ILLINOIS POLLUTION CONTROL BOARD
July 10, 1997

IN THE MATTER OF:	)	
	)	
TIERED APPROACH TO CORRECTIVE	)	R97-12(B)
ACTION OBJECTIVES (TACO): 35 ILL.	)	(Rulemaking - Land)
ADM. CODE PART 742.105, 742.200,	)	
742.505, 742.805 and 742.915	)	

Proposed Rule. First Notice.

OPINION AND ORDER OF THE BOARD (by M. McFawn and J. Yi)

On April 17, 1997, the Board opened Docket B: Tiered Approach to Corrective Action Objectives, also known as TACO. That same day, the Board adopted for second notice the majority of the TACO rules under Docket A.[1] At second notice and at final notice during Docket A, the Board adopted limited rules concerning the effect of similar-acting chemicals on the same target organ (mixture rule) at the recommendation of the Agency. The TACO program establishes a three tiered approach for establishing corrective action objectives, i.e., remediation objectives based on risks to human health and the environment, allowing for consideration of the proposed land use at a subject site. The purpose of bifurcating the rulemaking was twofold. Under Docket A, the Board could proceed to adopt the TACO program as final at new Part 742 in tandem with R97-11: *The Site Remediation Program and Groundwater Quality Standards* (June 5, 1997), which had a statutory adoption deadline of June 16, 1997, and under Docket B the Board could conduct this rulemaking to consider a single, outstanding issue. That issue now before the Board in this docket is how the effect of similar-acting chemicals on the same target organ is to be taken into account when determining remediation objectives under TACO. The need for a mixture rule originates at Section 58.5(c) of the Illinois Environmental Protection Act (Act) (415 ILCS 5/58.5(c) (1996)) and from the Board's groundwater regulations at 35 Ill. Adm. Code 620.

As explained in our opinion of April 17, 1997, the Agency's initial proposal addressed mixtures of similar-acting chemicals under Tier 2. However, the Agency advocated expanding the applicability of the initially proposed mixture rule in a series of filings subsequent to the five public hearings held prior to that date. The justification offered by the Agency for expanding the rule's applicability was minimal. In fact, several commentators objected to

[1] On June 5, 1997, the Board adopted the opinion and order in Docket A as final rules which were published in the *Illinois Register* on June 27, 1997 at 21 Ill. Reg. 7942, with an effective date of July 1, 1997.

these proposed amendments suggested by the Agency as unsupported by the record developed over the course of those hearings. Docket A PC 3,8,20, and 21.[2] While we found the record before the Board insufficient to adopt the entire mixture rule ultimately requested by the Agency prior to April 17, 1997, the justification provided by the Agency in support of expanding the rule's applicability did indicate that absent such a rule, remediation objectives determined using TACO may not be protective of human health at sites with multiple, similar-acting chemicals. Accordingly, a limited mixture rule was adopted under Docket A for second notice on April 17, 1997 and as final on June 5, 1997. Docket B was opened to facilitate the review of the mixture rule necessary to protect human health.[3]

Under Docket A, the limited mixture rule at Tiers 1 and 2 applies only to similar-acting *noncarcinogenic* chemicals. Under Tier 1, the cumulative effect of similar-acting noncarcinogenic chemicals must be evaluated for groundwater only, while under Tier 2 it must be evaluated for soil and groundwater. 35 Ill. Adm. Code 742.505(b)(3), 720, 805(c) (effective July 1, 1997.) These adopted rules, as well as the entire mixture rule subsequently proposed by the Agency, have been evaluated under this Docket B.

Today we propose for first notice a mixture rule in each of the three tiers. The rules proposed today are different from the limited mixture rules adopted in Docket A and those proposed on April 17, 1997 in Docket B. Briefly, the mixture rule under Tier 1 requires that the cumulative effects of both similar-acting carcinogenic and noncarcinogenic chemicals be evaluated when determining groundwater remediation objectives. Accordingly, the current rule at Section 742.505(b) that similar-acting noncarcinogenic chemicals be evaluated under Tier 1 for groundwater is retained, but amended to include the same requirement for similar-acting carcinogenic chemicals when the Tier 1 remediation objectives are exceeded or when similar-acting carcinogenic chemicals have remediation objectives set at risk levels higher than 1 in 1,000,000. Similarly, the mixture rule proposed under Tier 2 which applies to similar-acting noncarcinogenic chemicals is also retained, but amended to require that the cumulative effect of similar-acting carcinogenic chemicals be evaluated when developing groundwater remediation objectives. However, the Tier 2 mixture rule for soil remediation objectives remains unchanged, applicable only to similar-acting noncarcinogenic chemicals. Finally, a new requirement is added under Tier 3 which requires that both similar-acting noncarcinogenic

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[2] Docket A public comments and exhibits will be referred to as Docket A PC at __ and Docket A Exh. at __, respectively; Docket B public comments and exhibits will be referred to as PC at __ and Exh. at __; the Agency's prefiled testimony will be hereinafter referred to as Exh. 2; the May 21, 1997 hearing will be hereinafter referred to as Tr.1 at __; the May 29, 1997 hearing will be hereinafter referred to as Tr.2 at __.

[3] On April 17, 1997, the Board adopted for first notice an order in Docket B which contained proposed mixture rules. Because the Secretary of State had informed the Board that we could not propose those rules for first notice until the rules in Docket A were finalized, on May 1, 1997 we vacated that first notice order. In its place, we adopted the same order and directed the proposed amendments to hearing pursuant to our rulemaking authority under Sections 27 and 28 of the Act.

and carcinogenic chemicals be evaluated for both groundwater and soil as part of the Tier 3 site-specific analysis.

The Agency has also proposed, in its prefiled testimony, that the Board adopt language that the "requirements of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals shall be considered met for Class I groundwater at the point of human exposure" if certain requirements under Tier 1 and Tier 2, respectively, are achieved. Exh. 2 at 4-5. Those requirements are (1) that the level of the contaminant of concern does not exceed the Tier 1 remediation objective, and (2) that the remediation objective is based on a risk level of 1 in 1,000,000. Because we are adopting a mixture rule for both similar-acting carcinogenic and noncarcinogenic chemicals under all three tiers, the Board accepts the Agency's premise, but modifies the language it proposed with the amendments adopted today for first notice.

The reasons for the mixture rule proposed today and the changes from the former versions are explained in detail below. To familiarize the reader with the TACO approach, we will begin with a brief summary of the TACO program adopted under Docket A, followed by an explanation of the mixture rule and how it evolved over the course of Dockets A and B. Next, the rationale for the mixture rule proposed today at Tiers 1, 2, and 3 is provided in detail. Finally, the text of the amendments necessary to the new Part 742 to provide a mixture rule is set forth in our order for first notice.

SUMMARY OF THE TACO PROGRAM

Again, the TACO process codified at new Part 742 provides a three tiered approach for establishing remediation objectives based upon human health and the environment, allowing for consideration of the proposed land use at the subject site. While Part 742 contains rules, the TACO process set forth therein is not independent. It must be used in conjunction with remediation programs, most specifically those found at Part 740: Site Remediation Program; Part 732: Underground Storage Tank rules; and the closure requirements under the Resource Conservation and Recovery program at Parts 724 and 725.

A Tier 1 analysis requires the remediation applicant to compare contamination levels of constituents of concern at the remediation site to predetermined objectives. The predetermined remediation objectives are set forth in look-up tables in the rules in Appendix B. If any contaminant of concern at a remediation site are found to exceed the predetermined levels, the remediation applicant is required to remediate the contamination until the corrective action objectives are achieved, or alternatively, to develop site-specific remediation objectives using a Tier 2 or Tier 3 analysis.

A Tier 2 analysis uses equations set forth in the rules to develop alternate remediation objectives for constituents of concern, using site-specific information. The equations used to develop site-specific remediation objectives are from the Soil Screening Level (SSL) and the Risk Based Corrective Action (RBCA) approaches, and they are listed in the rules in Appendix C. If any contaminants of concern are found to exceed the remediation objectives developed using the Tier 2 equations, the remediation applicant is required to remediate the

contamination until the objectives are achieved, remediate to the Tier 1 objectives, or to develop alternate objectives using a Tier 3 analysis.

A Tier 3 analysis allows a remediation applicant to develop remediation objectives using alternative parameters not found in Tier 1 or Tier 2. It allows a remediation applicant to use modified parameters, provided the remediation applicant provides justification for the modification, and the technical and mathematical basis for the modification. Additionally, a Tier 3 analysis allows a remediation applicant to use alternative models if certain information is provided, including a licensed copy of the model, the mathematical and technical basis for the model, and a demonstration that the model was correctly applied. If any contaminants of concern are found to exceed the remediation objectives developed using the Tier 3 analysis, the remediation applicant is required to remediate the contamination until the objectives are achieved.

EVOLUTION OF THE MIXTURE RULE

The statutory premise for the mixture rules is found at Section 58.5(c) of the Act. 415 ILCS 58.5(c) (1996). Section 58.5(c) provides in pertinent part that the regulations establishing remediation objectives shall address "the presence of multiple substances of concern and multiple exposure pathways." 415 ILCS 5/58.5(c) (1996). Initially, the Agency only proposed a mixture rule under Tier 2. However, over the course of Dockets A and B in this rulemaking, the Agency has changed its position several times concerning the type of mixture rule needed at each of the three tiers. The Agency's various proposals and testimony are summarized below, as are the mixture rules adopted today for first notice. The evidence on the record supporting the rules proposed today and the Board's consideration of the same are set forth in greater detail in this opinion under "Analysis of Proposal and Testimony."

Under the authority of Section 58.5(c) of the Act, the Agency, in its original proposal under Docket A, recommended that TACO take into account mixtures of similar-acting chemicals with regard to soil remediation objectives. In this regard, the Agency also stated that the USEPA cautioned the users of the SSL to account for cumulative effects of chemicals that affect the same target organ. Docket A Exh. 5 at 28-29. In Errata Sheet Number 3 filed near the close of Docket A, the Agency recommended that this rulemaking also address mixtures of similar-acting chemicals in groundwater, citing 35 Ill. Adm. Code 620 as its authority. Specifically, Section 620.615 provides that mixtures of similar-acting chemicals in groundwater should be addressed when determining remediation objectives. Finally, during Docket B, the Agency recommended revising the Tier 1 mixture rule to be applicable only to similar-acting carcinogenic chemicals, and only to those similar-acting carcinogenic chemicals that exceed their Tier 1 remediation objectives, and for those whose remediation objectives that are set at risk levels higher than 1 in 1,000,000.

The following chart best summarizes the changes in the mixture rule subsequent to the Agency's original proposal. Summaries about the Agency's reasons for its various positions concerning the need for mixture rules, responses by other participants and the Board's actions are included in the following, more detailed discussion. To understand the chart below and the

more detailed discussion, two questions must be asked and answered initially: (1) is the rule being applied to determine groundwater or soil remediation objectives; and (2) are the similar-acting contaminants of concern carcinogenic or noncarcinogenic chemicals?

Mixture Rule

	Agency Errata Sheet #3	Board Docket A	Agency Docket B	Board 1st Notice Docket B
Tier 1				
Groundwater	both	noncarc	carc	both
Soil	----	----	----	----
Tier 2				
Groundwater	both	noncarc	both	both
Soil	noncarc	noncarc	noncarc	noncarc
Tier 3				
Groundwater	----	----	both	both
Soil	----	----	both	both

noncarc = noncarcinogenic chemicals
carc = carcinogenic chemicals
both = noncarcinogenic and carcinogenic chemicals

ANALYSIS OF PROPOSAL AND TESTIMONY

The Board's inquiry now considers whether it should adopt the changes proposed by the Agency to the mixture rule adopted in Docket A or otherwise modify the mixture rule applicable under TACO. First, the Board addresses general issues of concern under one or more of the three tiers. Second, we address whether a mixture rule should be adopted for soil remediation objectives under Tier 1. Third, the Board examines whether a mixture rule should be adopted for carcinogenic contaminants of concern as well as noncarcinogenic contaminants of concern for groundwater under both Tiers 1 and 2. Finally, the Board addresses whether a mixture rule should be adopted under Tier 3.

Dr. Thomas C. Hornshaw provided testimony in support of the Agency's proposed amendments to the mixture rule. In addition to his prefiled testimony, Dr. Hornshaw and

other Agency personnel provided testimony in response to questions asked of them at hearing. Two public hearings were held: the first on May 21, 1997 in Chicago, and the second on May 29, 1997 in Springfield. Participants other than the Agency also testified or asked questions at hearings, including, Harry Walton on behalf of the Site Remediation Advisory Committee (SRAC), the Illinois Environmental Regulatory Group (IERG) and Illinois Power Company; David Reiser of Ross & Hardies on behalf of the Illinois Petroleum Council and the Illinois Steel Group; and Whitney Wagner Rosen on behalf of the IERG.

Two exhibits and three public comments were filed in the Docket B proceeding. The first exhibit offered at hearing was the prefiled testimony of Dr. Thomas C. Hornshaw on behalf of the Agency; the second exhibit which was prepared by the Board, was a draft of the amendatory language proposed by Dr. Hornshaw in his testimony. The first public comment was the Agency's Posthearing Comments filed on June 13, 1997 (PC 1); the second was the Posthearing Comments of SRAC filed on June 13, 1997 (PC 2). The third public comment (PC 3) was filed on July 8, 1997 when the SRAC filed its Supplemental Posthearing Comments. Due to the late submission of this filing, the Board will postpone consideration of this public comment until it proceeds to second notice.

General Issues

Definition of Similar-Acting Chemical

In response to public testimony, the Board today proposes to adopt at Section 742.200 a definition of similar-acting chemicals. There was no such definition in the final rules adopted under Docket A because the term was defined within Sections 742.710 and 742.805(c). As part of its revised proposal under Docket B, the Agency proposed to strike that relevant language. Therefore, at hearing Mr. Rieser questioned Dr. Hornshaw on whether language may be added to 742.805(c) to provide a definition of "similar-acting chemicals". Tr.1 at 37-38. Specifically, Mr. Reiser proposed replacing "similar-acting chemicals" with "mixtures of chemicals which affect the same target organ/organ system or similar mode of action." Tr.1 at 38. Dr. Hornshaw agreed with Mr. Reiser that his suggestion was an appropriate clarification. Tr.1 at 38. In turn, the Board questioned Dr. Hornshaw whether a similar definition of "similar-acting chemicals" could be inserted at Section 742.200 entitled "Definitions." Tr.2 at 21-21. Dr. Hornshaw agreed with the Board's suggestion. Tr.2 at 21.

While the Board agrees with Mr. Reiser that a definition of "similar-acting chemicals" should be included in Part 742, it finds that this definition is most appropriately placed at Section 742.200 to provide overall clarity to the remediation applicant. Accordingly, the Board proposes that, at Section 742.200, the following definition of "similar-acting chemicals" be inserted:

> "Similar-Acting Chemicals" are chemical substances that have toxic or harmful physiological 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.)

This definition parallels the description of similar-acting chemicals found at 35 Ill. Adm. Code 620.615. Since the mixture rule originates from that rule, the Board finds that its description of similar-acting chemicals is most appropriate for defining the same under TACO.

Appendix A.Table H: Carcinogens with Groundwater Remediation Objectives in Excess of a 1 in 1,000,000 Cancer Risk Concentration

In its prefiled testimony under Docket B, the Agency proposed that a new Table H be added to Part 742 in Appendix A. Exh. 1 at 10. Table H lists those chemicals whose Tier 1 Class I groundwater remediation objectives exceed the 1 in 1,000,000 cancer risk concentrations. The Agency proposes that Table H identifies those similar-acting carcinogenic chemicals which must undergo either the Tier 2 or Tier 3 procedure for evaluating the mixture effect of similar-acting chemicals. For example, if more than one similar-acting carcinogenic chemical listed in Table H is detected at a site, whether the remediation applicant is proceeding under Tier 1, 2, or 3, then the remediation applicant must apply the methodologies in either Tier 2 or 3 to determine their additive effect and adjust the remediation objective as necessary. The Board agrees that the new Appendix A.Table H will assist the remediation applicant to more readily determine whether the similar-acting carcinogenic chemicals detected are subject to the mixture rule found under Tier 2 or 3.

Satisfaction of Section 620.615 of the Board's Groundwater Regulations

Initially, the Agency assumed that the requirements of Section 35 Ill. Adm. Code 620.615 concerning mixtures of similar-acting chemicals would govern the development of site remediation objectives at any site where such chemicals were detected. However, during the course of Docket A, the Agency applied that rule for similar-acting chemicals detected in Class I groundwater at a particular site then being studied for remediation, and its applicability was challenged. The Agency had applied the groundwater rule because the Act requires that TACO address multiple chemicals of concern, as does Section 620.615. Tr.1 at 16-17. Section 620.615 requires that the Agency determine "the need for additional health advice appropriate to site-specific conditions" when similar-acting chemicals are detected. The Agency is required to use the procedures for evaluating the mixture of such substances specified in Appendices A, B and C of Part 620. 35 Ill. Adm. Code 620.

To resolve any ambiguity, the Agency realized that Section 620.615 must be "cross-referenced" or an alternative procedure to Section 620.615 must be provided within the TACO regulations. The Agency maintains that if Section 620.615 is not cross-referenced in Part 742, "the door remains open for future debate" over the appropriate remediation objectives when similar-acting chemicals are detected in Class I groundwater. Tr.1 at 17. Moreover, the Agency foresees the possibility of a remediation applicant expecting to receive a no further remediation determination from the Agency by virtue of achieving all Class I groundwater objectives, only to be informed that further remediation would be necessary because the requirements of Section 620.615 have not been met. Tr.1 at 17-18. Finally, the Agency suggests that, because Part 742 is silent about the requirements for mixtures of similar-acting chemicals in Class I groundwater, a No Further Remediation Letter might be issued under the

Site Remediation Program and subsequently challenged on the grounds that the requirements of Section 620.615 were not satisfied. Tr.1 at 17-18. With these concerns in mind, the Agency proposed that language be added cross-referencing the requirements of Part 620.615 in Tiers 1 and 2 of Part 742.

Specifically, the Agency proposes that the Board adopt the following language at Section 742.805(b)(3) for Tier 1 and at Section 742.805(c) for Tier 2.

> The requirements of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals shall be considered met for Class I groundwater at the point of human exposure if the following requirements are achieved. Exh. 2.

The language proposed by the Agency means that the mixture rule mandated by the Act and Section 620.615 of the Board's rules would be considered satisfied if the remediation objectives set forth under Tier 1 and those developed under Tier 2 are met. We note that the Agency would not require a mixture rule for similar-acting noncarcinogenic chemicals under Tier 1; satisfaction of the applicable remediation objective listed thereunder would be sufficient. Exh. 2. As proposed, the specific requirements of the TACO mixture rule (versus that under Section 620.615) are found under Tier 2 at Section 742.805 and under Tier 3 at Section 742.915(h).

We have examined whether satisfaction of the remediation objectives under the TACO rules should be deemed satisfaction of the evaluations required under the Section 620.615. We agree with the Agency that either a cross-reference to the mixture rule at Section 620.615 or an alternative mixture is necessary to assure the remediation applicant that compliance with the TACO rules is considered comparable to the groundwater protection afforded by Section 620.615. However, we do not agree with the Agency that the Act and Section 620.615 can be deemed satisfied unless the cumulative affect of similar-acting chemicals is evaluated in all cases. Clearly the two would not be comparable if similar-acting noncarcinogenic chemicals in groundwater are not subject to the mixture rule under Tier 1. Our discussion on that point supra, is found under Tier 1 Groundwater.

To insure that each of the three tiers provides a mixture rule comparable to that found at Section 620.615, the cumulative effect of similar-acting chemicals, both similar-acting carcinogenic and noncarcinogenic chemicals, must be evaluated under each tier. Since the rules proposed today for first notice require just that, we will adopt the cross-reference requested by the Agency. Accordingly, the language proposed for first notice at both Tiers 1 and 2 will provide that the evaluation required under Section.620.615 to be considered satisfied, subject to two exceptions. First, under all three tiers if more than one similar-acting noncarcinogenic chemical is detected at the site, the mixture rule set out at Section 742.805(c) or that developed under Tier 3 must be applied. Second, if a similar-acting carcinogenic chemical listed on Appendix A.Table H is detected (whether or not this carcinogen is listed on Table H) plus any other similar- acting carcinogen is detected at the site, the mixture rule at Section 742.805(d) or that developed under Tier 3 must be applied. Compliance with one of the applicable mixture rule under TACO serves to satisfy the statutory requirement that

multiple substances be addressed, and the mixture rule serves as an appropriate alternative procedure to that set out at Section 620.615. Therefore, the remediation applicant knows what procedures to undertake to obtain a no further remediation determination. Furthermore, this approach eliminates any challenge on the grounds that the requirements of the Act or the Board's groundwater regulations concerning multiple similar-acting chemicals were not met.

Finally, we note that we have modified the Agency's proposed language. Those principle modifications include substituting (1) "the requirements of Section 620.615" with the term "evaluations" and (2) "shall be considered met" with the term "satisfied". The Board believes these substitutions more accurately reflect the appropriate cross-reference and relationship between the two rules.

Tier 1

In Docket A on June 5, 1997, we adopted as final some of the language proposed by the Agency at Section 742.505(b). The mixture rule adopted was applicable only to the groundwater remediation objectives under Tier 1, but for similar-acting noncarcinogenic chemicals only and regardless of whether the Tier 1 remediation objectives were exceeded. The Board found that a mixture rule for similar-acting noncarcinogenic chemicals necessary to protect human health. The example relied upon by the Board was a hypothetical site where BETX are present at levels equal to their respective Tier 1 remediation objectives. The acronym BETX stands for the carcinogen, benzene, and the similar-acting noncarcinogenic chemicals, ethylbenzene and toluene, which both affect the kidney and liver.[4] The cumulative effect of these two similar-acting noncarcinogenic chemicals could result in a hazard quotient greater than one, and therefore their presence in the groundwater could pose a risk to human health. Tiered Approach to Corrective Action Objectives: 35 Ill. Adm. Code 742 (June 5, 1997) R97-12(A), slip. op. at 46-50. The adoption of a mixture rule applicable to this scenario requires that the remediation objectives be corrected to levels where the hazard quotient is less than or equal to one.

After meeting with some of the participants after the adoption of Docket A, the Agency concluded that, for the protection of human health, the mixture rule need only apply to similar-acting carcinogenic chemicals in the context of groundwater remediation objectives and only when the applicable Tier 1 remediation objectives are exceeded or if the remediation objective was based on a risk factor of greater than 1 in 1,000,000.

Based on the evidence presented to the Board by the Agency in Docket A and as summarized below in this Docket B, the Board finds (1) that a mixture rule is not necessary for either carcinogenic or noncarcinogenic chemicals when developing soil remediation objectives under Tier 1 and (2) that a mixture rule is necessary for similar-acting carcinogenic and noncarcinogenic chemicals when developing groundwater remediation objectives under Tier 1.

[4] The "X" in BETX stands for xylene, a chemical not part of this discussion.

Soil

With regard to Tier 1 soil remediation objectives, Dr. Hornshaw testified that the inherent protection built into the process of developing the Tier 1 soil remediation objectives, for similar-acting carcinogenic and noncarcinogen, made consideration of the additivity of effects of similar-acting chemicals unnecessary in Tier 1. Tr.1 at 14, 19. Because these levels are premised upon the SSL, they are sufficiently conservative to obviate the need to evaluate the cumulative effect of similar-acting chemicals on the same target organ. Therefore, the remediation objectives set forth in Appendix A.Tables E and F are protective of human health in the context of soil remediation objectives.

Groundwater

Dr. Hornshaw testified that, initially, the Agency assumed that the requirements of 35 Ill. Adm. Code 620.615 regarding mixtures of similar-acting chemicals would govern the development of remediation objectives at a site. Tr.1 at 16. Therefore, the Agency and the SRAC agreed that it was not necessary to address mixtures of similar-acting carcinogenic and noncarcinogenic chemicals in groundwater in any tier. Tr.1 at 16. After some discussion, however, the Agency decided that a mixture rule for similar-acting carcinogenic and noncarcinogenic chemicals in Class I groundwater is necessary and appropriate because it is required by 35 Ill. Adm. Code 620.615. Tr.1 at 17.

Regarding similar-acting chemicals in groundwater at Tier 1, the Agency believes that the consideration of similar-acting chemicals is required by both Title XVII of the Act and 35 Ill. Adm. Code 620 of the Board's regulations. Tr.1 at 21. Dr. Hornshaw further testified that the Agency and the SRAC agreed that the original version of Part 742 was unclear regarding the requirements for remediation objectives for similar-acting chemicals in groundwater. Tr.1 at 20. Finally, the Agency reiterated its belief that Title XVII mandates that the remediation objectives in Tier 1 consist only of look-up tables. PC 1 at 2.

The Agency maintains that, unlike the Tier 1 soil remediation objectives, there is not necessarily the same degree of protection built into the groundwater remediation objectives. Tr.1 at 21. In support of its argument, Dr. Hornshaw suggested that an additional layer of protection is built into the soil remediation objectives, due to the assumptions made regarding transport in soil. Tr.1 at 21-22. Whereas for the groundwater component of the groundwater ingestion exposure route, Dr. Hornshaw argued that the only conservatisms built into development of the remediation objectives are assumptions regarding the toxicity and the actual intake of the chemical. Tr.1 at 21-22.

Further, Dr. Hornshaw maintained that, for certain similar-acting carcinogenic chemicals whose Tier 1 groundwater remediation objective are based on the chemical's drinking water standard, the groundwater remediation objectives do not have the same degree of conservatism as the corresponding soil remediation objectives. Tr.1 at 22. The Agency explained that this difference is because USEPA considered factors other than risk when it established the drinking water standards; factors such as natural occurrence, detection limits, or risk/benefit analysis. Tr.1 at 22.

Nevertheless, the Agency concluded that for the most part, "there is an appropriate degree of conservatism in the Tier 1 groundwater remediation objectives such that consideration of similar-acting carcinogenic and noncarcinogenic chemicals is not necessary in Tier 1." Tr.1 at 23-24. However, the Agency requested that the mixture rule include two caveats. The Agency requests that the potential for cumulative effects of mixtures of some similar-acting chemicals must be addressed in a Tier 2 evaluation (1) if any contaminant of concern, (carcinogen or noncarcinogen), exceeds its respective Tier 1 groundwater remediation objective, or (2) if a carcinogen whose Tier 1 groundwater objective is not based on a 1 in 1,000,000 cancer risk is detected in groundwater. Tr.1 at 24. Utilizing the look-up table in the newly proposed Appendix A.Table H, the Agency maintains that the applicant can determine with finality whether any chemicals at a site exceed their Tier 1 objectives. Tr.2 at 36-37.

The Board questioned whether the Agency's proposed mixture rule for Tier 1 groundwater remediation objectives considers similar-acting noncarcinogenic chemicals. Tr.1 at 56. Dr. Hornshaw explained that if any chemical (carcinogen and noncarcinogen) exceeds the Tier 1 remediation objectives, then that chemical, plus any other chemicals that affect the same target organ, shall be elevated to a Tier 2 evaluation to confirm that the mixture effect is addressed properly. Tr.1 at 56-57. In response to further Board questions regarding this issue, Dr. Hornshaw explained that, a remediation applicant need not address cumulative effects at the Tier 1 level unless a chemical exceeds its Tier 1 levels. Tr.1 at 57. If a chemical exceeds its Tier 1 level and there are other chemicals that affect the same target organ, then those chemicals must be remediated based upon Tier 2 methodologies. Tr.1 at 57.

At hearing in this docket, the Board asked the Agency about its position under Docket A. The Board recalled that at the close of first notice in Docket A, the Agency had advocated a mixture rule for both similar-acting carcinogenic and noncarcinogenic chemicals in Class I groundwater despite the statutory distinction between the two. Section 58.5(d) of the Act provides a range of acceptable risk levels for similar-acting carcinogenic chemicals; it does not provide anything comparable for similar-acting noncarcinogenic chemicals. According to its public comment at that time, the Agency advocated that the mixture rule be applicable to both similar-acting carcinogenic and noncarcinogenic chemicals because "[t]he Agency has taken the position that Part 742 should rely on the State's groundwater standard as closely as possible." Docket A, PC 10 at 11; Tr.2 at 26. The Board further noted, using a hypothetical situation, that it had identified two similar-acting noncarcinogenic contaminants of concern at levels near their respective remediation objectives where the value of the cumulative weighted average equation could result in a hazard quotient greater than one. Tr.2 at 27-28. A hazard quotient, also referred to as a hazard index, is a ratio of the chemical level present at a site and the acceptable level of each similar-acting chemical. Under the Board's groundwater rules, specifically those at Section 620.615, if the hazard index/quotient is greater than one, the remediation objective must be corrected to levels where the hazard index/quotient is less than or equal to one.

Next, the Board questioned Dr. Hornshaw why the Agency changed its policy and now maintains that similar-acting noncarcinogenic chemicals in groundwater need not be addressed

unless one of them exceeds the Tier 1 remediation. Dr. Hornshaw responded that, "we came to the conclusion that there is enough conservatism built into the Tier 1 objective for the noncarcinogens that…we don't think that there is a concern for mixtures." Tr.2 at 28. He further stated, however, that if the applicant is performing a Tier 2 evaluation, some of the conservatism is lost so that the Agency feels it is appropriate in that scenario to address mixtures of similar-acting chemicals. Tr.2 at 28. In addition, Dr. Hornshaw testified that the Agency drew upon language from 35 Ill. Adm. Code 620.615 which states that "if two or more of the chemical substances are similar-acting then the Agency shall consider mixtures of similar-acting substances." Tr.2 at 28. Due to the "requirements" set forth in 35 Ill. Adm. Code 620.615, Dr. Hornshaw explained that the Agency decided it is unnecessary to evaluate mixtures of noncarcinogenic chemicals at Tier 1, but if an applicant is performing a Tier 2 remediation, mixtures of noncarcinogenic chemicals must be addressed. Tr.2 at 28-29.

Moreover the Board questioned whether the hazard quotient could exceed one at a site. The Agency responded that the hazard quotient could exceed one if, for example, both ethylbenzene and toluene are present at a site. PC 1 at 2; See Tr.2 at 33. These two chemicals are likely to exist, the Agency maintains, at a UST site. PC 1 at 2. Moreover, Dr. Hornshaw stated that the carcinogen, benzene, is also likely to be at a majority of the UST sites, and it very likely will exceed the Tier 1 remediation objectives. PC 1 at 2; Tr.2 at 33. Further, Dr. Hornshaw testified that "it is benzene that is going to drive most of the cleanups." PC 1 at 3; Tr.2 at 33.

Addressing its change in policy concerning the need for a mixture rule for similar-acting noncarcinogenic chemicals under Tier 1, Gary King, Manager of the Division of Remedial Management, testified that "although there is a possibility that for the noncarcinogens you could exceed a hazard quotient of one, the Agency felt that following the statutory mandates to have a look-up table that people could rely on was most critical." PC 1 at 3; See Tr.2 at 37. Finally, he noted that, "one of the things we wanted to do was continue to have a Tier 1 table that had integrity, so that if you met the Tier 1 numbers, you didn't have to jump to Tier 2 or Tier 3." Tr.2 at 37.

The Agency claims that there is enough built-in protection in the groundwater remediation objectives for it to conclude that the mixture rule need not apply under Tier 1. The Agency has not identified the distinction between the tiers which renders the pre-established remediation objectives under Tier 1 so conservative that the presence of similar-acting chemicals in excess of the hazard quotient/index of one is protective of human health. The Agency has only identified a policy change on its part as reason to support its position. We believe that the mixture rule must apply in all cases if the remediation objectives under all three tiers are to be equally protective.

At hearing, Harry Walton on behalf of the SRAC, the IERG and Illinois Power Company, testified that one of the guiding tenets of this rulemaking was to create a look-up table to provide finality in the remediation process. Tr.2 at 44. Mr. Walton further testified that there is a need to evaluate those constituents for which the Tier 1 value exceeds the 1 in 1,000,000 cancer risk. Tr.2 at 44. He argued that, in those situations, those constituents should be evaluated under a

Tier 2 analysis. Tr.2 at 44. In doing so, the integrity of the look-up table is maintained. Tr.2 at 44. Mr. Walton asserted that maintaining the integrity of the look-up table is important because the regulated community wants certainty in the remediation process. Tr.2 at 47.

Mr. Walton also testified that since Tier 1 is based on the groundwater standards, it meets the intent of the groundwater protection standards. Tr.2 at 45. He explained that the 35 Ill. Adm. Code 620 numbers were generated in a general use strategy, while the 35 Ill. Adm. Code 742 numbers are intended to be applied to remedial programs. Tr.2 at 45.

In response to a Board question, Mr. Walton hypothesized that a remediation applicant could calculate a remediation objective less than the Tier 1 levels when doing a Tier 2 analysis, but he had not been able to identify such a scenario. Tr.2 at 48-49. Mr. Walton suggested that, because the primary constituent of concern drives the remediation process, if that objective is satisfied, then typically the other remediation objectives will be satisfied. Tr.2 at 49. For example, in Mr. Walton's experience, benzene drives most remediations because it moves aggressively in the environment. He concluded that remediating benzene would typically cause the other contaminants to be remediated. Tr.2 at 45 and 49.

We sympathize with the desire by the Agency and the participants for the simplicity of "look-up tables" under Tier 1. However, the Agency recommends and the participants agree that under Tier 1 more than a simple look-up table is necessary when determining groundwater remediation objectives for similar-acting carcinogenic chemicals which exceed the high end of the statutory risk range of 1 in 1,000,000 cancer risk. Likewise, the evidence does not support a simple look-up table when the cumulative effect of similar-acting noncarcinogenic chemicals in groundwater exceeds the hazard quotient/index of one. Furthermore, we believe that the burden on a remediation applicant to determine the cumulative effect of similar-acting noncarcinogenic chemicals and to correct the remediation objectives as necessary is not unduly burdensome. The example most used by the participants is the presence of BETX at a site. They agree that the cleanup at such a site will be driven by the carcinogen, benzene, and testified that the similar-acting noncarcinogenic chemicals will be cleaned up to acceptable levels coincidental to the benzene cleanup. In such a case, then the only additional burden on the remediation applicant will be to perform the necessary calculations to determine the cumulative effect and the corrected remediation objectives, and prove that the latter where achieved as part of the benzene remediation.

Tier 2

Under Docket A, the adopted mixture rule is applicable only for similar-acting noncarcinogenic chemicals in the context of *both* groundwater and soil remediation objectives. The Board did not adopt a mixture rule for similar-acting carcinogenic chemicals because the record did not support the same. Tiered Approach to Corrective Action Objectives: 35 Ill. Adm. Code 742 (June 5, 1997), R97-12(A) slip. op. at 49-50.

The Agency's position under Docket B is that a mixture rule for similar-acting noncarcinogenic chemicals is still necessary for soil and groundwater remediation objectives,

but the only mixture rule necessary for similar-acting carcinogenic chemicals is in the context of groundwater remediation objectives. Based upon the evidence presented by the Agency, as summarized below, we agree with the Agency. We note that because a mixture rule for similar-acting noncarcinogenic chemicals only was adopted under Tier 2 on June 5, 1997, the Board need only amend the existing Tier 2 rules to include a mixture rule at Section 742.810 for similar-acting carcinogenic chemicals in excess of the groundwater remediation values determined under Tier 2.

Soil

As for mixtures of similar-acting chemicals in soil under Tier 1 or 2, Dr. Hornshaw testified that it was only necessary to address mixture effects of similar-acting noncarcinogenic chemicals because, for similar-acting carcinogenic chemicals, the language of Section 58.5(d) of the Act specifically provides for the establishment of remediation objectives at an excess lifetime cancer risk of between 1 in 10,000 and 1 in 1,000,000. Tr.1 at 15. Dr. Hornshaw further explained that the Agency and the SRAC were in agreement that, "since the statute provides for an acceptable cancer risk range and since even if there are 10 carcinogens present at their respective 1 in 1,000,000 remediation objectives (an unusual event), the cumulative cancer risk of 1 in 100,000 is still within an acceptable range." Tr.1 at 15. On the other hand, because the Act does not specify an acceptable risk range for similar-acting noncarcinogenic chemicals, Dr. Hornshaw concluded that the additive effects of similar-acting noncarcinogenic chemicals need to be considered and provided for in Tier 2. Tr.1 at 15, 19.

Groundwater

With regard to mixtures of similar-acting carcinogenic chemicals in groundwater under Tier 2, the Agency maintains that there are similar-acting carcinogenic chemicals whose groundwater objectives exceed the 1 in 1,000,000 cancer risk level, and which, if present in a mixture with other similar-acting carcinogenic chemicals, could potentially result in a cumulative cancer risk exceeding 1 in 10,000. Tr.1 at 24. The Agency argues that, given the statutory and regulatory requirements to consider mixture effects in groundwater, the mixture rule should be applied to Tier 2 mixtures of similar-acting carcinogenic chemicals. Tr.1 at 22-23. Accordingly, the Agency concluded that only similar-acting carcinogenic chemicals whose Tier 1 groundwater objectives exceed the 1 in 1,000,000 risk level and those similar-acting carcinogenic chemicals whose Tier 1 groundwater remediation objectives are not based on a 1 in 1,000,000 risk level must be evaluated for mixture effects in Tier 2. Tr.1 at 24. Finally, the Agency proposes that those similar-acting carcinogenic chemicals whose Tier 1 groundwater remediation objectives exceed the 1 in 1,000,000 risk level will be specifically identified in a look-up table. Tr.1 at 24; See Exh. 1, Appendix A, Table H.

As for mixtures of similar-acting noncarcinogenic chemicals in groundwater, Dr. Hornshaw testified that its was generally agreed by the Agency and the SRAC that consideration of similar-acting noncarcinogenic chemicals in Tier 2 is required. Tr.1 at 20.

At hearing, Mr. Reiser questioned Dr. Hornshaw about how Section 742.805(d) is supposed to work. Tr.1 at 40. Dr. Hornshaw responded that if a chemical detected at a site

during the site investigation is on the newly proposed Appendix A.Table H, then that chemical is a carcinogen whose Tier 1 remediation objective exceeds the 1 in 1,000,000 target cancer risk. In that case, the additive effect of that chemical and all those chemicals detected at the site which affect the same target organ must be considered in a Tier 2 evaluation. Tr.1 at 40. Mr. Reiser also questioned whether such a chemical must exceed its Tier 1 level for the mixture rule to apply. Tr.1 at 43. Dr. Hornshaw responded that such a chemical does not have to exceed its Tier 1 level, rather it is sufficient that it exceeds its detection level for the mixture rule to be applicable. Tr.1 at 43.

Finally, Mr. Reiser asked how cumulative risk is determined. Tr.1 at 43-44. Dr. Hornshaw suggested that cumulative risk can be assessed by several methods. First, Dr. Hornshaw explained, proposed Appendix A.Table H provides a list of chemicals with a greater than 1 in 1,000,000 risk level. Tr.1 at 44. A second approach is to use the same kind of approach in Section 742.805(c)(1) where the applicant would calculate a weighted average using the concentration detected over an acceptable concentration, i.e., 1 in 10,000 risk level. Tr.2 at 10. Third, a remediation applicant could pursue a more formal risk assessment and actually calculate the risk of the entire mixture given exposure assumptions that are either default in approach or developed as part of a Tier 3 risk assessment. Tr.1 at 44.

Tier 3

Under Docket B, the Agency has again requested the mixture rule apply to both soil and groundwater remediation objectives for both similar-acting carcinogenic and noncarcinogenic chemicals. Tr.1 at 19, 27. The Agency proposed the following language towards that end:

> Contaminants of concern which affect the same target organ, organ system or similar mode of action shall be specifically addressed. At a minimum, the chemical subject to this requirement are identified in Appendix A, Tables E and F.

In response to a Board Member's question regarding how similar-acting chemicals will be addressed in Tier 3, Dr. Hornshaw explained that there are guidance documents provided by USEPA for conducting risk assessments at Superfund sites. Tr.1 at 60. These guidance documents provide instructions with quantified results informing the responsible party how to address mixtures of similar-acting carcinogenic and noncarcinogenic chemicals. Tr.1 at 60-61. The instructions include an evaluation of exposure through all routes and a comparison against acceptable exposures to determine whether the situation needs to be evaluated further. Tr.1 at 61.

The Board proposes for first notice the amendments requested under Tier 3 by the Agency to insure that the cumulative effects of both carcinogenic and noncarcinogenic chemicals are evaluated under the Tier 3 site-specific approach. That language is found at Section 742.915(h), and the regulation previously located there is entirely relocated to subparagraph (i) of the same section.

In closing, the Board questions why the proposed language does not parallel more closely that requested under Tiers 1 and 2. Most specifically, the Board believes that the mixture rule under Tier 3 should (1) use the term "similar-acting chemical"; (2) provide minimum requirements for specifically addressing the cumulative effects of similar-acting chemicals, be they similar-acting carcinogenic or noncarcinogenic chemicals; and (3) that compliance with those minimum requirements will be deemed protective of Class I groundwater in terms of human health. The Board asks that the Agency and the participants consider and comment on these suggested revisions.

CONCLUSION

The Board proposes for first notice a mixture rule for similar-acting chemicals in Class I groundwater which spans uniformly all three tiers of TACO. The rule proposed is basically that proposed by the Agency with one exception. That exception is that the Board proposes to apply the mixture rule under Tier 1 to similar-acting noncarcinogenic chemicals detected in groundwater at sites. The Agency ultimately proposed that the mixture rule under Tier 1 apply only to similar-acting carcinogenic chemicals, but that it apply to both similar-acting noncarcinogenic and carcinogenic chemicals under Tiers 2 and 3.

The Board concludes that a mixture rule for similar-acting noncarcinogenic chemicals in groundwater is required under Tier 1, as well as under Tiers 2 and 3, because the remediation objective for similar-acting noncarcinogenic chemicals in groundwater is premised upon a hazard quotient of one. If that ratio is exceeded, the levels of the similar-acting noncarcinogenic chemicals at the site exceed acceptable levels, whether or not the remediation objective is exceeded. The Agency has provided no evidence to the contrary. Again, while we sympathize with the participants' desire for simple look-up tables for similar-acting noncarcinogenic chemicals in groundwater under Tier 1, we find that the evidence instead supports that protection of human health requires a mixture rule under all three tiers for similar-acting noncarcinogenic chemicals in groundwater.

Finally, having proposed the mixture rule to be all-inclusive, the Board adopts the cross-reference to Section 620.615 of the Board's groundwater rules. Thus, the remediation applicant and the public are assured that an evaluation of similar-acting chemicals provided thereunder is also provided under TACO.

ORDER

The Board directs the Clerk to cause the filing of the following proposal for first notice in the *Illinois Register*:

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

SUBPART B: GENERAL

SUBPART C: EXPOSURE ROUTE EVALUATIONS

SUBPART D: DETERMINING AREA BACKGROUND

SUBPART E: TIER 1 EVALUATION

SUBPART F: TIER 2 GENERAL EVALUATION

SUBPART G: TIER 2 SOIL EVALUATION

SUBPART H: TIER 2 GROUNDWATER EVALUATION

SUBPART I: TIER 3 EVALUATION

SUBPART J: INSTITUTIONAL CONTROLS

SUBPART K: ENGINEERED BARRIERS

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)
Table J	Values to be Substituted for k_s When Evaluating Inorganics as a Function of pH (cm(3)[water]/g[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, Title XVI and Title VII] (see P.A. 88-496, effective September 13, 1993 and P.A. 89-0431, effective December 15, 1995).

MAIN SOURCE: Adopted at 21 Ill. Reg. 7942, effective July 1, 1997, amended at 21 Ill. Reg. _____, effective _____.

NOTE: Capitalization indicates statutory language.

Section 742.105 Applicability

a) Any person, including a person required to perform an investigation pursuant to the Illinois Environmental Protection Act (415 ILCS 5/1 et seq.) (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. 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);

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 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 55/1 *et seq.*) as long as done in accordance with Sections 742.805~~(a)~~ and 742.900(c)(9). (415 ILCS 5/58.5(d)(4)

SOURCE: Amended at 21 Ill. Reg. _____ , effective _____.

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 5/1 et seq.).

"ADL" means Acceptable Detection Limit, which is the detectable concentration of a substance which 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.

"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. (Section 58.2 of the Act)

"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. (Section 58.2 of the Act)

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

"Class II Groundwater" means groundwater that meets the Class II: General Resource Groundwater criteria set forth in 35 Illinois Administrative 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. (Section 58.2 of the Act)

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

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

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

"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. (Section 3.64 of the Act)

"Groundwater Quality Standards" means the standards for groundwater as set forth in 35 Illinois Administrative 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 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.

"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. (Section 58.2 of the Act)

"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. (Section 58.2 of the Act)

"Negative Easement" means a right of the owner of the dominant or benefitted estate or property to restrict the property rights of the owner of the servient or burdened estate or property.

"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. (Section 58.2 of the Act)

"Point of Human Exposure" means the point(s) 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.

"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 (RfC)" means an estimate of a daily exposure, in units of milligrams of chemical per cubic meter of air (mg/m^3), 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 (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). (Section 58.2 of the Act)

"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.

"Restrictive Covenant or Deed Restriction" means a provision placed in a deed limiting the use of the property and prohibiting certain uses. (Black's Law Dictionary, 5th Edition)

“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. (Section 58.2 of the Act)

"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 (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.

"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.

"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.

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

"Volatile Organic Compounds (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, 8015, 8020, 8021, 8030, 8031, 8240, 8260, 8315, and 8316. For analytes not listed in any category in those methods, those analytes which have a boiling point less than 200^0C and a vapor pressure greater than 0.1 Torr (mm Hg) at 20^0C.

SOURCE: Amended at 21 Ill. Reg. _____ , effective _____.

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) <u>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:</u> ~~The Class I groundwater remediation objectives set forth in Appendix B, Table E shall be corrected for cumulative effect of mixtures of similar-acting noncarcinogenic chemicals in accordance with the methodoligies set forth in either subsection (A) or (B), if more than one chemical listed in Appendix A, Table E is detected at~~

~~a site and if such chemicals affect the same target organ (i.e., has the same critical effect as defined by the RfD)~~

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 ~~Calculate the weighted average using the following equations:~~

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

~~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/mode of action, the actual number of contaminants will range from 2 to 14.~~

~~$CUOx_a$ = A Tier 1 remediation objective must be developed for each x_a.~~

~~ii) 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.~~

~~iii) 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;~~

B) No carcinogenic contaminant of concern as listed in Appendix A, Table 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. ~~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~~

4) If the conditions of subsection (b)(3) 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 21 Ill. Reg. _____ , effective _____.

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, 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;

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:

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

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.

$CUOx_a$ = A Tier 1 or Tier 2 remediation objective must be developed for each x_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.

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 addivity.

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 at 21 Ill. Reg. _____ , effective _____.

Section 742.915 Formal Risk Assessments

A comprehensive site-specific risk assessment shall demonstrate that contaminants of concern at a site do not pose a significant risk to any human receptor. All site-specific risk assessments shall be submitted to the Agency for review and approval. A submittal under this Section shall address the following factors:

a) Whether the risk assessment procedure used is nationally recognized and accepted including, but not limited to, those procedures incorporated by reference in Section 742.210;

b) Whether the site-specific data reflect actual site conditions;

c) The adequacy of the investigation of present and post-remediation exposure routes and risks to receptors identified at the site;

d) The appropriateness of the sampling and analysis;

e) The adequacy and appropriateness of toxicity information;

f) The extent of contamination; ~~and~~

g) Whether the calculations were accurately performed;~~.~~

h) Similar-acting chemicals shall be specifically addressed. At a minimum, the chemicals subject to this requirement are identified in Appendix A, Tables E and F and; ~~Proposals seeking to modify the target risk consistent with Section 742.900(d) shall address the following factors:~~

~~1) the presence of sensitive populations;~~

~~2) the number of receptors potentially impacted;~~

~~3) the duration of risk at the differing target levels; and~~

~~4) the characteristic of the chemicals of concern.~~

i) Proposals seeking to modify the target risk consistent with Section 742.900(d) shall address the following factors:

1) the presence of sensitive populations;

2) the number of receptors potentially impacted;

3) the duration of risk at the differing target levels; and

4) the characteristic of the chemicals of concern.

SOURCE: Amended at 21 Ill. Reg. _____ , effective _____.

Section 742.APPENDIX A: General

Section 742.TABLE E: Similar-Acting Noncarcinogenic Chemicals ~~with Noncarcinogenic Toxic Effects on Specific Target Organs/Organ Systems or Similar Modes of Action~~

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

Liver
Acenaphthene
Acetone

Butylbenzyl phthalate
1,1-Dichloroethylene
Chlorobenzene
Di-n-octyl phthalate
Endrin
Ethylbenzene
Fluoranthene
Nitrobenzene
Picloram
Styrene
2,4,5-TP (Silvex)
Toluene
2,4,5-Trichlorophenol

Central Nervous System
Butanol
Cyanide (amenable)
2,4-Dimethylphenol
Endrin
Manganese
2-Methylphenol
Mercury
Styrene
Xylenes

Circulatory System
Antimony
Barium
2,4-D
cis-1,2-Dichloroethylene
Nitrobenzene
trans-1,2-Dichloroethylene
2,4-Dimethylphenol
Fluoranthene
Fluorene
Styrene
Zinc

Gastrointestinal System
Endothall
Hexachlorocyclopentadiene
Methyl bromide

Reproductive System
Barium
Boron
Carbon disulfide
2-Chlorophenol
1,2 Dibromo-3-Chloropropane (Inhalation only)
Dinoseb
Methoxychlor
Phenol

Cholinesterase Inhibition
Aldicarb
Carbofuran

POLLUTION CONTROL BOARD

NOTICE OF ADOPTED RULES

Decreased Body Weight Gains
and Circulatory System Effects
Atrazine
Simazine

Adrenal Gland
Nitrobenzene
1,2,4-Trichlorobenzene

Respiratory System
1,2-Dichloropropane
Hexachlorocyclopentadiene
Methyl bromide
Vinyl acetate

Immune System
2,4-Dichlorophenol
p-Chloroaniline

SOURCE: Amended at 21 Ill. Reg. _____ , effective _____.

Section 742.APPENDIX A: General

Section 742.TABLE F: Similar-Acting Carcinogenic Chemicals ~~With Carcinogenic Toxic Effects on Specific Target Organs/Organ Systems or Similar Modes of Action~~

Kidney
Bromodichloromethane
Chloroform
1,2-Dibromo-3-chloropropane
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Hexachlorobenzene

Liver
Aldrin
Bis(2-chloroethyl)ether
Bis(2-ethylhexyl)phthalate
Carbazole
Carbon tetrachloride
Chlordane
Chloroform
DDD
DDE
DDT
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
3,3'-Dichlorobenzidine
1,2-Dichloroethane
1,3-Dichloropropane (Ingestion only)
1,3-Dichloropropylene
Dieldrin
2,4-Dinitrotoluene
2,6-Dinitrotoluene
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
alpha-HCH
gamma-HCH (Lindane)
Methylene chloride
N-Nitrosodiphenylamine
N-Nitrosodi-n-propylamine
Pentachlorophenol
Tetrachloroethylene

Trichloroethylene
2,4,6-Trichlorophenol
Toxaphene
Vinyl chloride

Circulatory System
Benzene
2,4,6-Trichlorophenol

Gastrointestinal System
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Chrysene
Dibenzo(a,h)anthracene
Indeno(1,2,3-c,d)pyrene
Bromodichloromethane
Bromoform
1,2-Dibromo-3-chloropropane
1,2-Dibromoethane
1,3-Dichloropropylene

Lung
Arsenic
Beryllium (Inhalation only)
Cadmium (Inhalation only)
Chromium, hexavalent (Inhalation only)
1,3-Dichloropropylene
Methylene chloride
N-Nitrosodi-n-propylamine
Vinyl chloride

Nasal Cavity
1,2-Dibromo-3-chloropropane
(Inhalation only)
1,2-Dibromoethane (Inhalation only)
N-Nitrosodi-n-propylamine

Bladder
3,3'-Dichlorobenzidine
1,3-Dichloropropylene
N-Nitrosodiphenylamine

SOURCE: Amended at 21 Ill. Reg. _____ , effective _____.

Section 742.APPENDIX A: General

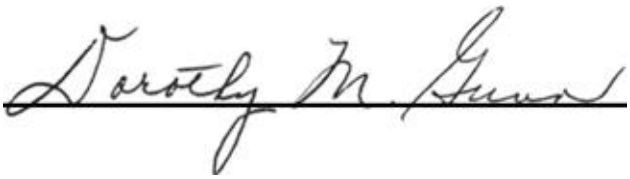
TABLE H: Chemicals Whose Tier 1 Class I Groundwater Remediation Objective Exceeds the 1 in 1,000,000 Cancer Risk Concentration.

Chemical	Class I Groundwater Remediation Objective (mg/l)	1 in 1,000,000 Cancer Risk Concentration (mg/l)	ADL (mg/l)
Aldrin	0.00004	0.000002	0.00004
Benzo(a)pyrene	0.0002	0.000005	0.00023
Bis(2-chloroethyl)ether	0.01	0.00003	0.01
Bis(2-ethylhexyl)phthalate	0.006	0.003	0.0027
Carbon Tetrachloride	0.005	0.0003	0.00003
Chlordane	0.002	0.00003	0.00014
Dibenzo(a,h)anthracene	0.0003	0.000005	0.0003
1,2-Dibromo-3-chloropropane	0.0002	0.00003	0.0002
1,2-Dibromoethane	0.00005	0.0000004	0.00005
3,3'-Dichlorobenzidine	0.02	0.00008	0.02
1,2-Dichloroethane	0.005	0.0004	0.00003
Dieldrin	0.00002	0.000002	0.00002
Heptachlor	0.0004	0.000008	0.00003
Heptachlor epoxide	0.0002	0.000004	0.00032
Hexachlorobenzene	0.00006	0.00002	0.00006
alpha-HCH	0.00003	0.000006	0.00003
Tetrachloroethylene	0.005	0.0007	0.00001
Toxaphene	0.003	0.00003	0.00086
Vinyl Chloride	0.002	0.000015	0.00006
Ionizable Organics			
N-Nitrosodiphenylamine	0.01	0.007	0.01
N-Nitrosodi-n-propylamine	0.01	0.000005	0.01
Pentachlorophenol	0.001	0.0003	0.001
2,4,6-Trichlorophenol	0.0064	0.003	0.0064
Inorganics			
Arsenic	0.05	0.00002	0.001
Beryllium	0.004	0.0000083	0.004

SOURCE: Adopted at 21 Ill. Reg. _____ , effective _____.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the10th day of July 1997, by a vote of 6-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board