 30 Industrial/Commercial = 25 Construction Worker = 1
EF	Exposure Frequency	d/yr	RBCA	Residential = 350 Industrial/Commercial = 250 Construction Worker = 30
erf	Error Function	unitless	Appendix C, Table G	Mathematical Function

Symbol	Parameter	Units	Source	Parameter Value(s)
f_{oc}	Organic Carbon Content of Soil	g/g	RBCA or Field Measurement (See Appendix C, Table F)	Surface Soil = 0.006 Subsurface Soil = 0.002 or Site-Specific
GW_{comp}	Groundwater Objective at the Compliance Point	mg/L	Appendix B, Table E, 35 IAC 620.Subpart F, or Equation R25 in Appendix C, Table C	Site-Specific
GW_{source}	Groundwater Concentration at the Source	mg/L	Equation R13 in Appendix C, Table C	Calculated Value
H'	Henry's Law Constant	cm^3_{water}/cm^3_{air}	Appendix C, Table E	Chemical-Specific
i	Hydraulic Gradient	cm/cm (unitless)	Field Measurement (See Appendix C, Table F)	Site-Specific
I	Infiltration Rate	cm/yr	RBCA	30
IR_{air}	Daily Outdoor Inhalation Rate	m^3/d	RBCA	20
IR_{soil}	Soil Ingestion Rate	mg/d	RBCA	Residential = 100 Industrial/Commercial = 50 Construction Worker = 480
IR_w	Daily Water Ingestion Rate	L/d	RBCA	Residential = 2 Industrial/Commercial = 1

Symbol	Parameter	Units	Source	Parameter Value(s)
K	Aquifer Hydraulic Conductivity	cm/d for Equations R15, R19 and R26 cm/yr for Equation R24	Field Measurement (See Appendix C, Table F)	Site-Specific
K_{oc}	Organic Carbon Partition Coefficient	cm^3/g or L/kg	Appendix C, Table E or Appendix C, Table I	Chemical-Specific
k_s (non-ionizing organics)	Soil Water Sorption Coefficient	$\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$	Equation R20 in Appendix C, Table C	Calculated Value
k_s (ionizing organics)	Soil Water Sorption Coefficient	$\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$	Equation R20 in Appendix C, Table C	Chemical and pH-Specific (See Appendix C, Table I)
k_s (inorganics)	Soil Water Sorption Coefficient	$\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$	Appendix C, Table J	Chemical and pH-Specific
L_s	Depth to Subsurface Soil Sources	cm	RBCA	100
LF_{sw}	Leaching Factor	$(\text{mg}/\text{L}_{\text{water}})/$ $(\text{mg}/\text{kg}_{\text{soil}})$	Equation R14 in Appendix C, Table C	Calculated Value
M	Soil to Skin Adherence Factor	mg/cm^2	RBCA	0.5

Symbol	Parameter	Units	Source	Parameter Value(s)
Pe	Particulate Emission Rate	g/cm ² -s	RBCA	6.9 • 10 ⁻¹⁴
RAF _d	Dermal Relative Absorption Factor	unitless	RBCA	0.5
RAF _d (PNAs)	Dermal Relative Absorption Factor	unitless	RBCA	0.05
RAF _d (inorganics)	Dermal Relative Absorption Factor	unitless	RBCA	0
RAF _o	Oral Relative Absorption Factor	unitless	RBCA	1.0
RBSL _{air}	Carcinogenic Risk-Based Screening Level for Air	ug/m ³	Equation R9 in Appendix C, Table C	Chemical-, Media-, and Exposure Route-Specific
RBSL _{air}	Noncarcinogenic Risk-Based Screening Level for Air	ug/m ³	Equations R10 in Appendix C, Table C	Chemical-, Media-, and Exposure Route-Specific
RfD _i	Inhalation Reference Dose	mg/kg-d	IEPA (IRIS/HEAST ^a)	Toxicological-Specific
RfD _o	Oral Reference Dose	mg/(kg-d)	IEPA (IRIS/HEAST ^a)	Toxicological-Specific (Note: for Construction Worker use subchronic reference doses)
SA	Skin Surface Area	cm ² /d	RBCA	3,160

Symbol	Parameter	Units	Source	Parameter Value(s)
S_d	Source Width Perpendicular to Groundwater Flow Direction in Vertical Plane	cm	Field Measurement	For Migration to Groundwater Route: Use 200 or Site-Specific For Groundwater remediation objective: Use Site-Specific
S_w	Source Width Perpendicular to Groundwater Flow Direction in Horizontal Plane	cm	Field Measurement	Site-Specific
SF_i	Inhalation Cancer Slope Factor	$(\text{mg}/\text{kg}\cdot\text{d})^{-1}$	IEPA (IRIS/HEAST ^a)	Toxicological-Specific
SF_o	Oral Slope Factor	$(\text{mg}/\text{kg}\cdot\text{d})^{-1}$	IEPA (IRIS/HEAST ^a)	Toxicological-Specific
THQ	Target Hazard Quotient	unitless	RBCA	1
TR	Target Cancer Risk	unitless	RBCA	Residential = 10^{-6} at the point of human exposure Industrial/Commercial = 10^{-6} at the point of human exposure Construction Worker = 10^{-6} at the point of human exposure
U	Specific Discharge	cm/d	Equation R19 in Appendix C, Table C	Calculated Value

Symbol	Parameter	Units	Source	Parameter Value(s)
U_{air}	Average Wind Speed Above Ground Surface in Ambient Mixing Zone	cm/s	RBCA	225
U_{gw}	Groundwater Darcy Velocity	cm/yr	Equation R24 in Appendix C, Table C	Calculated Value
VF_p	Volatilization Factor for Surficial Soils Regarding Particulates	kg/m^3	Equation R5 in Appendix C, Table C	Calculated Value
VF_{samb}	Volatilization Factor (Subsurface Soils to Ambient Air)	$(\text{mg/m}^3_{\text{air}})/(\text{mg/kg}_{\text{s}})$ or kg/m^3	Equation R11 in Appendix C, Table C	Calculated Value
VF_{ss}	Volatilization Factor for Surficial Soils	kg/m^3	Use Equations R3 and R4 in Appendix C, Table C	Calculated Value from Equation R3 or R4 (whichever is less)
W	Width of Source Area Parallel to Direction to Wind or Groundwater Movement	cm	Field Measurement	Site-Specific

Symbol	Parameter	Units	Source	Parameter Value(s)
w	Average Soil Moisture Content	$\frac{g_{\text{water}}}{g_{\text{soil}}}$	RBCA or Field Measurement (See Appendix C, Table F)	0.1, or Surface Soil (top 1 meter) = 0.1 Subsurface Soil (below 1 meter) = 0.2, or Site-Specific
X	Distance along the Centerline of the Groundwater Plume Emanating from a Source. The x direction is the direction of groundwater flow	cm	Field Measurement	Site-Specific
α_x	Longitudinal Dispersivity	cm	Equation R16 in Appendix C, Table C	Calculated Value
α_y	Transverse Dispersivity	cm	Equation R17 in Appendix C, Table C	Calculated Value
α_z	Vertical Dispersivity	cm	Equation R18 in Appendix C, Table C	Calculated Value
δ_{air}	Ambient Air Mixing Zone Height	cm	RBCA	200

Symbol	Parameter	Units	Source	Parameter Value(s)
δ_{gw}	Groundwater Mixing Zone Thickness	cm	RBCA	200
θ_{as}	Volumetric Air Content in Vadose Zone Soils	$\text{cm}^3_{\text{air}}/\text{cm}^3_{\text{soil}}$	RBCA or Equation R21 in Appendix C, Table C	Surface Soil (top 1 meter) = 0.28 Subsurface Soil (below 1 meter) = 0.13, Or Gravel = 0.05 Sand = 0.14 Silt = 0.16 Clay = 0.17, or Calculated Value
θ_{ws}	Volumetric Water Content in Vadose Zone Soils	$\text{cm}^3_{\text{water}}/\text{cm}^3_{\text{soil}}$	RBCA or Equation R22 in Appendix C, Table C	Surface Soil (top 1 meter) = 0.15 Subsurface Soil (below 1 meter) = 0.30, or Gravel = 0.20 Sand = 0.18 Silt = 0.16 Clay = 0.17, or Calculated Value

Symbol	Parameter	Units	Source	Parameter Value(s)
θ_T	Total Soil Porosity	$\text{cm}^3/\text{cm}^3_{\text{soil}}$	RBCA or Equation R23 in Appendix C, Table C	0.43, or Gravel = 0.25 Sand = 0.32 Silt = 0.40 Clay = 0.36, or Calculated Value
λ	First Order Degradation Constant	d^{-1}	Appendix C, Table E	Chemical-Specific
π	pi			3.1416
ρ_{bs}	Soil Bulk Density	g/cm^3	RBCA or Field Measurement (See Appendix C, Table F)	1.5, or Gravel = 2.0 Sand = 1.8 Silt = 1.6 Clay = 1.7, or Site-Specific
ρ_w	Water Density	g/cm^3	RBCA	1
τ	Averaging Time for Vapor Flux	s	RBCA	$9.46 \cdot 10^8$

^a HEAST = Health Effects Assessment Summary Tables. USEPA, Office of Solid Waste and Emergency Response. EPA/540/R-95/036. Updated Quarterly.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table E Default Physical and Chemical Parameters

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
Neutral Organics							
83-32-9	Acenaphthene	4.24	0.0421	7.69E-6	0.00636	7,080	0.0034
67-64-1	Acetone	1,000,000	0.124	1.14E-5	0.00159	0.575	0.0495
15972-60-8	Alachlor	242	0.0198	5.69E-6	0.00000132	394	No Data
116-06-3	Aldicarb	6,000	0.0305	7.19E-6	0.0000000574	12	0.00109
309-00-2	Aldrin	0.18	0.0132	4.86E-6	0.00697	2,450,000	0.00059
120-12-7	Anthracene	0.0434	0.0324	7.74E-6	0.00267	29,500	0.00075
1912-24-9	Atrazine	70	0.0258	6.69E-6	0.00000005	451	No Data
71-43-2	Benzene	1,750	0.088	9.80E-6	0.228	58.9	0.0009

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
56-55-3	Benzo(a)anthracene	0.0094	0.0510	9.00E-6	0.000137	398,000	0.00051
205-99-2	Benzo(b)fluoranthene	0.0015	0.0226	5.56E-6	0.00455	1,230,000	0.00057
207-08-9	Benzo(k)fluoranthene	0.0008	0.0226	5.56E-6	0.000034	1,230,000	0.00016
65-85-0	Benzoic Acid	3,500	0.0536	7.97E-6	0.0000631	0.600	No Data
50-32-8	Benzo(a)pyrene	0.00162	0.043	9.00E-6	0.0000463	1,020,000	0.00065
111-44-4	Bis(2-chloroethyl)ether	17,200	0.0692	7.53E-6	0.000738	15.5	0.0019
117-81-7	Bis(2-ethylhexyl)phthalate	0.34	0.0351	3.66E-6	0.00000418	15,100,000	0.0018
75-27-4	Bromodichloromethane	6,740	0.0298	1.06E-5	0.0656	55.0	No Data
75-25-2	Bromoform	3,100	0.0149	1.03E-5	0.0219	87.1	0.0019
71-36-3	Butanol	74,000	0.0800	9.30E-6	0.000361	6.92	0.01283
85-68-7	Butyl Benzyl Phthalate	2.69	0.0174	4.83E-6	0.0000517	57,500	0.00385
86-74-8	Carbazole	7.48	0.0390	7.03E-6	0.000000626	3,390	No Data

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (D _i) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
1563-66-2	Carbofuran	320	0.0249	6.63E-6	.00377	37	No Data
75-15-0	Carbon Disulfide	1,190	0.104	1.00E-5	1.24	45.7	No Data
56-23-5	Carbon Tetrachloride	793	0.0780	8.80E-6	1.25	174	0.0019
57-74-9	Chlordane	0.056	0.0118	4.37E-6	0.00199	120,000	0.00025
106-47-8	p-Chloroaniline	5,300	0.0483	1.01E-5	0.0000136	66.1	No Data
108- 90 09 -7	Chlorobenzene	472	0.0730	8.70E-6	0.152	219	0.0023
124-48-1	Chlorodibromomethane	2,600	0.0196	1.05E-5	0.0321	63.1	0.00385
67-66-3	Chloroform	7,920	0.104	1.00E-5	0.15	39.8	0.00039
95-57-8	2-Chlorophenol	22,000	0.0501	9.46E-6	0.016	388	No Data
218-01-9	Chrysene	0.0016	0.0248	6.21E-6	0.00388	398,000	0.00035
94-75-7	2,4-D	680	0.0231	7.31E-6	0.00000041	451	0.00385
72-54-8	4,4'-DDD	0.09	0.0169	4.76E-6	0.000164	1,000,000	0.000062

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
72-55-9	4,4'-DDE	0.12	0.0144	5.87E-6	0.000861	4,470,000	0.000062
50-29-3	4,4'-DDT	0.025	0.0137	4.95E-6	0.000332	2,630,000	0.000062
75-99-0	Dalapon	900,000	0.0414	9.46E-6	0.00000264	5.8	0.005775
53-70-3	Dibenzo(a,h)anthracene	0.00249	0.0202	5.18E-6	0.000000603	3,800,000	0.00037
96-12-8	1,2-Dibromo-3-chloropropane	1,200	0.0212	7.02E-6	0.00615	182	0.001925
106-93-4	1,2-Dibromoethane	4,200	0.0287	8.06E-6	0.0303	93	0.005775
84-74-2	Di-n-butyl Phthalate	11.2	0.0438	7.86E-6	0.0000000385	33,900	0.03013
95-50-1	1,2-Dichlorobenzene	156	0.0690	7.90E-6	0.0779	617	0.0019
106-46-7	1,4-Dichlorobenzene	73.8	0.0690	7.90E-6	0.0996	617	0.0019
91-94-1	3,3-Dichlorobenzidine	3.11	0.0194	6.74E-6	0.000000164	724	0.0019

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (D _i) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
75-34-3	1,1-Dichloroethane	5,060	0.0742	1.05E-5	0.23	31.6	0.0019
107-06-2	1,2-Dichloroethane	8,520	0.104	9.90E-6	0.0401	17.4	0.0019
75-35-4	1,1-Dichloroethylene	2,250	0.0900	1.04E-5	1.07	58.9	0.0053
156-59-2	Cis-1,2-Dichloroethylene	3,500	0.0736	1.13E-5	0.167	35.5	0.00024
156-60-5	Trans-1,2-Dichloroethylene	6,300	0.0707	1.19E-5	0.385	52.5	0.00024
120-83-2	2,4-Dichlorophenol	4,500	0.0346	8.77E-6	0.00013	147	0.00027
78-87-5	1,2-Dichloropropane	2,800	0.0782	8.73E-6	0.115	43.7	0.00027
542-75-6	1,3-Dichloropropylene (cis + trans)	2,800	0.0626	1.00E-5	0.726	45.7	0.061
60-57-1	Dieldrin	0.195	0.0125	4.74E-6	0.000619	21,400	0.00032
84-66-2	Diethyl Phthalate	1,080	0.0256	6.35E-6	0.0000185	288	0.00619
105-67-9	2,4-Dimethylphenol	7,870	0.0584	8.69E-6	0.000082	209	0.0495
51-28-5	2,4-Dinitrophenol	2,790	0.0273	9.06E-6	0.0000182	0.01	0.00132

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (D _i) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
121-14-2	2,4-Dinitrotoluene	270	0.203	7.06E-6	0.0000038	95.5	0.00192
606-20-2	2,6-Dinitrotoluene	182	0.0327	7.26E-6	0.0000306	69.2	0.00192
88-85-7	Dinoseb	52	0.0215	6.62E-6	0.0000189	1,120	0.002817
117-84-0	Di-n-octyl Phthalate	0.02	0.0151	3.58E-6	0.00274	83,200,000	0.0019
115-29-7	Endosulfan	0.51	0.0115	4.55E-6	0.000459	2,140	0.07629
145-73-3	Endothall	21,000	0.0291	8.07E-6	0.0000000107	0.29	No Data
72-20-8	Endrin	0.25	0.0125	4.74E-6	0.000308	12,300	0.00032
100-41-4	Ethylbenzene	169	0.0750	7.80E-6	0.323	363	0.003
206-44-0	Fluoranthene	0.206	0.0302	6.35E-6	0.00066	107,000	0.00019
86-73-7	Fluorene	1.98	0.0363	7.88E-6	0.00261	13,800	0.000691
76-44-8	Heptachlor	0.18	0.0112	5.69E-6	60.7	1,410,000	0.13
1024-57-3	Heptachlor epoxide	0.2	0.0132	4.23E-6	0.00039	83,200	0.00063

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
118-74-1	Hexachlorobenzene	6.2	0.0542	5.91E-6	0.0541	55,000	0.00017
319-84-6	Alpha-HCH (alpha-BHC)	2.0	0.0142	7.34E-6	0.000435	1,230	0.0025
58-89-9	Gamma-HCH (Lindane)	6.8	0.0142	7.34E-6	0.000574	1,070	0.0029
77-47-4	Hexachlorocyclo-Pentadiene	1.8	0.0161	7.21E-6	1.11	200,000	0.012
67-72-1	Hexachloroethane	50	0.0025	6.80E-6	0.159	1,780	0.00192
193-39-5	Indeno(1,2,3-c,d)pyrene	0.000022	0.0190	5.66E-6	0.0000656	3,470,000	0.00047
78-59-1	Isophorone	12,000	0.0623	6.76E-6	0.000272	46.8	0.01238
7439-97-6	Mercury	---	0.0307	6.30E-6	0.467	---	No Data
72-43-5	Methoxychlor	0.045	0.0156	4.46E-6	0.000648	97,700	0.0019
74-83-9	Methyl Bromide	15,200	0.0728	1.21E-5	0.256	10.5	0.01824
1634-04-4	Methyl tertiary-butyl ether	51,000	0.102	1.10E-5	0.0241	11.5	No Data
75-09-2	Methylene Chloride	13,000	0.101	1.17E-5	0.0898	11.7	0.012
95-48-7	2-Methylphenol	26,000	0.0740	8.30E-6	0.0000492	91.2	0.0495

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
91-20-3	Naphthalene	31.0	0.0590	7.50E-6	0.0198	2,000	0.0027
98-95-3	Nitrobenzene	2,090	0.0760	8.60E-6	0.000984	64.6	0.00176
86-30-6	N-Nitrosodiphenylamine	35.1	0.0312	6.35E-6	0.000205	1,290	0.01
621-64-7	N-Nitrosodi-n-propylamine	9,890	0.0545	8.17E-6	0.0000923	24.0	0.0019
87-86-5	Pentachlorophenol	1,950	0.0560	6.10E-6	0.000001	592	0.00045
108-95-2	Phenol	82,800	0.0820	9.10E-6	0.0000163	28.8	0.099
1918-02-1	Picloram	430	0.0255	5.28E-6	0.00000000166	1.98	No Data
1336-36-3	Polychlorinated biphenyls (PCBs)	0.7	----- ^a	----- ^a	----- ^a	309,000	No Data
129-00-0	Pyrene	0.135	0.0272	7.24E-6	0.000451	105,000	0.00018
122-34-9	Simazine	5	0.027	7.36E-6	0.0000000133	133	No Data
100-42-5	Styrene	310	0.0710	8.00E-6	0.113	776	0.0033
93-72-1	2,4,5-TP (Silvex)	31	0.0194	5.83E-6	0.0000000032	5,440	No Data

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (D _i) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
127-18-4	Tetrachloroethylene	200	0.0720	8.20E-6	0.754	155	0.00096
108-88-3	Toluene	526	0.0870	8.60E-6	0.272	182	0.011
8001-35-2	Toxaphene	0.74	0.0116	4.34E-6	0.000246	257,000	No Data
120-82-1	1,2,4-Trichlorobenzene	300	0.0300	8.23E-6	0.0582	1,780	0.0019
71-55-6	1,1,1-Trichloroethane	1,330	0.0780	8.80E-6	0.705	110	0.0013
79-00-5	1,1,2-Trichloroethane	4,420	0.0780	8.80E-6	0.0374	50.1	0.00095
79-01-6	Trichloroethylene	1,100	0.0790	9.10E-6	0.422	166	0.00042
95-95-4	2,4,5-Trichlorophenol	1,200	0.0291	7.03E-6	0.000178	1,600	0.00038
88-06-2	2,4,6-Trichlorophenol	800	0.0318	6.25E-6	0.000319	381	0.00038
108-05-4	Vinyl Acetate	20,000	0.0850	9.20E-6	0.021	5.25	No Data
57-01-4	Vinyl Chloride	2,760	0.106	1.23E-6	1.11	18.6	0.00024
108-38-3	m-Xylene	161	0.070	7.80E-6	0.301	407	0.0019

CAS No.	Chemical	Solubility in Water (S) (mg/L)	Diffusivity in Air (Di) (cm ² /s)	Diffusivity in Water (D _w) (cm ² /s)	Dimensionless Henry's Law Constant (H') (25°C)	Organic Carbon Partition Coefficient (K _{oc}) (L/kg)	First Order Degradation Constant (λ) (d ⁻¹)
95-47-6	o-Xylene	178	0.087	1.00E-5	0.213	363	0.0019
106-42-3	p-Xylene	185	0.0769	8.44E-6	0.314	389	0.0019
1330-20-7	Xylenes (total)	186	0.0720	9.34E-6	0.25	260	0.0019

Chemical Abstracts Service (CAS) registry number. This number in the format xxx-xx-x, is unique for each chemical and allows efficient searching on computerized data bases.

^aSoil Remediation objectives are determined pursuant to 40 CFR 761, as incorporated by reference at Section 732.104 (the USEPA "PCB Spill Cleanup Policy"), for most sites; persons remediating sites should consult with BOL if calculation of Tier 2 soil remediation objectives is desired.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table F Methods for Determining Physical Soil Parameters

Methods for Determining Physical Soil Parameters		
Parameter	Sampling Location ^a	Method
ρ_b (soil bulk density)	Surface	ASTM - D 1556-90 Sand Cone Method ^b
		ASTM - D 2167-94 Rubber Balloon Method ^b
		ASTM - D 2922-91 Nuclear Method ^b
	Subsurface	ASTM - D 2937-94 Drive Cylinder Method ^b
ρ_s (soil particle density)	Surface or Subsurface	ASTM - D 854-92 Specific Gravity of Soil ^b
w (moisture content)	Surface or Subsurface	ASTM - D 4959-89 (Reapproved 1994) Standard ^b
		ASTM - D 4643-93 Microwave Oven ^b
		ASTM - D2216-92 Laboratory Determination ^b
		ASTM - D3017-88 (Reapproved 1993) Nuclear Method ^b
		Equivalent USEPA Method (e.g., sample preparation procedures described in methods 3541 or 3550)

Methods for Determining Physical Soil Parameters		
Parameter	Sampling Location ^a	Method
f _{oc} (fraction organic carbon content)	Surface or Subsurface	Nelson and Sommers (1982)
		ASTM - D 2974-0087 (Reapproved 1995) Moisture, Ash, and Organic Matter ^b <u>appropriately adjusted to estimate the fraction of organic carbon as stated in Nelson and Sommers (1982)</u>
		USEPA Method 9060A Total Organic Content
η or θ _T (total soil porosity)	Surface or Subsurface (calculated)	Equation S24 in Appendix C, Table A for SSL Model, or Equation R23 in Appendix C, Table C for RBCA Model
θ _a or θ _{as} (air-filled soil porosity)	Surface or Subsurface (calculated)	Equation S21 in Appendix C, Table A for SSL Model, or Equation R21 in Appendix C, Table C for RBCA Model
θ _w or θ _{ws} (water-filled soil porosity)	Surface or Subsurface (calculated)	Equation S20 in Appendix C, Table A for SSL Model, or Equation R22 in Appendix C, Table C for RBCA Model
K (hydraulic conductivity)	Surface or Subsurface	ASTM - D 5084-90 Flexible Wall Permeameter
		Pump Test
		Slug Test
i (hydraulic gradient)	Surface or Subsurface	Field Measurement

^a This is the location where the sample is collected

^b As incorporated by reference in Section 742.120.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table G Error Function (erf)

$$\operatorname{erf}(\beta) = \frac{2}{\sqrt{\pi}} \int_0^{\beta} e^{-\varepsilon^2} d\varepsilon$$

β	$\operatorname{erf}(\beta)$
0	0
0.05	0.056372
0.1	0.112463
0.15	0.167996
0.2	0.222703
0.25	0.276326
0.3	0.328627
0.35	0.379382
0.4	0.428392
0.45	0.475482
0.5	0.520500
0.55	0.563323
0.6	0.603856
0.65	0.642029
0.7	0.677801
0.75	0.711156
0.8	0.742101
0.85	0.770668
0.9	0.796908
0.95	0.820891
1.0	0.842701
1.1	0.880205
1.2	0.910314
1.3	0.934008
1.4	0.952285

1.5	0.966105
1.6	0.976348
1.7	0.983790
1.8	0.989091
1.9	0.992790
2.0	0.995322
2.1	0.997021
2.2	0.998137
2.3	0.998857
2.4	0.999311
2.5	0.999593
2.6	0.999764
2.7	0.999866
2.8	0.999925
2.9	0.999959
3.0	0.999978

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.Table H Q/C Values by Source Area

Source (Acres)	Area Q/C Value (g/m ² -s per kg/m ³)
0.5	97.78
1	85.81
2	76.08
5	65.75
10	59.16
30	50.60

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C TABLE I: K_{oc} Values for Ionizing Organics as a Function of pH (cm^3/g or L/kg or $\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$)

pH	Benzoic Acid	2-Chloro-phenol	2,4-Dichloro-phenol	Pentachloro-phenol	2,4,5-Trichloro-phenol	2,4,6-Trichloro-phenol	Dinoseb	<u>2,4,5-TP</u> <u>2,3,5-TP</u> (Silvex)
4.5	1.07E+01	3.98E+02	1.59E+02	1.34E+04	2.37E+03	1.06E+03	3.00E+04	1.28E+04
4.6	9.16E+00	3.98E+02	1.59E+02	1.24E+04	2.37E+03	1.05E+03	2.71E+04	1.13E+04
4.7	7.79E+00	3.98E+02	1.59E+02	1.13E+04	2.37E+03	1.05E+03	2.41E+04	1.01E+04
4.8	6.58E+00	3.98E+02	1.59E+02	1.02E+04	2.37E+03	1.05E+03	2.12E+04	9.16E+03
4.9	5.54E+00	3.98E+02	1.59E+02	9.05E+03	2.37E+03	1.04E+03	1.85E+04	8.40E+03
5.0	<u>4.62E+00</u> 4.64E+00	3.98E+02	1.59E+02	7.96E+03	2.36E+03	1.03E+03	1.59E+04	7.76E+03
5.1	<u>3.86E+00</u> 3.88E+00	3.98E+02	1.59E+02	6.93E+03	2.36E+03	1.02E+03	1.36E+04	7.30E+03
5.2	<u>3.23E+00</u> 3.25E+00	3.98E+02	1.59E+02	5.97E+03	2.35E+03	1.01E+03	1.15E+04	6.91E+03
5.3	<u>2.70E+00</u> 2.72E+00	3.98E+02	1.59E+02	5.10E+03	2.34E+03	9.99E+02	9.66E+03	6.60E+03
5.4	<u>2.27E+00</u> 2.29E+00	3.98E+02	1.58E+02	4.32E+03	2.33E+03	9.82E+02	8.10E+03	6.36E+03
5.5	<u>1.92E+00</u> 1.94E+00	3.97E+02	1.58E+02	3.65E+03	2.32E+03	9.62E+02	6.77E+03	6.16E+03
5.6	<u>1.63E+00</u> 1.65E+00	3.97E+02	1.58E+02	3.07E+03	2.31E+03	9.38E+02	5.65E+03	6.00E+03
5.7	<u>1.40E+00</u> 1.42E+00	3.97E+02	1.58E+02	2.58E+03	2.29E+03	9.10E+02	4.73E+03	5.88E+03

5.8	<u>1.22E+00</u> 1.24E+00	3.97E+02	1.58E+02	2.18E+03	2.27E+03	8.77E+02	3.97E+03	5.78E+03
5.9	<u>1.07E+00</u> 1.09E+00	3.97E+02	1.57E+02	1.84E+03	2.24E+03	8.39E+02	3.35E+03	5.70E+03
6.0	<u>9.50E-01</u> 9.69E-01	3.96E+02	1.57E+02	1.56E+03	2.21E+03	7.96E+02	2.84E+03	5.64E+03
6.1	<u>8.54E-01</u> 8.75E-01	3.96E+02	1.57E+02	1.33E+03	2.17E+03	7.48E+02	2.43E+03	5.59E+03
6.2	<u>7.78E-01</u> 7.99E-01	3.96E+02	1.56E+02	1.15E+03	2.12E+03	6.97E+02	2.10E+03	5.55E+03
6.3	<u>7.19E-01</u> 7.36E-01	3.95E+02	1.55E+02	9.98E+02	2.06E+03	6.44E+02	1.83E+03	5.52E+03
6.4	<u>6.69E-01</u> 6.89E-01	3.94E+02	1.54E+02	8.77E+02	1.99E+03	5.89E+02	1.62E+03	5.50E+03
6.5	<u>6.31E-01</u> 6.51E-01	3.93E+02	1.53E+02	7.81E+02	1.91E+03	5.33E+02	1.45E+03	5.48E+03
6.6	<u>6.00E-01</u> 6.20E-01	3.92E+02	1.52E+02	7.03E+02	1.82E+03	4.80E+02	1.32E+03	5.46E+03
6.7	<u>5.74E-01</u> 5.95E-01	3.90E+02	1.50E+02	6.40E+02	1.71E+03	4.29E+02	1.21E+03	5.45E+03
6.8	<u>5.55E-01</u> 5.76E-01	3.88E+02	1.47E+02	5.92E+02	1.60E+03	3.81E+02	1.12E+03	5.44E+03
6.9	<u>5.39E-01</u> 5.60E-01	3.86E+02	1.45E+02	5.52E+02	1.47E+03	3.38E+02	1.05E+03	5.43E+03

7.0	<u>5.28E-01</u> 5.47E-01	3.83E+02	1.41E+02	5.21E+02	1.34E+03	3.00E+02	9.96E+02	5.43E+03
7.1	<u>5.18E-01</u> 5.38E-01	3.79E+02	1.38E+02	4.96E+02	1.21E+03	2.67E+02	9.52E+02	5.42E+03
7.2	<u>5.10E-01</u> 5.32E-01	3.75E+02	1.33E+02	4.76E+02	1.07E+03	2.39E+02	9.18E+02	5.42E+03
7.3	<u>5.04E-01</u> 5.25E-01	3.69E+02	1.28E+02	4.61E+02	9.43E+02	2.15E+02	8.90E+02	5.42E+03
7.4	<u>4.99E-01</u> 5.19E-01	3.62E+02	1.21E+02	4.47E+02	8.19E+02	1.95E+02	8.68E+02	5.41E+03
7.5	<u>4.95E-01</u> 5.16E-01	3.54E+02	1.14E+02	4.37E+02	7.03E+02	1.78E+02	8.50E+02	5.41E+03
7.6	<u>4.92E-01</u> 5.13E-01	3.44E+02	1.07E+02	4.29E+02	5.99E+02	1.64E+02	8.36E+02	5.41E+03
7.7	<u>4.86E-01</u> 5.09E-01	3.33E+02	9.84E+01	4.23E+02	5.07E+02	1.53E+02	8.25E+02	5.41E+03
7.8	<u>4.86E-01</u> 5.06E-01	3.19E+02	8.97E+01	4.18E+02	4.26E+02	1.44E+02	8.17E+02	5.41E+03
7.9	<u>4.85E-01</u> 5.06E-01	3.04E+02	8.07E+01	4.14E+02	3.57E+02	1.37E+02	8.10E+02	5.41E+03
8.0	<u>4.85E-01</u> 5.06E-01	2.86E+02	7.17E+01	4.10E+02	2.98E+02	1.31E+02	8.04E+02	5.41E+03
8.1	<u>4.84E-01</u>	<u>2.67E+02</u>	<u>6.30E+01</u>	<u>4.09E+02</u>	<u>2.49E+02</u>	<u>1.26E+02</u>	<u>8.00E+02</u>	<u>5.40E+03</u>
8.2	<u>4.84E-01</u>	<u>2.46E+02</u>	<u>5.47E+01</u>	<u>4.07E+02</u>	<u>2.08E+02</u>	<u>1.22E+02</u>	<u>7.97E+02</u>	<u>5.40E+03</u>
8.3	<u>4.83E-01</u>	<u>2.24E+02</u>	<u>4.40E+01</u>	<u>4.05E+02</u>	<u>1.75E+02</u>	<u>1.19E+02</u>	<u>7.93E+02</u>	<u>5.40E+03</u>

8.4	<u>4.83E-01</u>	<u>2.02E+02</u>	<u>4.00E+01</u>	<u>4.04E+02</u>	<u>1.48E+02</u>	<u>1.17E+02</u>	<u>7.91E+02</u>	<u>5.40E+03</u>
8.5	<u>4.82E-01</u>	<u>1.80E+02</u>	<u>3.38E+01</u>	<u>4.03E+02</u>	<u>1.25E+02</u>	<u>1.15E+02</u>	<u>7.89E+02</u>	<u>5.40E+03</u>
8.6	<u>4.82E-01</u>	<u>1.58E+02</u>	<u>2.84E+01</u>	<u>4.02E+02</u>	<u>1.08E+02</u>	<u>1.13E+02</u>	<u>7.88E+02</u>	<u>5.40E+03</u>
8.7	<u>4.82E-01</u>	<u>1.37E+02</u>	<u>2.38E+01</u>	<u>4.02E+02</u>	<u>9.31E+02</u>	<u>1.12E+02</u>	<u>7.87E+02</u>	<u>5.40E+03</u>
8.8	<u>4.81E-01</u>	<u>1.18E+02</u>	<u>1.99E+01</u>	<u>4.01E+02</u>	<u>8.16E+02</u>	<u>1.11E+02</u>	<u>7.86E+02</u>	<u>5.40E+03</u>
8.9	<u>4.81E-01</u>	<u>1.00E+02</u>	<u>1.66E+01</u>	<u>4.01E+02</u>	<u>7.23E+01</u>	<u>1.10E+02</u>	<u>7.85E+02</u>	<u>5.40E+03</u>
9.0	<u>4.80E-01</u>	<u>8.47E+01</u>	<u>1.39E+01</u>	<u>4.00E+02</u>	<u>6.48E+01</u>	<u>1.09E+02</u>	<u>7.85E+02</u>	<u>5.40E+03</u>

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and Illustrations

Section 742.TABLE J Values to be Substituted for k_d or k_s when Evaluating Inorganics as a Function of pH (cm^3/g or L/kg or $\text{cm}^3_{\text{water}}/\text{g}_{\text{soil}}$)

pH	As	Ba	Be	Cd	Cr (+3)	Cr (+6)	Hg	Ni	Ag	Se	Tl	Zn	Pb
4.9	2.5E+01	1.1E+01	2.3E+01	1.5E+01	1.2E+03	3.1E+01	4.0E-02	1.6E+01	1.0E-01	1.8E+01	4.4E+01	1.6E+01	1.5E+01
5.0	2.5E+01	1.2E+01	2.6E+01	1.7E+01	1.9E+03	3.1E+01	6.0E-02	1.8E+01	1.3E-01	1.7E+01	4.5E+01	1.8E+01	<u>1.5E+01</u>
5.1	2.5E+01	1.4E+01	2.8E+01	1.9E+01	3.0E+03	3.0E+01	9.0E-02	2.0E+01	1.6E-01	1.6E+01	4.6E+01	1.9E+01	<u>1.5E+01</u>
5.2	2.6E+01	1.5E+01	3.1E+01	2.1E+01	4.9E+03	2.9E+01	1.4E-01	2.2E+01	2.1E-01	1.5E+01	4.7E+01	2.1E+01	<u>1.5E+01</u>
5.3	2.6E+01	1.7E+01	3.5E+01	2.3E+01	8.1E+03	2.8E+01	2.0E-01	2.4E+01	2.6E-01	1.4E+01	4.8E+01	2.3E+01	<u>1.5E+01</u>
5.4	2.6E+01	1.9E+01	3.8E+01	2.5E+01	1.3E+04	2.7E+01	3.0E-01	2.6E+01	3.3E-01	1.3E+01	5.0E+01	2.5E+01	<u>1.5E+01</u>
5.5	2.6E+01	2.1E+01	4.2E+01	2.7E+01	2.1E+04	2.7E+01	4.6E-01	2.8E+01	4.2E-01	1.2E+01	5.1E+01	2.6E+01	<u>1.5E+01</u>
5.6	2.6E+01	2.2E+01	4.7E+01	2.9E+01	3.5E+04	2.6E+01	6.9E-01	3.0E+01	5.3E-01	1.1E+01	5.2E+01	2.8E+01	<u>1.5E+01</u>
5.7	2.7E+01	2.4E+01	5.3E+01	3.1E+01	5.5E+04	2.5E+01	1.0E-00	3.2E+01	6.7E-01	1.1E+01	5.4E+01	3.0E+01	<u>1.5E+01</u>
5.8	2.7E+01	2.6E+01	6.0E+01	3.3E+01	8.7E+04	2.5E+01	1.6E-00	3.4E+01	8.4E-01	9.8E+00	5.5E+01	3.2E+01	<u>1.5E+01</u>
5.9	2.7E+01	2.8E+01	6.9E+01	3.5E+01	1.3E+05	2.4E+01	2.3E-00	3.6E+01	1.1E+00	9.2E+00	5.6E+01	3.4E+01	<u>1.5E+01</u>
6.0	2.7E+01	3.0E+01	8.2E+01	3.7E+01	2.0E+05	2.3E+01	3.5E-00	3.8E+01	1.3E+00	8.6E+00	5.8E+01	3.6E+01	<u>1.5E+01</u>
6.1	2.7E+01	3.1E+01	9.9E+01	4.0E+01	3.0E+05	2.3E+01	5.1E-00	4.0E+01	1.7E+00	8.0E+00	5.9E+01	3.9E+01	<u>1.5E+01</u>
6.2	2.8E+01	3.3E+01	1.2E+02	4.2E+01	4.2E+05	2.2E+01	7.5E-00	4.2E+01	2.1E+00	7.5E+00	6.1E+01	4.2E+01	<u>1.5E+01</u>
6.3	2.8E+01	3.5E+01	1.6E+02	4.4E+01	5.8E+05	2.2E+01	1.1E+01	4.5E+01	2.7E+00	7.0E+00	6.2E+01	4.4E+01	<u>1.5E+01</u>
6.4	2.8E+01	3.6E+01	2.1E+02	4.8E+01	7.7E+05	2.1E+01	1.6E+01	4.7E+01	3.4E+00	6.5E+00	6.4E+01	4.7E+01	<u>7.1E+02</u>
6.5	2.8E+01	3.7E+01	2.8E+02	5.2E+01	9.9E+05	2.0E+01	2.2E+01	5.0E+01	4.2E+00	6.1E+00	6.6E+01	5.1E+01	<u>7.1E+02</u>
6.6	2.8E+01	3.9E+01	3.9E+02	5.7E+01	1.2E+06	2.0E+01	3.0E+01	5.4E+01	5.3E+00	5.7E+00	6.7E+01	5.4E+01	<u>7.1E+02</u>
6.7	2.9E+01	4.0E+01	5.5E+02	6.4E+01	1.5E+06	1.9E+01	4.0E+01	5.8E+01	6.6E+00	5.3E+00	6.9E+01	5.8E+01	<u>7.1E+02</u>

pH	As	Ba	Be	Cd	Cr (+3)	Cr (+6)	Hg	Ni	Ag	Se	Tl	Zn	Pb
6.8	2.9E+01	4.1E+01	7.9E+02	7.5E+01	1.8E+06	1.9E+01	5.2E+01	6.5E+01	8.3E+00	5.0E+00	7.1E+01	6.2E+01	7.1E+02
6.9	2.9E+01	4.2E+01	1.1E+03	9.1E+01	2.1E+06	1.8E+01	6.6E+01	7.4E+01	1.0E+01	4.7E+00	7.3E+01	6.8E+01	7.1E+02
7.0	2.9E+01	4.2E+01	1.7E+03	1.1E+02	2.5E+06	1.8E+01	8.2E+01	8.8E+01	1.3E+01	4.3E+00	7.4E+01	7.5E+01	7.1E+02
7.1	2.9E+01	4.3E+01	2.5E+03	1.5E+02	2.8E+06	1.7E+01	9.9E+01	1.1E+02	1.6E+01	4.1E+00	7.6E+01	8.3E+01	7.1E+02
7.2	3.0E+01	4.4E+01	3.8E+03	2.0E+02	3.1E+06	1.7E+01	1.2E+02	1.4E+02	2.0E+01	3.8E+00	7.8E+01	9.5E+01	7.1E+02
7.3	3.0E+01	4.4E+01	5.7E+03	2.8E+02	3.4E+06	1.6E+01	1.3E+02	1.8E+02	2.5E+01	3.5E+00	8.0E+01	1.1E+02	7.1E+02
7.4	3.0E+01	4.5E+01	8.6E+03	4.0E+02	3.7E+06	1.6E+01	1.5E+02	2.5E+02	3.1E+01	3.3E+00	8.2E+01	1.3E+02	7.1E+02
7.5	3.0E+01	4.6E+01	1.3E+04	5.9E+02	3.9E+06	1.6E+01	1.6E+02	3.5E+02	3.9E+01	3.1E+00	8.5E+01	1.6E+02	7.1E+02
7.6	3.1E+01	4.6E+01	2.0E+04	8.7E+02	4.1E+06	1.5E+01	1.7E+02	4.9E+02	4.8E+01	2.9E+00	8.7E+01	1.9E+02	7.1E+02
7.7	3.1E+01	4.7E+01	3.0E+04	1.3E+03	4.2E+06	1.5E+01	1.8E+02	7.0E+02	5.9E+01	2.7E+00	8.9E+01	2.4E+02	7.1E+02
7.8	3.1E+01	4.9E+01	4.6E+04	1.9E+03	4.3E+06	1.4E+01	1.9E+02	9.9E+02	7.3E+01	2.5E+00	9.1E+01	3.1E+02	7.1E+02
7.9	3.1E+01	5.0E+01	6.9E+04	2.9E+03	4.3E+06	1.4E+01	1.9E+02	1.4E+03	8.9E+01	2.4E+00	9.4E+01	4.0E+02	7.1E+02
8.0	3.1E+01	5.2E+01	1.0E+05	4.3E+03	4.3E+06	1.4E+01	2.0E+02	1.9E+03	1.1E+02	2.2E+00	9.6E+01	5.3E+02	7.1E+02
8.1	3.2E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.3E+01	--- ^a	--- ^a	--- ^a	2.1E+00	1.0E+02	--- ^a	7.1E+02
8.2	3.2E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.3E+01	--- ^a	--- ^a	--- ^a	1.9E+00	1.0E+02	--- ^a	7.1E+02
8.3	3.2E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.3E+01	--- ^a	--- ^a	--- ^a	1.8E+00	1.0E+02	--- ^a	7.1E+02
8.4	3.2E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.2E+01	--- ^a	--- ^a	--- ^a	1.7E+00	1.1E+02	--- ^a	7.1E+02
8.5	3.2E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.2E+01	--- ^a	--- ^a	--- ^a	1.6E+00	1.1E+02	--- ^a	7.1E+02
8.6	3.3E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.2E+01	--- ^a	--- ^a	--- ^a	1.5E+00	1.1E+02	--- ^a	7.1E+02
8.7	3.3E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.2E+01	--- ^a	--- ^a	--- ^a	1.4E+00	1.2E+02	--- ^a	7.1E+02
8.8	3.3E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.1E+01	--- ^a	--- ^a	--- ^a	1.3E+00	1.2E+02	--- ^a	1.9E+03
8.9	3.3E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.1E+01	--- ^a	--- ^a	--- ^a	1.2E+00	1.2E+02	--- ^a	1.9E+03
9.0	3.3E+01	--- ^a	--- ^a	--- ^a	--- ^a	1.0E+01	--- ^a	--- ^a	--- ^a	1.1E+00	1.2E+02	--- ^a	1.9E+03

^a No data available for this pH.

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX C Tier 2 Illustrations and Tables and IllustrationsSection 742.TABLE K Parameter Estimates for Calculating Water-Filled Soil Porosity (θ_w)

Soil Texture ^a	Saturated Hydraulic Conductivity, K_s (m/yr)	$1/(2b+3)^b$
Sand	1,830	0.090
Loamy Sand	540	0.085
Sandy Loam	230	0.080
Silt Loam	120	0.074
Loam	60	0.073
Sandy Clay Loam	40	0.058
Silt Clay Loam	13	0.054
Clay Loam	20	0.050
Sandy Clay	10	0.042
Silt Clay	8	0.042
Clay	5	0.039

^a The appropriate texture classification is determined by a particle size analysis by ASTM D2488-93 as incorporated by reference in Section 742.210 and the U.S. Department of Agriculture Soil Textural Triangle shown in Appendix C, Illustration C.

^b Where b is the soil-specific exponential parameter (unitless)

(Source: Amended at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX D Highway Authority Agreement

HIGHWAY AUTHORITY AGREEMENT

This Agreement is entered into this _____ day of _____, 200____ pursuant to 35 Ill. Adm. Code 742.1020 by and between the (1) _____ (“Property Owner”) [*or, in the case of a petroleum leaking underground storage tank, the owner/operator of the tank (“Owner/Operator”)*] and (2) *Name of Entity in Control of the Right-of-Way* (“Highway Authority”), collectively known as the “Parties.”

[Use this paragraph for sites with petroleum leaking underground storage tank(s)]
WHEREAS, _____ is the owner or operator of one or more leaking underground storage tanks presently or formerly located at *common address or description of Site location* (“the Site”);

[Use this paragraph for sites that do not have petroleum leaking underground storage tanks] **WHEREAS,** _____ is the owner of the property located at *common address or description of Site location* (“the Site”);

WHEREAS, as a result of one or more releases of contaminants [*insert either “from the above referenced underground storage tanks” or “at the above referenced Site”*] (“the Release(s)”), soil and/or groundwater contamination at the Site exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742;

WHEREAS, the soil and/or groundwater contamination exceeding Tier 1 residential remediation objectives extends or may extend into the Highway Authority’s right-of-way;

WHEREAS, the Owner/Operator or Property Owner is conducting corrective action in response to the Release(s);

WHEREAS, the Parties desire to prevent groundwater beneath the Highway Authority’s right-of-way that exceeds Tier 1 remediation objectives from use as a supply of potable or domestic water and to limit access to soil within the right-of-way that exceeds Tier 1 residential remediation objectives so that human health and the environment are protected during and after any access;

NOW, THEREFORE, the Parties agree as follows:

1. The recitals set forth above are incorporated by reference as if fully set forth herein.
2. *[Use this paragraph if IEMA has issued an incident number]* The Illinois Emergency Management Agency has assigned incident number(s) _____ to the Release(s).

3. Attached as Exhibit A is a scaled map(s) prepared by the [Owner/Operator or Property Owner] that shows the Site and surrounding area and delineates the current and estimated future extent of soil and groundwater contamination above the applicable Tier 1 residential remediation objectives as a result of the Release(s). [Use the following sentence if either soil or groundwater is not contaminated above applicable Tier 1 residential remediation objectives: [Soil] [Groundwater] is not contaminated above the applicable Tier 1 residential remediation objectives.]
4. Attached as Exhibit B is a table(s) prepared by the [Owner/Operator or Property Owner] that lists each contaminant of concern that exceeds its Tier 1 residential remediation objective, its Tier 1 residential remediation objective and its concentrations within the zone where Tier 1 residential remediation objectives are exceeded. The locations of the concentrations listed in Exhibit B are identified on the map(s) in Exhibit A.
5. Attached as Exhibit C is a scaled map prepared by the [Owner/Operator or Property Owner] showing the area of the Highway Authority's right-of-way that is governed by this agreement ("Right-of-Way"). Because Exhibit C is not a surveyed plat, the Right-of-Way boundary may be an approximation of the actual Right-of-Way lines.
6. [Use this paragraph if samples have not been collected within the Right-of-Way, sampling within the Right-of-Way is not practical, and contamination does not extend beyond the Right-of-Way]. Because the collection of samples within the Right-of-Way is not practical, the Parties stipulate that, based on modeling, soil and groundwater contamination exceeding Tier 1 residential remediation objectives does not and will not extend beyond the boundaries of the Right-of-Way.
7. The Highway Authority stipulates it has jurisdiction over the Right-of-Way that gives it sole control over the use of the groundwater and access to the soil located within or beneath the Right-of-Way.
8. The Highway Authority agrees to prohibit within the Right-of-Way all potable and domestic uses of groundwater exceeding Tier 1 residential remediation objectives.
9. The Highway Authority further agrees to limit access by itself and others to soil within the Right-of-Way exceeding Tier 1 residential remediation objectives. Access shall be allowed only if human health (including worker safety) and the environment are protected during and after any access. The Highway Authority may construct, reconstruct, improve, repair, maintain and operate a highway upon the Right-of-Way, or allow others to do the same by permit. In addition, the Highway Authority and others using or working in the Right-of-Way under permit have the right to remove soil or groundwater from the Right-of-Way and

dispose of the same in accordance with applicable environmental laws and regulations. The Highway Authority agrees to issue all permits for work in the Right-of-Way, and make all existing permits for work in the Right-of-Way, subject to the following or a substantially similar condition:

As a condition of this permit the permittee shall request the office issuing this permit to identify sites in the Right-of-Way where a Highway Authority Agreement governs access to soil that exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742. The permittee shall take all measures necessary to protect human health (including worker safety) and the environment during and after any access to such soil.

10. This agreement shall be referenced in the Agency's no further remediation determination issued for the Release(s).
11. The Agency shall be notified of any transfer of jurisdiction over the Right-of-Way at least 30 days prior to the date the transfer takes effect. This agreement shall be null and void upon the transfer unless the transferee agrees to be bound by this agreement as if the transferee were an original party to this agreement. The transferee's agreement to be bound by the terms of this agreement shall be memorialized at the time of transfer in a writing ("Rider") that references this Highway Authority Agreement and is signed by the Highway Authority, or subsequent transferor, and the transferee.
12. This agreement shall become effective on the date the Agency issues a no further remediation determination for the Release(s). It shall remain effective until the Right-of-Way is demonstrated to be suitable for unrestricted use and the Agency issues a new no further remediation determination to reflect there is no longer a need for this agreement, or until the agreement is otherwise terminated or voided.
13. In addition to any other remedies that may be available, the Agency may bring suit to enforce the terms of this agreement or may, in its sole discretion, declare this agreement null and void if any of the Parties or any transferee violates any term of this agreement. The Parties or transferee shall be notified in writing of any such declaration.
14. This agreement shall be null and void if a court of competent jurisdiction strikes down any part or provision of the agreement.
15. This agreement supersedes any prior written or oral agreements or understandings between the Parties on the subject matter addressed herein. It may be altered, modified or amended only upon the written consent and agreement of the Parties.
16. Any notices or other correspondence regarding this agreement shall be sent to the Parties at following addresses:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62974-9276

Property Owner or Owner/Operator
[Address]

[Contact at Highway Authority]

[Address]

IN WITNESS WHEREOF, the Parties have caused this agreement to be signed by their duly authorized representatives.

[NAME OF LOCAL GOVERNMENT]

Date: _____ By: _____

Its: _____

Property Owner or Owner/Operator

Date: _____ By: _____
Title

(Source: Added at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX E Highway Authority Agreement Memorandum of Agreement

HIGHWAY AUTHORITY AGREEMENT MEMORANDUM OF AGREEMENT

This Memorandum of Agreement is entered by and between the Illinois Environmental Protection Agency (“Agency”) and *Name of Local Government* (“Highway Authority”), collectively known as the “Parties.”

[Use this paragraph for sites with petroleum leaking underground storage tank(s)]
WHEREAS, the Highway Authority is the owner or operator of one or more leaking

underground storage tanks presently or formerly located at *common address or description of Site location* (“the Site”);

[Use this paragraph for sites where the highway authority is also the property owner]
WHEREAS, the Highway Authority is the owner of the property located at *common address or description of Site location* (“the Site”);

WHEREAS, as a result of one or more releases of contaminants *[insert either “from the above referenced underground storage tanks” or “at the above referenced Site”]* (“the Release(s)”), soil and/or groundwater contamination at the Site exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742;

WHEREAS, the soil and/or groundwater contamination exceeding Tier 1 residential remediation objectives extends or may extend into the Highway Authority’s right-of-way adjacent to the Site;

WHEREAS, the Highway Authority is conducting corrective action in response to the Release(s);

WHEREAS, the Parties desire to prevent groundwater beneath the Highway Authority’s right-of-way that exceeds Tier 1 residential remediation objectives from use as a supply of potable or domestic water and to limit access to soil within the right-of-way that exceeds Tier 1 residential remediation objectives so that human health and the environment are protected during and after any access;

NOW, THEREFORE, the Parties agree as follows:

1. The recitals set forth above are incorporated by reference as if fully set forth herein.
2. [Use this paragraph if IEMA has issued an incident number] The Illinois Emergency Management Agency has assigned incident number(s) to the Release(s).
3. Attached as Exhibit A is a scaled map(s) prepared by the Highway Authority that shows the Site and surrounding area and delineates the current and estimated future extent of soil and groundwater contamination above the applicable Tier 1 residential remediation objectives as a result of the Release(s). [Use the following sentence if either soil or groundwater is not contaminated above applicable Tier 1 residential remediation objectives: [Soil] [Groundwater] is not contaminated above the applicable Tier 1 residential remediation objectives.]
4. Attached as Exhibit B is a table(s) prepared by the Highway Authority that lists each contaminant of concern that exceeds its Tier 1 residential remediation objective, its Tier 1 residential remediation objective and its concentrations within the zone where Tier 1 residential remediation objectives are exceeded. The

locations of the concentrations listed in Exhibit B are identified on the map(s) in Exhibit A.

5. Attached as Exhibit C is a scaled map prepared by the Highway Authority showing the area of the Highway Authority's right-of-way that is governed by this agreement ("Right-of-Way"). Because Exhibit C is not a surveyed plat, the Right-of-Way boundary may be an approximation of the actual Right-of-Way lines.
6. [Use this paragraph if samples have not been collected within the Right-of-Way, sampling within the Right-of-Way is not practical, and contamination does not extend beyond the Right-of-Way]. Because the collection of samples within the Right-of-Way is not practical, the Parties stipulate that, based on modeling, soil and groundwater contamination exceeding Tier 1 residential remediation objectives does not and will not extend beyond the boundaries of the Right-of-Way.
7. The Highway Authority stipulates it has jurisdiction over the Right-of-Way that gives it sole control over the use of the groundwater and access to the soil located within or beneath the Right-of-Way.
8. The Highway Authority agrees to prohibit within the Right-of-Way all potable and domestic uses of groundwater exceeding Tier 1 residential remediation objectives.
9. The Highway Authority further agrees to limit access by itself and others to soil within the Right-of-Way exceeding Tier 1 residential remediation objectives. Access shall be allowed only if human health (including worker safety) and the environment are protected during and after any access. The Highway Authority may construct, reconstruct, improve, repair, maintain and operate a highway upon the Right-of-Way, or allow others to do the same by permit. In addition, the Highway Authority and others using or working in the Right-of-Way under permit have the right to remove soil or groundwater from the Right-of-Way and dispose of the same in accordance with applicable environmental laws and regulations. The Highway Authority agrees to issue all permits for work in the Right-of-Way, and make all existing permits for work in the Right-of-Way, subject to the following or a substantially similar condition:

As a condition of this permit the permittee shall request the office issuing this permit to identify sites in the Right-of-Way where a Highway Authority Memorandum of Agreement governs access to soil that exceeds the Tier 1 residential remediation objectives of 35 Ill. Adm. Code 742. The permittee shall take all measures necessary to protect human health (including worker safety) and the environment during and after any access to such soil.

10. This agreement shall be referenced in the Agency's no further remediation determination issued for the Release(s).
11. The Agency shall be notified of any transfer of jurisdiction over the Right-of-Way at least 30 days prior to the date the transfer takes effect. This agreement shall be null and void upon the transfer unless the transferee agrees to be bound by this agreement as if the transferee were an original party to this agreement. The transferee's agreement to be bound by the terms of this agreement shall be memorialized at the time of transfer in a writing ("Rider") that references this Highway Authority Memorandum of Agreement and is signed by the Highway Authority, or subsequent transferor, and the transferee.
12. This agreement shall become effective on the date the Agency issues a no further remediation determination for the Release(s). It shall remain effective until the Right-of-Way is demonstrated to be suitable for unrestricted use and the Agency issues a new no further remediation determination to reflect there is no longer a need for this agreement, or until the agreement is otherwise terminated or voided.
13. In addition to any other remedies that may be available, the Agency may bring suit to enforce the terms of this agreement or may, in its sole discretion, declare this agreement null and void if the Highway Authority or a transferee violates any term of this agreement. The Highway Authority or transferee shall be notified in writing of any such declaration.
14. This agreement shall be null and void if a court of competent jurisdiction strikes down any part or provision of the agreement.
15. This agreement supersedes any prior written or oral agreements or understandings between the Parties on the subject matter addressed herein. It may be altered, modified or amended only upon the written consent and agreement of the Parties.
16. Any notices or other correspondence regarding this agreement shall be sent to the Parties at following addresses:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62974-9276

[Contact at Highway Authority]

[Address]

IN WITNESS WHEREOF, the Parties have caused this agreement to be signed by their duly authorized representatives.

[NAME OF LOCAL GOVERNMENT]

Date: _____ By: _____

Its: _____

ILLINOIS ENVIRONMENTAL PROTECTION
AGENCY

Date: _____ By: _____

Director

(Source: Added at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX F: Environmental Land Use Control

PREPARED BY:

Name: _____

Address: _____

RETURN TO:

Name: _____

Address: _____

THE ABOVE SPACE FOR RECORDER'S OFFICE

Model Environmental Land Use Control

THIS ENVIRONMENTAL LAND USE CONTROL ("ELUC"), is made this _____
day of _____, 20____, by _____, ("Property Owner") of the real

property _____ located _____ at _____ the _____ common
address _____ (“Property”).

WHEREAS, 415 ILCS 5/58.17 and 35 Ill. Adm. Code 742 provide for the use of an ELUC as an institutional control in order to impose land use limitations or requirements related to environmental contamination so that persons conducting remediation can obtain a No Further Remediation determination from the Illinois Environmental Protection Agency (“IEPA”). The reason for an ELUC is to ensure protection of human health and the environment. The limitations and requirements contained herein are necessary in order to protect against exposure to contaminated soil or groundwater, or both, that may be present on the property as a result of [VARIABLE] activities. Under 35 Ill. Adm. Code 742, the use of risk-based, site-specific remediation objectives may require the use of an ELUC on real property, and the ELUC may apply to certain physical features (e.g., engineered barriers, monitoring wells, caps, etc.).

WHEREAS, _____ [the party performing remediation] intends to request risk-based, site specific soil and groundwater remediation objectives from IEPA under 35 Ill. Adm. Code 742 to obtain risk-based closure of the site, identified by Bureau of Land [10-digit LPC or Identification number] _____, utilizing an ELUC.

NOW, THEREFORE, the recitals set forth above are incorporated by reference as if fully set forth herein, and the Property Owner agrees as follows:

Date: _____ By: _____
Director

Section One. Property Owner does hereby establish an ELUC on the real estate, situated in the County of _____, State of Illinois and further described in Exhibit A attached hereto and incorporated herein by reference (the “Property”).

Attached as Exhibit B are site maps that show the legal boundary of the Property, any physical features to which the ELUC applies, the horizontal and vertical extent of the contaminants of concern above the applicable remediation objectives for soil or groundwater or both, and the nature, location of the source, and direction of movement of the contaminants of concern, as required under 35 Ill. Adm. Code 742.

Section Two. Property Owner represents and warrants **he/she** is the current owner of the Property and has the authority to record this ELUC on the chain of title for the Property with the Office of the Recorder or Registrar of Titles in _____ County, Illinois.

Section Three. The Property Owner hereby agrees, for **himself/herself**, and **his/her** heirs, grantees, successors, assigns, transferees and any other owner, occupant, lessee, possessor or user of the Property or the holder of any portion thereof or interest therein, that **[INSERT RESTRICTION (e.g. the groundwater under the Property shall not be used as a potable supply of water, and any contaminated groundwater or soil that is removed, excavated, or disturbed from the Property described in Exhibit A herein must be handled in accordance with all applicable laws and regulations)]**.

Section Four. This ELUC is binding on the Property Owner, his/her heirs, grantees, successors, assigns, transferees and any other owner, occupant, lessee, possessor or user of the Property or the holder of any portion thereof or interest therein. This ELUC shall apply in perpetuity against the Property and shall not be released until the IEPA determines there is no longer a need for this ELUC as an institutional control; until the IEPA, upon written request, issues to the site that received the no further remediation determination a new no further remediation determination approving modification or removal of the limitation(s) or requirement(s); the new no further remediation determination is filed on the chain of title of the site subject to the no further remediation determination; and until a release or modification of the land use limitation or requirement is filed on the chain of title for the Property.

Section Five. Information regarding the remediation performed on the Property may be obtained from the IEPA through a request under the Freedom of Information Act (5 ILCS 140) and rules promulgated thereunder by providing the IEPA with the [10-digit LPC or identification number] listed above.

Section Six. The effective date of this ELUC shall be the date that it is officially recorded in the chain of title for the Property to which the ELUC applies.

WITNESS the following signatures:

Property Owner(s)

By: _____

Its: _____

Date: _____

STATE OF ILLINOIS _____)
_____) SS:
COUNTY OF _____)

I, _____ the undersigned, a Notary Public for said County and State, DO HEREBY CERTIFY, that _____ and _____, personally known to me to be the Property Owner(s) of _____, and personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that in said capacities they signed and delivered the said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal, this _____ day of _____, 20__.

PIN NO. XX-XX-XXX-XXX-XXXX
(Parcel Index Number)

Exhibit A

The subject property is located in the City of _____, _____ County, State of Illinois, commonly known as _____, _____, Illinois and more particularly described as:

LIST THE COMMON ADDRESS;

LEGAL DESCRIPTION; AND

REAL ESTATE TAX INDEX OR PARCEL #

(PURSUANT TO SECTION 742. 1010(D)(2))

PIN NO. XX-XX-XXX-XXX-XXXX

Exhibit B

IN ACCORDANCE WITH SECTION 742.1010(D)(8)(A)-(D), PROVIDE ALL THE FOLLOWING ELEMENTS. ATTACH SEPARATE SHEETS, LABELED AS EXHIBIT B, WHERE NECESSARY.

- (A) A scaled map showing the legal boundary of the property to which the ELUC applies.
- (B) Scaled maps showing the horizontal and vertical extent of contaminants of concern above the applicable remediation objectives for soil and groundwater to which the ELUC applies.
- (C) Scaled maps showing the physical features to which an ELUC applies (e.g., engineered barriers, monitoring wells, caps, etc.).
- (D) Scaled maps showing the nature, location of the source, and direction of movement of the contaminants of concern.

(Source: Added at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX G Model Ordinance

ORDINANCE NUMBER _____

AN ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY BY THE INSTALLATION OR USE OF POTABLE WATER SUPPLY WELLS OR BY ANY OTHER METHOD

WHEREAS, certain properties in the City [Village] of _____, Illinois have been used over a period of time for commercial/industrial purposes; and

WHEREAS, because of said use, concentrations of certain chemical constituents in the groundwater beneath the City [Village] may exceed Class I groundwater quality standards for potable resource groundwater as set forth in 35 Illinois Administrative Code 620 or Tier 1 remediation objectives as set forth in 35 Illinois Administrative Code 742; and

WHEREAS, the City [Village] of _____ desires to limit potential threats to human health from groundwater contamination while facilitating the redevelopment and productive use of properties that are the source of said chemical constituents;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY [VILLAGE] OF _____, ILLINOIS:

Section One. Use of groundwater as a potable water supply prohibited.

[Except for such uses or methods in existence before the effective date of this ordinance,] The use or attempt to use as a potable water supply groundwater from within the corporate limits of the City [Village] of _____, as a potable water supply, by the installation or drilling of wells or by any other method is hereby prohibited. This prohibition [expressly includes] [does not include] the City [Village] of _____.

Section Two. Penalties.

Any person violating the provisions of this ordinance shall be subject to a fine of up to _____ for each violation.

Section Three. Definitions.

“Person” is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any other legal entity, or their legal representatives, agents or assigns.

“Potable water” is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods.

Section Four. Memorandum of Understanding.

[This Section is only necessary if ordinance does not expressly prohibit installation of potable water supply wells by the city or village--could be separate resolution]

The Mayor of the City [Village] of _____ is hereby authorized and directed to enter into a Memorandum of Understanding with the Illinois Environmental Protection Agency (“Illinois EPA”) in which the City [Village] of _____ assumes responsibility for tracking all sites that have received no further remediation determinations from the Illinois EPA, notifying the Illinois EPA of changes to this ordinance, and taking certain precautions when siting public potable water supply wells.

Section Five. Repealer.

All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section Six. Severability.

If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not affect the validity of the ordinance as a whole or of any portion not adjudged invalid.

Section Seven. Effective date.

This ordinance shall be in full force and effect from and after its passage, approval and publication as required by law.

ADOPTED: _____
(Date)

APPROVED: _____
(Date)

(City Clerk)

(Mayor)

Officially published this _____ day of _____, 20__.

(Source: Added at 30 Ill. Reg. _____, effective _____)

Section 742.APPENDIX H Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING BETWEEN _____
AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY REGARDING THE
USE OF A LOCAL GROUNDWATER OR WATER WELL ORDINANCE AS AN
ENVIRONMENTAL INSTITUTIONAL CONTROL

I. PURPOSE AND INTENT

A. This Memorandum of Understanding (“MOU”) between _____ and the Illinois Environmental Protection Agency (“Illinois EPA”) is entered into for the purpose of satisfying the requirements of 35 Ill. Adm. Code 742.1015 for the use of groundwater or water well ordinances as environmental institutional controls. The Illinois EPA has reviewed the groundwater or water well ordinance of _____ (Attachment A) and determined that the ordinance prohibits the use of groundwater for potable purposes and/or the installation and use of new potable water supply wells by private entities but does not expressly prohibit those activities by the unit of local government itself. In such cases, 35 Ill. Adm. Code 742.1015(a) provides that the unit of local government may enter into an MOU with the Illinois EPA to allow the use of the ordinance as an institutional control.

- B. The intent of this Memorandum of Understanding is to specify the responsibilities that must be assumed by the unit of local government to satisfy the requirements for MOUs as set forth at 35 Ill. Adm. Code 742.1015(i).

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

In order to ensure the long-term integrity of the groundwater or water well ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the groundwater or water well ordinance is effectively managed, _____ hereby assumes the following responsibilities pursuant to 35 Ill. Adm. Code 742.1015(d)(2) and (i):

- A. _____ will notify the Illinois EPA Bureau of Land of any proposed ordinance changes or requests for variance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request (35 Ill. Adm. Code 742.1015(i)(4));
- B. _____ will maintain a registry of all sites within its corporate limits that have received “No Further Remediation” determinations in reliance on the ordinance from the Illinois EPA (35 Ill. Adm. Code 742.1015(i)(5));
- C. _____ will review the registry of sites established under paragraph II. B. prior to siting public potable water supply wells within the area covered by the ordinance (35 Ill. Adm. Code 742.1015(i)(6)(A));
- D. _____ will determine whether the potential source of potable water has been or may be affected by contamination left in place at the sites tracked and reviewed under paragraphs II. B. and C. (35 Ill. Adm. Code 742.1015(i)(6)(B)); and
- E. _____ will take action as necessary to ensure that the potential source of potable water is protected from contamination or treated before it is used as a potable water supply (35 Ill. Adm. Code 742.1015(i)(6)(C)).

NOTE: Notification under paragraph II. A. above or other communications concerning this MOU should be directed to:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

III. SUPPORTING DOCUMENTATION

The following documentation is required by 35 Ill. Adm. Code 742.1015(i) and is attached to this MOU:

- A. Attachment A: A copy of the groundwater or water well ordinance certified by the city clerk or other official as the current, controlling law (35 Ill. Adm. Code 742.1015(i)(3));
- B. Attachment B: Identification of the legal boundaries within which the ordinance is applicable (certification by city clerk or other official that the ordinance is applicable everywhere within the corporate limits; if ordinance is not applicable throughout the entire city or village, legal description and map of area showing sufficient detail to determine where ordinance is applicable) (35 Ill. Adm. Code 742.1015(i)(2));
- C. Attachment C: A statement of the authority of the unit of local government to enter into the MOU (council resolution, code of ordinances, inherent powers of mayor or other official signing MOU -- attach copies) (35 Ill. Adm. Code 742.1015(i)(1)).

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: _____
(Name of city or village)

BY: _____ DATE: _____
(Name and title of signatory)

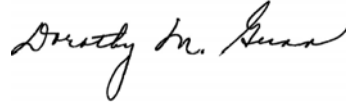
FOR: Illinois Environmental Protection Agency

BY: _____ DATE: _____
Manager, Division of Remediation Management
Bureau of Land

(Source: Added at 30 Ill. Reg. _____, effective _____)

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on December 7, 2006, by a vote of 4-0.

A handwritten signature in cursive script that reads "Dorothy M. Gunn".

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board