

ILLINOIS POLLUTION CONTROL BOARD
July 26, 2001

IN THE MATTER OF:)
)
PROPOSED AMENDMENTS TO TIERED) R00-19(B)
APPROACH TO CORRECTIVE ACTION) (Rulemaking – Land)
OBJECTIVES (TACO): 35 ILL. ADM.)
CODE 742)

Adopted Rule. Final Order.

OPINION AND ORDER OF THE BOARD (by E.Z. Kezelis, N.J. Melas, R.C. Flemal):

By today's order, the Board adopts amendments to the Tiered Approach to Corrective Action Objectives (TACO) found at Part 742 of the Board's land regulations (35 Ill. Adm. Code 742). The TACO rules were originally adopted by the Board on June 5, 1997, Tiered Approach to Corrective Action Objectives (TACO): 35 Ill. Adm. Code 742, R97-12(A). Part 742 contains procedures for developing remediation objectives based on risks to human health and the environment posed by environmental conditions at sites undergoing remediation in the Site Remediation Program, the Leaking Underground Storage Tank Program, and pursuant to Resource Conservation and Recovery Act (RCRA) Part B permits and closures.¹

PROCEDURAL HISTORY

Background

On May 15, 2000, the Agency submitted proposed amendments to the TACO regulations. The Board's adoption of these amendments is authorized by Sections 27 and 28 of the Environmental Protection Act (Act) (415 ILCS 5/27, 28 (1998)).

The Board moved the Agency's proposal to first notice on July 27, 2000. In doing so, the Board divided the proposal into two subdockets based upon subject matter. The Subdocket A amendments, which were adopted by the Board on December 21, 2000 (Proposed Amendments to Tiered Approach to Corrective Action Objectives (TACO): 35 Ill. Adm. Code 742, R00-19(A)), created a new institutional control, known as the Environmental Land Use Control or

¹ The TACO regulations provide for a three-tiered approach to cleanup objectives. Under a Tier 1 analysis, an applicant compares levels of contaminants of concern at the remediation site to pre-determined remediation objectives. See Tiered Approach to Corrective Action Objectives (TACO): 35 Ill. Adm. Code 742 (June 5, 1997), R97-12(A). For a Tier 2 analysis, an applicant uses site-specific information and equations set forth in the rules to develop alternative remediation objectives for contaminants of concern. *Id.* Finally, a Tier 3 analysis provides greater flexibility by allowing an applicant to develop site-specific remediation objectives using alternative parameters not found in Tier 1 or Tier 2. *Id.*

“ELUC,” and changed the acceptable background levels for arsenic found in Part 742, Appendix A, Table G.

The Subdocket B amendments, which are adopted herein, were moved to second notice by the Board on June 7, 2001. These amendments address several aspects of TACO that, with the benefit of time and practical experience, were in need of clarification and correction. Many of these amendments were made with the input and agreement of the regulated community.

The amendments that are adopted today have, with two notable exceptions, changed very little from those that were originally proposed by the Board at first notice. The first exception involves Appendix A, Table G, which was incorporated into Subdocket A, and was adopted by the Board on December 21, 2000. The second exception involves the proposed cleanup standards for methyl tertiary-butyl ether (MTBE), which were originally proposed in Appendix A, Table A; Appendix B, Table A; Appendix B, Table B; Appendix B, Table E; Appendix B, Table F; and Appendix C, Table E. The Board is not moving forward with the MTBE amendments in this docket.

The Board has opened a separate Subdocket C for the purpose of addressing the proposed MTBE amendments. See Proposed Amendments to Tiered Approach to Corrective Action Objectives (TACO): 35 Ill. Adm. Code 742 (June 7, 2001), R00-19(C). By creating a separate subdocket for MTBE, the Board intends to provide a concurrent examination of all MTBE-related issues that are currently pending in this and other rulemaking proposals.

SUMMARY OF SUBDOCKET B AMENDEMENTS

As mentioned, there have been only a few minor changes to the rule from that proposed by the Board in its first-notice opinion and order. Furthermore, additional explanation for certain amendments can be found in the Board’s second-notice opinion and order which was adopted on June 7, 2001. See Proposed Amendments to Tiered Approach to Corrective Action Objectives (TACO): 35 Ill. Adm. Code 742 (June 7, 2001), R00-19(B). For purposes of this final opinion and order, however, only those areas generating public interest or concern will be mentioned again.

Section 742.225 Demonstration of Compliance with Remediation Objectives

The proposed change to Section 742.225 involved the addition of a new subsection (f), which clarifies that “soil sample concentrations determined by laboratory tests for the purposes of comparison to corrective action objectives should be normalized for moisture content by calculating and reporting the soil concentration of contaminants on a dry soil weight basis.” Agency Exh. 1 (O’Brien) at 2. According to the Agency, this amendment is intended to address the potential variation in analyzing soil samples that are based on a saturated weight. *Id.* Soil samples taken from the same location may vary from day to day depending on the moisture content of the soil at the particular time the sample is collected, thereby making the saturated weight results less reliable. *Id.* Additionally, the proposed dry weight measurement is consistent with the analytical methods directed by the United States Environmental Protection Agency. *Id.*

The Agency proposed this amendment because it will result in greater consistency and accuracy in sampling results. *Id.*

This amendment raised some concern both during hearing and in public comment. Specifically, the Illinois Steel Group (ISG) urged the Board to reconsider adoption of this proposed amendment.

While the Board appreciates ISG's comments, the Board finds that the proposed amendment will help ensure consistency in sampling procedures and in sampling results and will not unduly prejudice the regulated community.

Potential Conflict with Other Proposed Amendments

Concerns were raised at hearing and in public comments regarding the potential conflict between the TACO amendments and related portions of Title 35. At the time these comments were made, the Board was awaiting the Agency's proposed amendments to Part 732 (Petroleum Underground Storage Tank Program) and Part 740 (Site Remediation Program) of Title 35.

After close of the public comment period and prior to the Board adopting its second-notice opinion and order, the proposed amendments to Part 732 and Part 740 were filed. Except for concerns regarding the proposed regulation of MTBE, the Board is confident that adoption of the TACO amendments will not create a conflict with the Part 732 or Part 740 regulations.

Applicability of Adopted Amendments to Ongoing Remedial Activities

An important concern was also raised by ISG at hearing and in public comment. Specifically, ISG is concerned about the applicability of these amendments to ongoing remedial projects. PC 2 at 3.

Agreeing that this was an important concern, the Board clarified the applicability of these amendments in its second notice opinion and order. Specifically, the Board recognizes that the TACO standards are not self-implementing, but are implemented through a variety of cleanup programs, including Site Remediation Program (SRP), Leaking Underground Storage Tank (LUST), and Resource Conservation and Recovery Act (RCRA) closure permits. Within these programs, there are a variety of plans for which Agency approval is required, including, but not limited to, a remedial action plan (SRP), a corrective action plan (LUST), and a RCRA Part B permit. Other Agency approvals are also necessary at various stages of a cleanup under each of these programs. Because the TACO standards are not self-implementing, they can only be applied to ongoing remediation sites in accordance with the relevant cleanup program and any challenges to their applicability would also proceed under the specific procedures established for the particular cleanup program.

Accordingly, the Board concludes that the applicability of the TACO amendments, once adopted, must be governed by the relevant program's rules. Should a program participant challenge their applicability to a particular cleanup in the future, the Board will consider the challenge in the context of that particular case and that program's particular rules.

ORDER

The Board hereby adopts these amendments to the TACO regulations. Accordingly, the Board directs the Clerk to file the following adopted amendments with the Secretary of State.

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

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742.205	Severability
742.210	Incorporations by Reference
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SUBPART G: TIER 2 SOIL EVALUATION

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742.710	SSL Soil Equations
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742.910	Alternative Models
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SUBPART J: INSTITUTIONAL CONTROLS

Section

742.1000	Institutional Controls
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742.1012	Federally Owned Property: Land Use Control Memorandums of Agreement
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SUBPART K: ENGINEERED BARRIERS

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742.1100	Engineered Barriers
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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 $\{A_{N-I+1}\}$ for W Test of Normality, for $N=2(1)50$

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

TABLE E Similar-Acting Noncarcinogenic Chemicals

TABLE F Similar-Acting Carcinogenic Chemicals

TABLE G Concentrations of Inorganic Chemicals in Background Soils

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

APPENDIX B Tier 1 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 Tables and Illustrations

ILLUSTRATION A Tier 2 Evaluation for Soil

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ILLUSTRATION C US Department of Agriculture Soil Texture Classification

TABLE A SSL Equations

TABLE B SSL Parameters

TABLE C RBCA Equations

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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 $\frac{\text{cm}^3 \text{water}/\text{g}_{\text{soil}}}{\text{cm}^3 \text{water}/\text{g}_{\text{soil}}}$)TABLE J Values to be Substituted for K_d or K_s as k_d or k_s when Evaluating Inorganics as a Function of pH ($\frac{\text{cm}^3/\text{g}}{\text{cm}^3/\text{g}}$ or L/kg or $\frac{\text{cm}^3 \text{water}/\text{g}_{\text{soil}}}{\text{cm}^3 \text{water}/\text{g}_{\text{soil}}}$)TABLE K Parameter Estimates for Calculating Water-Filled Soil Porosity (θ_w)

AUTHORITY: Implementing Sections 22.4, 22.12, Title XVI, and Title XVII and authorized by Sections 27, 57.14, and 58.5 of the Environmental Protection Act [415 ILCS 5/22.4, 22.12, 27, 57.14 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(B) at 24 25 Ill. Reg. _____, effective _____.

NOTE: Capitalization indicates statutory language.

SUBPART B: GENERAL

Section 742.210 Incorporations by Reference

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

ASTM. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103 (215) 299-5400.

ASTM D 2974-87, Standard Test Methods for Moisture, Ash and Organic Matter of Peat and Other Organic Soils, approved May 29, 1987 (reapproved 1995).

ASTM D 2488-93, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), approved September 15, 1993.

ASTM D 1556-90, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, approved 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 2922-91, Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), approved December 23, 1991.

ASTM D 2937-94, Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method, approved June 15, 1994.

ASTM D 854-92, Standard Test Method for Specific Gravity of Soils, approved November 15, 1992.

ASTM D 2216-92, Standard Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock, approved June 15, 1992.

ASTM D 4959-89, Standard Test Method for Determination of Water (Moisture) Content of Soil by Direct Heating Method, approved June 30, 1989 (reapproved 1994).

ASTM D 4643-93, Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method, approved July 15, 1993.

ASTM D 5084-90, Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter, approved June 29, 1990.

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

ASTM D 1140-92, Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75 μ m) Sieve, approved November 15, 1992.

ASTM D 3017-88, Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth), approved May 27, 1988.

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

ASTM D 2487-93, Standard Test Method for Classification of Soils for Engineering Purposes, approved September 15, 1993.

ASTM E 1527-93, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, approved March 15, 1993. Vol. 11.04.

ASTM E 1739-95, 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 III, December 1996~~ Final Update IIIA, April 1998), as amended by Updates I, IIA, ~~and III~~, and IIIA (Document No. 955-001-00000-1) (~~contact USEPA, Office of Solid Waste, for Update III~~).

"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 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).

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.

"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).

"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).

"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).

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

- 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 761.120 (1993/1998).

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

(Source: Amended in R00-19(B) at 24 25 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 ~~or Tier 3~~ shall

not exceed the soil saturation limit, as determined under subsection (c) of this Section.

- b) For any organic contaminant, the remediation objective under Tier 2 ~~or Tier 3~~ 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 in R00-19(B) at 24 25 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 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.
 - 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.
- 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.
- e) When averaging under this Section, if no more than 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 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 50% of sample results are "non-detect", 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 in ~~R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

SUBPART C: EXPOSURE ROUTE EVALUATIONS

Section 742.300 Exclusion of Exposure Route

- a) This Subpart sets forth requirements to demonstrate that an actual or potential impact to a receptor or potential receptor from a contaminant of concern can be excluded from consideration from one or more exposure routes. If an evaluation under this ~~Part~~ Subpart demonstrates the applicable requirements for excluding an exposure route are met, then the exposure route is excluded from consideration and no remediation objective(s) need be developed for that exposure route.
- b) No exposure route may be excluded from consideration until characterization of the extent and concentrations of contaminants of concern at a site has been performed. The actual steps and methods taken to characterize a site shall be determined by the specific program requirements under which the site remediation is being addressed.
- c) As an alternative to the use of the requirements in this ~~Part~~ Subpart, a person may use the procedures for evaluation of exposure routes under Tier 3 as set forth in Section 742.925.

(Source: Amended in ~~R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

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; ~~and~~

- 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 in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.310 Inhalation Exposure Route

The inhalation exposure route may be excluded from consideration if:

- a) The requirements of Sections 742.300 and 742.305 are met; ~~and~~
- b) ~~An institutional control, in accordance with Subpart J, is in place that meets the following requirements:~~
 - 1) ~~Either:~~
 - A) ~~The concentration of any contaminant of concern within ten feet of the land surface or within ten feet of any man-made pathway shall not exceed the Tier 1 remediation objective under Subpart E for the inhalation exposure route; or~~
 - B) ~~An engineered barrier, as set forth in Subpart K and approved by the Agency, is in place; and~~
 - 2) ~~Requires safety precautions for the construction worker if the Tier 1 construction worker remediation objectives are exceeded.~~
- b) An approved engineered barrier is in place that meets the requirements of Subpart K;
- c) Safety precautions for the construction worker are taken if the Tier 1 construction worker remediation objectives are exceeded; and
- d) An institutional control, in accordance with Subpart J, will be placed on the property.

(Source: Amended in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.315 Soil Ingestion Exposure Route

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

- a) The requirements of Sections 742.300 and 742.305 are met; ~~and~~
- b) ~~An institutional control, in accordance with Subpart J, is in place that meets the following requirements:~~
 - 1) ~~Either:~~
 - A) ~~The concentration of any contaminant of concern within three feet of the land surface shall not exceed the Tier 1 remediation objective under Subpart E for the ingestion of soil exposure route;~~
~~or~~
 - B) ~~An engineered barrier, as set forth in Subpart K and approved by the Agency, is in place; and~~
 - 2) ~~Requires safety precautions for the construction worker if the Tier 1 construction worker remediation objectives are exceeded.~~
- b) An approved engineered barrier is in place that meets the requirements of Subpart K;
- c) Safety precautions for the construction worker are taken if the Tier 1 construction worker remediation objectives are exceeded; and
- d) An institutional control, in accordance with Subpart J, will be placed on the property.

(Source: Amended ~~in R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

SUBPART F: TIER 2 GENERAL EVALUATION

Section 742.605 Land Use

- a) Present and post-remediation land use is evaluated in a Tier 2 evaluation. Acceptable exposure factors for the Tier 2 evaluation for residential, industrial/commercial, and construction worker populations are provided in the far right column of ~~both~~ Appendix C, ~~both~~ Tables B and D. Use of exposure factors different from those in Appendix C, Tables B and D must be approved by the Agency as part of a Tier 3 evaluation.
- b) If a Tier 2 evaluation is based on an industrial/commercial property use, then:
 - 1) Construction worker populations shall also be evaluated; and
 - 2) Institutional controls are required in accordance with Subpart J.

(Source: Amended in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

SUBPART G: TIER 2 SOIL EVALUATION

Section 742.700 Tier 2 Soil Evaluation Overview

- a) Tier 2 remediation objectives are developed through the use of models which allow site-specific data to be considered. Appendix C, Tables A and C list equations that shall be used under a Tier 2 evaluation to calculate soil remediation objectives prescribed by SSL and RBCA models, respectively. (See also Appendix C, Illustration A.)
- b) Appendix C, Table A lists equations that are used under the SSL model. (See also Appendix C, Illustration A.) The SSL model has equations to evaluate the following human exposure routes:
 - 1) Soil ingestion exposure route;
 - 2) Inhalation exposure route for:
 - A) ~~Volatiles~~ Organic contaminants;
 - B) Fugitive dust; and
 - 3) Soil component of the groundwater ingestion exposure route.
- c) Evaluation of the dermal exposure route is not required under the SSL model.
- d) Appendix C, Table C lists equations that are used under the RBCA model. (See also Appendix C, Illustration A.) The RBCA model has equations to evaluate human exposure based on the following:
 - 1) The combined exposure routes of inhalation of vapors and particulates, soil ingestion and dermal contact with soil;
 - 2) The ambient vapor inhalation (outdoor) route from subsurface soils;
 - 3) Soil component of the groundwater ingestion route; and
 - 4) Groundwater ingestion exposure route.
- e) The equations in either Appendix C, Table A or C may be used to calculate remediation objectives for each contaminant of concern under Tier 2, if the following requirements are met:
 - 1) The Tier 2 soil remediation objectives for the ingestion and inhalation exposure routes shall use the applicable equations from the same approach (i.e., SSL equations in Appendix C, Table C).

- 2) The equations used to calculate soil remediation objectives for the soil component of the groundwater ingestion exposure route are not dependent on the approach utilized to calculate soil remediation objectives for the other exposure routes. For example, it is acceptable to use the SSL equations for calculating Tier 2 soil remediation objectives for the ingestion and inhalation exposure routes, and the RBCA equations for calculating Tier 2 soil remediation objectives for the soil component of the groundwater ingestion exposure route.
- 3) Combining equations from Appendix C, Tables A and C to form a new model is not allowed. In addition, Appendix C, Tables A and C must use their own applicable parameters identified in Appendix C, Tables B and D, respectively.
- f) In calculating soil remediation objectives for industrial/commercial property use, applicable calculations shall be performed twice: once using industrial/commercial population default values and once using construction worker population default values. The more stringent soil remediation objectives derived from these calculations must be used for further Tier 2 evaluations.
- g) Tier 2 data sheets provided by the Agency shall be used to present calculated Tier 2 remediation objectives, if required by the particular program for which remediation is being performed.
- h) The RBCA equations which rely on the parameter Soil Water Sorption Coefficient (k_s) can only be used for ionizing organics and inorganics by substituting values for k_s from Appendix C, Tables I and J, respectively. This will also require the determination of a site-specific value for soil pH.

(Source: Amended in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.710 SSL Soil Equations

- a) This Section sets forth the equations and parameters used to develop Tier 2 soil remediation objectives for the three exposure routes using the SSL approach.
- b) Soil Ingestion Exposure Route
 - 1) Equations S1 through S3 form the basis for calculating Tier 2 remediation objectives for the soil ingestion exposure route using the SSL approach. Equation S1 is used to calculate soil remediation objectives for noncarcinogenic contaminants. Equations S2 and S3 are used to calculate soil remediation objectives for carcinogenic contaminants for residential populations and industrial/commercial and construction worker populations, respectively.
 - 2) For Equations S1 through S3, the SSL default values cannot be modified with site-specific information.

c) Inhalation Exposure Route

- 1) Equations S4 through S16, S26 and S27 are used to calculate Tier 2 soil remediation objectives for the inhalation exposure route using the SSL approach. To address this exposure route, volatiles organic contaminants and mercury must be evaluated separately from fugitive dust using their own equations set forth in subsections (c)(2) and (c)(3) of this Section, respectively.
- 2) Volatiles Organic Contaminants
 - A) Equations S4 through S10 are used to calculate Tier 2 soil remediation objectives for volatile organic contaminants and mercury based on the inhalation exposure route. Equation S4 is used to calculate soil remediation objectives for noncarcinogenic volatile organic contaminants in soil for residential and industrial/commercial populations. Equation S5 is used to calculate soil remediation objectives for noncarcinogenic volatile organic contaminants and mercury in soil for construction worker populations. Equation S6 is used to calculate soil remediation objectives for carcinogenic volatile organic contaminants in soil for residential and industrial/commercial populations. Equation S7 is used to calculate soil remediation objectives for carcinogenic volatile organic contaminants in soil for construction worker populations. Equations S8 through S10, S27 and S28 are used for calculating numerical values for some of the parameters in Equations S4 through S7.
 - B) For Equation S4, a numerical value for the Volatilization Factor (VF) can be calculated in accordance with subsection (c)(2)(F) of this Section. The remaining parameters in Equation S4 have either SSL default values listed in Appendix C, Table B or toxicological-specific information (i.e., RfC), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
 - C) For Equation S5, a numerical value for the Volatilization Factor adjusted for Agitation (VF') can be calculated in accordance with subsection (c)(2)(G) of this Section. The remaining parameters in Equation S5 have either SSL default values listed in Appendix C, Table B or toxicological-specific information (i.e., RfC), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
 - D) For Equation S6, a numerical value for VF can be calculated in accordance with subsection (c)(2)(F) of this Section. The remaining parameters in Equation S6 have either default values

listed in Appendix C, Table B or toxicological-specific information (i.e., URF), which can be obtained from IRIS or requested from the program under which the remediation is being performed.

- E) For Equation S7, a numerical value for VF' can be calculated in accordance with subsection (c)(2)(G) of this Section. The remaining parameters in Equation S7 have either default values listed in Appendix C, Table B or toxicological-specific information (i.e., URF), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
- F) The VF can be calculated for residential and industrial/commercial populations using one of the following equations based on the information known about the contaminant source and receptor population:
 - i) Equation S8, in conjunction with Equation S10, is used to calculate VF assuming an infinite source of contamination; or
 - ii) If the area and depth of the contaminant source are known or can be estimated reliably, mass limit considerations may be used to calculate VF using Equation S26.
- G) The VF' can be calculated for the construction worker populations using one of the following equations based on the information known about the contaminant source:
 - i) Equation S9 is used to calculate VF' assuming an infinite source of contamination; or
 - ii) If the area and depth of the contaminant source are known or can be estimated reliably, mass limit considerations may be used to calculate VF' using Equation S27.

3) Fugitive Dust

- A) Equations S11 through S16 are used to calculate Tier 2 soil remediation objectives using the SSL fugitive dust model for the inhalation exposure route. Equation S11 is used to calculate soil remediation objectives for noncarcinogenic contaminants in fugitive dust for residential and industrial/commercial populations. Equation S12 is used to calculate soil remediation objectives for noncarcinogenic contaminants in fugitive dust for construction worker populations. Equation S13 is used to calculate soil remediation objectives for carcinogenic contaminants in fugitive dust for residential and industrial/commercial populations. Equation S14 is used to calculate soil remediation objectives for

carcinogenic contaminants in fugitive dust for construction worker populations. Equations S15 and S16 are used for calculating numerical quantities for some of the parameters in Equations S11 through S14.

- B) For Equation S11, a numerical value can be calculated for the Particulate Emission Factor (PEF) using Equation S15. This equation relies on various input parameters from a variety of sources. The remaining parameters in Equation S11 have either SSL default values listed in Appendix C, Table B or toxicological-specific information (i.e., RfC), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
 - C) For Equation S12, a numerical value for the Particulate Emission Factor for Construction Worker (PEF') can be calculated using Equation S16. The remaining parameters in Equation S12 have either SSL default values listed in Appendix C, Table B or toxicological-specific information (i.e., RfC), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
 - D) For Equation S13, a numerical value for PEF can be calculated using Equation S15. The remaining parameters in Equation S13 have either default values listed in Appendix C, Table B or toxicological-specific information (i.e., URF), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
 - E) For Equation S14, a numerical value for PEF' can be calculated using Equation S16. The remaining parameters in Equation S14 have either default values listed in Appendix C, Table B or toxicological-specific information (i.e., URF), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
- d) Soil Component of the Groundwater Ingestion Exposure Route

The Tier 2 remediation objective for the soil component of the groundwater ingestion exposure route can be calculated using one of the following equations based on the information known about the contaminant source and receptor population:

- 1) Equation S17 is used to calculate the remediation objective assuming an infinite source of contamination.
 - A) The numerical quantities for four parameters in Equation S17, the Target Soil Leachate Concentration (C_w), Soil-Water Partition

Coefficient (K_d) for non-ionizing organics, Water-Filled Soil Porosity (θ_w) Theta_w (θ_w) and Air-Filled Soil Porosity (θ_a) Theta_a (θ_a), are calculated using Equations S18, S19, S20 and S21, respectively. Equations S22, S23, S24 and S25 are also needed to calculate numerical values for Equations S18 and S21. The pH-dependent K_d values for ionizing organics can be calculated using Equation S19 and the pH-dependent K_{oc} values in Appendix C, Table I.

- B) The remaining parameters in Equation S17 are Henry's Law Constant (H'), a chemical specific value listed in Appendix C, Table E and Dry Soil Bulk Density (ρ_b), a site-specific based value listed in Appendix C, Table B.
- C) The default value for GW_{obj} is the Tier 1 groundwater objective. For chemicals for which there is no Tier 1 groundwater remediation objective, the value for GW_{obj} shall be the ~~Health Advisory~~ concentration determined according to the procedures specified in 35 Ill. Adm. Code 620, Subpart F. As an alternative to using Tier 1 groundwater remediation objectives or ~~Health Advisory~~ concentrations determined according to the procedures specified in 35 Ill. Adm. Code 620, Subpart F. GW_{obj} may be developed using Equations R25 and R26, if approved institutional controls are in place as required in Subpart J.

- 2) If the area and depth of the contaminant source are known or can be estimated reliably, mass limit considerations may be used to calculate the remediation objective for this exposure route using Equation S28. The parameters in Equation S28 have default values listed in Appendix C, Table B.

(Source: Amended in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.715 RBCA Soil Equations

- a) This Section presents the RBCA model and describes the equations and parameters used to develop Tier 2 soil remediation objectives.
- b) Ingestion, Inhalation, and Dermal Contact
- 1) The two sets of equations in subsections (b)(2) and (b)(3) of this Section shall be used to generate Tier 2 soil remediation objectives for the combined ingestion, inhalation, and dermal contact with soil exposure routes.
- 2) Combined Exposure Routes of Soil Ingestion, Inhalation of Vapors and Particulates, and Dermal Contact with Soil

- A) Equations R1 and R2 form the basis for deriving Tier 2 remediation objectives for the set of equations that evaluates the combined exposure routes of soil ingestion, inhalation of vapors and particulates, and dermal contact with soil using the RBCA approach. Equation R1 is used to calculate soil remediation objectives for carcinogenic contaminants. Equation R2 is used to calculate soil remediation objectives for noncarcinogenic contaminants. Soil remediation objectives for the ambient vapor inhalation (outdoor) route from subsurface soils must also be calculated in accordance with the procedures outlined in subsection (b)(3) of this Section and compared to the values generated from Equations R1 or R2. The smaller value (i.e., R1 and R2 compared to R7 and R8, respectively) from these calculations is the Tier 2 soil remediation objective for the combined exposure routes of soil ingestion, inhalation, and dermal contact with soil.
- B) In Equation R1, numerical values are calculated for two parameters:
- i) The volatilization factor for surficial soils (VF_{ss}) using Equations R3 and R4; and
 - ii) The volatilization factor for subsurface soils regarding particulates (VF_p) using Equation R5.
- C) VF_{ss} uses Equations R3 and R4 to derive a numerical value. Equation R3 requires the use of Equation R6. Both equations must be used to calculate the VF_{ss} . The lowest calculated value from these equations must be substituted into Equation R1.
- D) The remaining parameters in Equation R1 have either default values listed in Appendix C, Table D or toxicological-specific information (i.e., SF_o , SF_i), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
- E) For Equation R2, the parameters VF_{ss} and VF_p are calculated. The remaining parameters in Equation R2 have either default values listed in Appendix C, Table D or toxicological-specific information (i.e., RfD_o , RfD_i), which can be obtained from IRIS or requested from the program under which the remediation is being performed.
- F) For chemicals other than inorganics which do not have default values for the dermal absorption factor (RAF_d) in Appendix C, Table D, a dermal absorption factor of 0.5 shall be used for

Equations R1 and R2. For inorganics, dermal absorption may be disregarded (i.e., $RAF_d = 0$).

- 3) Ambient Vapor Inhalation (outdoor) route from Subsurface Soils (soil below one meter)
 - A) Equations R7 and R8 form the basis for deriving Tier 2 remediation objectives for the ambient vapor inhalation (outdoor) route from subsurface soils using the RBCA approach. Equation R7 is used to calculate soil remediation objectives for carcinogenic contaminants. Equation R8 is used to calculate soil remediation objectives for noncarcinogenic contaminants.
 - B) For Equation R7, the carcinogenic risk-based screening level for air ($RBSL_{air}$) and the volatilization factor for soils below one meter to ambient air (VF_{samb}) have numerical values that are calculated using Equations R9 and R11, respectively. Both equations rely on input parameters from a variety of sources.
 - C) The noncarcinogenic risk-based screening level for air ($RBSL_{air}$) and the volatilization factor for soils below one meter to ambient air (VF_{samb}) in Equation R8 have numerical values that can be calculated using Equations R10 and R11, respectively.
- c) Soil Component of the Groundwater Ingestion Exposure Route
 - 1) Equation R12 forms the basis for deriving Tier 2 remediation objectives for the soil component of the groundwater ingestion exposure route using the RBCA approach. The parameters, groundwater at the source (GW_{source}) and Leaching Factor (LF_{sw}), have numerical values that are calculated using Equations R13 and R14, respectively.
 - 2) Equation R13 requires numerical values that are calculated using Equation R15.
 - 3) Equation R14 requires numerical values that are calculated using Equations R21, R22, and R24. For non-ionizing organics, the Soil Water Sorption Coefficient k_s shall be calculated using Equation R20. For ionizing organics and inorganics, the values for (k_s) are listed in Appendix C, Tables I and J, respectively. The pH-dependent k_s values for ionizing organics can be calculated using Equation R20 and the pH-dependent K_{oc} values in Appendix C, Table I. The remaining parameters in Equation R14 are field measurements or default values listed in Appendix C, Table D.
- d) The default value for GW_{comp} is the Tier 1 groundwater remediation objective. For chemicals for which there is no Tier 1 groundwater remediation objective, the value for GW_{comp} shall be the Health Advisory concentration determined

according to the procedures specified in 35 Ill. Adm. Code 620, Subpart F. As an alternative to using the ~~Tier 1 groundwater remediation objectives or Health Advisory~~ above concentrations, GW_{comp} may be developed using Equations R25 and R26, if approved institutional controls are in place as may be required in Subpart J.

(Source: Amended ~~in R00-19(B)~~ at 24 25 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 ~~Health Advisory~~ concentration determined according to the procedures specified in 35 Ill. Adm. Code 620, ~~Subpart F~~ 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 ~~Health Advisory~~ 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:

$$W_{ave} = \frac{x_1}{CUO_{x_1}} + \frac{x_2}{CUO_{x_2}} + \frac{x_3}{CUO_{x_3}} + \dots + \frac{x_a}{CUO_{x_a}}$$

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 14.

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

- iA) 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.
- iiB) 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 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 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 H, does not exceed 1 in 10,000.

(Source: Amended in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.810 Calculations to Predict Impacts from Remaining Groundwater Contamination

- a) Equation R26 predicts the contaminant concentration along the centerline of a groundwater plume emanating from a vertical planar source in the aquifer (dimensions S_w wide and S_d deep). This model accounts for both three-dimensional dispersion (x is the direction of groundwater flow, y is the other horizontal direction, and z is the vertical direction) and biodegradation.
 - 1) The parameters in this equation are:

$X =$	distance from the planar source to the location of concern, along the centerline of the <u>groundwater</u> plume (i.e., $y=0$, $z=0$)
$C_x =$	the concentration of the contaminant at a distance X from the source, along the centerline of the plume
$C_{source} =$	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. As indicated above, the model assumes a planar source discharging groundwater at a concentration equal to C_{source} .
$?_x =$	dispersivity in the x direction (i.e., Equation R16)
$?_y =$	dispersivity in the y direction (i.e., Equation R17)

- $\alpha_z =$ dispersivity in the z direction (i.e., Equation R18)
- $U =$ specific discharge (i.e., actual groundwater flow velocity through a porous medium; takes into account the fact that the groundwater actually flows only through the pores of the subsurface materials) where the aquifer hydraulic conductivity (K), the hydraulic gradient (I) and the total soil porosity α_T must be known (i.e., Equation R19)
- $\lambda =$ first order degradation constant obtained from Appendix C, Table E or from measured groundwater data
- $S_w =$ width of planar groundwater source in the y direction
- $S_d =$ depth of planar groundwater source in the z direction

2) The following parameters are determined through field measurements: U, K, I, α_T , S_w , S_d .

- A) The determination of values for U, K, I and α_T can be obtained through the appropriate laboratory and field techniques;
- B) From the immediate down-gradient edge of the source of the groundwater contamination values for S_w and S_d shall be determined. S_w is defined as the width of groundwater at the source which exceeds the Tier 1 groundwater remediation objective. S_d is defined as the depth of groundwater at the source which exceeds the Tier 1 groundwater remediation objective; and
- C) Total soil porosity can also be calculated using Equation R23.

b) Once values are obtained for all the input parameters identified in subsection (a) of this Section, the contaminant concentration C_x along the centerline of the plume at a distance X from the source shall be calculated ~~such so that X is the~~ distance from the down-gradient edge of the source of the contamination at the site to the point where the contaminant concentration is equal to the Tier 1 groundwater remediation objective or ~~Health Advisory~~ concentration determined according to the procedures specified in 35 Ill. Adm. Code 620, Subpart F.

- 1) If there are any potable water supply wells located within the calculated distance X, then the Tier 1 groundwater remediation objective or concentration shall be met at the edge of the minimum or designated maximum setback zone of the nearest potable water supply down-gradient of the source. ~~If there are any potable water supply wells located within the calculated distance X, then the Tier 1 groundwater remediation objective or Health Advisory concentration shall be met at the edge of the minimum or designated maximum setback zone of the nearest potable~~

~~water supply down gradient of the source. If no potable water supply wells exist within the calculated distance X, then it can be determined that no existing potable water supply wells are adversely impacted. To demonstrate that a minimum or maximum setback zone of a potable water supply well will not be impacted above the applicable Tier 1 groundwater remediation objective or concentration determined according to the procedures specified in 35 Ill. Adm. Code 620, Subpart F, X shall be the distance from the C_{source} location to the edge of the setback zone.~~

- 2) To demonstrate that no surface water is adversely impacted, X shall be the distance from the down-gradient edge of the source of the contamination ~~at the site~~ to the nearest surface water body. This calculation must show that the contaminant in the groundwater at this location (C_x) does not exceed the applicable water quality standard.

(Source: Amended in ~~R00-19(B)~~ at 24 25 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 Tiers 1 or 2); and
 - 9) Requests for site-specific remediation objectives 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)(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 ~~in R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

Section 742.925 Exposure Routes

Technical information may demonstrate that there is no actual or potential impact of contaminants of concern to receptors from a particular exposure route. In these instances, a

demonstration excluding an exposure route shall be submitted to the Agency for review and approval. A submittal under this Section shall include the following information:

- a) A description of the route evaluated;
- b) ~~Technical support including a discussion of the natural or man-made barriers to exposure through that route, and calculations, and modeling results~~ A description of the site and physical site characteristics;
- c) ~~Physical and chemical properties of contaminants of concern~~ A discussion of the result and possibility of the route becoming active in the future; and
- d) ~~Contaminant migration properties;~~ Technical support that may include, but is not limited to, the following:
 - 1) a discussion of the natural or man-made barriers to that exposure route;
 - 2) calculations and modeling;
 - 3) physical and chemical properties of contaminants of concern; and
 - 4) contaminant migration properties.
- e) ~~Description of the site and physical site characteristics; and~~
- f) ~~Discussion of the result and possibility of the route becoming active in the future;~~

(Source: Amended ~~in R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

SUBPART J: INSTITUTIONAL CONTROLS

Section 742.1005 No Further Remediation Letters

- a) A No Further Remediation Letter issued by the Agency under 35 Ill. Adm. Code 732 or ~~742~~ 740 may be used as an institutional control under this Part if the requirements of subsection (b) of this Section are met.
- b) A request for approval of a No Further Remediation Letter as an institutional control shall meet the requirements applicable to the specific program under which the remediation is performed.

(Source: Amended ~~in R00-19(B)~~ at 24 25 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. 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.

- 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 ~~the latest, most current~~ 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 ~~areal~~ area and extent of groundwater contamination ~~(measured or 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) ~~Information showing the concentration of contaminants of concern in which the applicable remediation objectives are exceeded;~~
 - 34) A scaled map delineating the boundaries of all properties under which groundwater is located which exceeds the applicable groundwater remediation objectives;
 - 45) Information identifying the current owner(s) of each property identified in subsection ~~(b)(4)~~ (b)(3) of this Section; and
 - 56) A copy of the proposed submission ~~of the information~~ to the current owners identified in subsection ~~(b)(5)~~ (b)(4) of this Section of the information required in subsections (b)(1) through ~~(b)(5)~~ (b)(4) of this Section and proof that the notification required in subsection (c) of this Section has been submitted. 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).
- c) Each of the property owners identified in subsection ~~(b)(5)~~ (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 of this notification shall be submitted to the Agency within 45 days from the date ~~of the instrument~~

memorializing the Agency's no further remediation determination is recorded.
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)(4)~~ (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)(6)~~ (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)(4)~~ (b)(3) of this Section; or
 - 3) Violation of the terms of an institutional control recorded under Section 742.1005 or Section 742.1010.
- 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 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 in R00-19(B) at 24 25 Ill. Reg. _____, effective _____)

Section 742.1020 Highway Authority Agreements

- 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.
- 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 remediation objectives 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 ~~(b)~~ (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 ~~current fee owner of the highway right of way~~ and 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 ~~h~~Highway ~~a~~Authority ~~a~~Agreement as an institutional control.

(Source: Amended in ~~R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)

SUBPART K: ENGINEERED BARRIERS

Section 742.1105 Engineered Barrier Requirements

- a) Natural attenuation, access controls, and point of use treatment shall not be considered engineered barriers. Engineered barriers may not be used to prevent direct human exposure to groundwater without the use of institutional controls.
- b) For purposes of determining remediation objectives under Tier 1, engineered barriers are not recognized.
- c) The following engineered barriers are recognized for purposes of calculating remediation objectives that exceed residential remediation objectives:
- 1) For the soil component of the groundwater ingestion exposure route, the following engineered barriers are recognized if they prevent completion of the exposure pathway:
 - A) ~~Caps, covering the contaminated media, or walls~~ constructed of compacted clay, asphalt, concrete or other material approved by the Agency; and
 - B) Permanent structures such as buildings and highways.
 - 2) For the soil ingestion exposure route, the following engineered barriers are recognized if they prevent completion of the exposure pathway:
 - A) ~~Caps, covering the contaminated media, or walls~~ constructed of compacted clay, asphalt, concrete, or other material approved by the Agency;

- B) Permanent structures such as buildings and highways; and
 - ~~C) Clean soil, covering the contaminated media, that is a minimum of three feet in depth.~~
 - C) Soil, sand, gravel, or other geologic materials that:
 - i) Cover the contaminated media;
 - ii) Meet the soil remediation objectives under Subpart E for residential property for contaminants of concern; and
 - iii) Are a minimum of three feet in depth.
- 3) For the inhalation exposure route, the following engineered barriers are recognized if they prevent completion of the exposure pathway:
- A) ~~Caps, covering the contaminated media, or walls~~ constructed of compacted clay, asphalt, concrete, or other material approved by the Agency;
 - B) Permanent structures such as buildings and highways; and
 - ~~C) Clean soil covering the contaminated media, that is a minimum of ten feet in depth and not within ten feet of any manmade pathway.~~
 - C) Soil, sand, gravel, or other geologic materials that:
 - i) Cover the contaminated media;
 - ii) Meet the soil remediation objectives under Subpart E for residential property for contaminants of concern; and
 - iii) Are a minimum of ten feet in depth and not within ten feet of any manmade pathway.
- 4) For the ingestion of groundwater exposure route, the following engineered barriers are recognized if they prevent completion of the exposure pathway:
- A) Slurry walls; and
 - B) Hydraulic control of groundwater.
- d) Unless otherwise prohibited under Section 742.1100, any other type of engineered barrier may be proposed if it will be as effective as the options listed in subsection (c) of this Section.

(Source: Amended ~~in R00-19(B)~~ at 24 25 Ill. Reg. _____, effective _____)