

**ENVIRONMENTAL PROTECTION  
COMMISSION[567]  
Notice of Intended Action For Information**

Pursuant to the authority of Iowa Code section 455B.474, the Environmental Protection Commission proposes to amend Chapter 135, “Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks,” Iowa Administrative Code.

The amendments propose to revise the current Tier 2 software model (*Tier 2 Version 2.51*) based on observations during the first decade of use. There was a perception that the length of plumes generated by the Tier 2 groundwater model may significantly over-estimate the length of actual groundwater contamination plumes. Changes were made to recalibrate the Tier 2 software model to make the modeled groundwater plumes more closely match the actual plumes.

The Department also looked at the potential impact of the RBCA Tier 2 model revision (*Tier 2 Version 3.1*) on sites with respect to public water supply wells and what effect public water supply wells may have on inducing contaminant plume movement. For situations where there is a potential for plumes to be drawn into the water supply, the revised RBCA *Tier 2 Version 3.1* model alone could be an inappropriate tool for their risk evaluation. Therefore, the amendments establish a screening process which involves the Department using their existing source water protection evaluation of the public water supply well to determine whether the risk to the public water supply well should be assessed using the previous *Tier 2 Version 2.51* model, which is more conservative.

The amendments also establish a procedure to implement corrective action at high risk sites either through a collaborative meeting process resulting in a Memorandum of Agreement between the interested parties and the department or submittal of a Corrective Action Design Report.

Three public hearings will be held at the following locations:

March 4, 2008	Community Meeting Room
1:00 – 3:00 PM	Denison City Hall Clerk’s Office

111 N Main St  
Denison, Iowa

March 5, 2008      Iowa City Public Library  
1:00 – 3:00 PM      Meeting Room B  
123 S Linn Street  
Iowa City, Iowa

March 6, 2008      Wallace State Office Building  
1:00 – 3:00 PM      5<sup>th</sup> Floor Conference Rooms  
502 East Ninth Street  
Des Moines, Iowa

These amendments are intended to implement Iowa Code section 455B.474. A fiscal impact summary prepared by the Legislative Services Agency pursuant to Iowa Code § 17A.4(3) will be available at <http://www.legis.state.ia.us/IAC.html> or at (515) 281-5279 prior to the Administrative Rules Review Committee's review of this rule making.

The following amendments are proposed.

ITEM 1: Amend rule 135.2 by adding the following definitions:

"Corrective action meeting process" is a series of meetings organized by department staff with owners or operators and other interested parties such as certified groundwater professionals, funding source representatives, and affected property owners. The purpose of the meeting process is to develop and agree on a corrective action plan and the terms for implementation of the plan.

"Corrective action plan" is a plan which specifies the corrective action to be undertaken by the owner or operator in order to comply with requirements in this chapter and which is incorporated into a memorandum of agreement or other written agreement between the department and the owner or operator. The plan may include but is not limited to provisions for additional site assessment, site monitoring, Tier 2 revisions, Tier 3 assessment, excavation and other soil and groundwater remediation.

“Memorandum of Agreement” is a written agreement between the department and the owner or operator which specifies the corrective action that will be undertaken by the owner or operator in order to comply with requirements in this chapter and terms for implementation of the plan. The plan may include, but is not limited to, provisions for additional site assessment, site monitoring, Tier 2 revisions, Tier 3 assessment, excavation, and other remedial activities.

“Public Water Supply Well” is a well connected to a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.

“Sensitive Area” is a screening tool used to determine if a public water supply well warrants a more in-depth assessment. It is not intended to be a mechanism to assign a risk classification to the public water supply well receptor. If the leaking underground storage tank site is within a five-year capture zone, or within the 2500-foot radius as determined by the Geological Survey Bureau in the Source Water Protection Evaluation, or 1000 feet of a public water supply well, whichever is larger and has a Source Water Protection Aquifer designation of highly susceptible or susceptible, the leaking underground storage tank site will be considered located within a sensitive area.

ITEM 2 Amend paragraphs 135.8 (1) paragraphs “a” and “c” as follows:

*a. Tier 1.* The purpose of a Tier 1 assessment is to identify sites which do not pose an unreasonable risk to public health and safety or the environment based on limited site data. The objective is to determine maximum concentrations of chemicals of concern at the source of a release(s) in soil and groundwater. If a Tier 1 assessment is required and the department determines the leaking underground storage tank site is located within a sensitive area for a public water supply well, the department will issue a letter notifying the owner or operator that a Tier 2 Site Cleanup Report is required and the *Tier 2 Version 2.51* software must be used to evaluate the risk to the public water supply well receptor. The public water supply well operator will be notified and provided the opportunity to submit any pertinent information to support the additional assessment. The Tier 1 assessment assumes a worst-case scenario in which the actual or potential receptors could

be exposed to these chemicals at maximum concentrations through certain soil and groundwater pathways. The point of exposure is assumed to be the source showing maximum concentrations. Risk-based screening levels (Tier 1 levels) contained in the Tier 1 Look-Up Table have been derived from models which use conservative assumptions to predict exposure to actual and potential receptors. (These models and default assumptions are contained in Appendix A.) If Tier 1 levels are not exceeded for a pathway, that pathway may not require further assessment. If the maximum concentrations exceed a Tier 1 level, the options are to conduct a more extensive Tier 2 assessment, apply an institutional control, or in limited circumstances excavate contaminated soil to below Tier 1 levels. If all pathways clear the Tier 1 levels, it is possible for the site to obtain a no action required classification.

*c. Tier 3.* Where site conditions may not be adequately addressed by Tier 2 procedures, a Tier 3 assessment may provide more accurate risk assessment. The purpose of a Tier 3 is to identify reasonable exposure levels of chemicals of concern and to assess the risk of exposure to existing and potential receptors based on additional site assessment information, probabilistic evaluations, or sophisticated chemical fate and transport models in accordance with 135.11(455B). The department can request a Tier 3 assessment of risk if the site conditions have not been adequately addressed by the Tier 2 procedures.

ITEM 3 Amend paragraphs 135.10 (1) as follows:

*General conditions.* A Tier 2 site assessment must be conducted and a site cleanup report submitted for all sites which have not obtained a no action required site classification and for all pathways and chemicals of concern groups that have not obtained no further action clearance as provided in 135.9(455B). If in the course of conducting a Tier 2 assessment, data indicates the conditions for pathway clearance under Tier 1 no longer exist, the pathway shall be further assessed under this rule. The Tier 2 assessment and report must be completed whenever free product is discovered as provided in 135.7(455B) or if required by departmental correspondence per 135.8(1)a, the public water supply well receptor must be evaluated by the Tier 2 Version 2.51 software. If the owner or operator elects to complete the Tier 2 site assessment without

doing a Tier 1 assessment, all the Tier 1 requirements as provided in 135.9(455B) must be met in addition to requirements under this rule. If the department determines the leaking underground storage tank site is within a sensitive area, the public water supply well operator will be notified and provided the opportunity to submit any pertinent information to support additional assessment.

ITEM 4. Amend paragraphs 135.10(4)"a", "b" and "f" as follows:

*a. Pathway completeness.* Unless cleared at Tier 1, this pathway is complete and must be evaluated under any of the following conditions: (1) the first encountered groundwater is a protected groundwater source; or (2) there is a drinking water well or a non-drinking water well within the modeled groundwater plume or the actual plume as provided in 135.10(2)"j" and 135.10(2)"k"; or (3) the department has determined the leaking underground storage tank site is within a sensitive area.

*b. Receptor evaluation.* At a minimum, all drinking water and non-drinking water wells located within 1000 feet of the site must be identified. If the leaking underground storage tank site is located within a sensitive area for a public water supply well, the Groundwater Ingestion to Drinking Water Well Pathway must be evaluated using the Tier 2 Version 2.51 software. All other pathways may be evaluated using the Tier 2 Version 3.1 software. The owner or operator, the certified groundwater professional, public water supply operator, or the department may request a meeting to discuss the evaluation of the potential risk to a public water supply well.

All drinking or non-drinking water wells located within 100 feet of the largest actual plume (defined to the appropriate target level for the receptor type) must be tested, at a minimum, for chemicals of concern as part of the receptor evaluation. Actual plumes refer to groundwater plumes for all chemicals of concern. Untreated or raw water should be collected for analysis. The certified groundwater professional or the department may request additional sampling of drinking and nondrinking water wells as part of their evaluation.

All existing drinking water wells and non-drinking water wells within the modeled plume or the actual plume as provided in paragraph "a" must be evaluated as actual receptors. Potential receptors only exist if the groundwater is a protected groundwater

source. Potential receptor points of exposure are those points within the modeled plume or actual plume that exceed the potential point of exposure target level. The point(s) of compliance for actual receptor(s) is the receptor. The point(s) of compliance for potential receptor(s) is the potential receptor point of exposure as provided in 135.10(2)“j” and 135.10(2)“k.”

*f. Plume definition.* The groundwater plume shall be defined to the applicable Tier 1 level for actual receptors except, where there are no actual receptors and the groundwater is a protected groundwater source, the plume shall be defined to the Tier 1 level for potential receptors.

ITEM 5 Amend paragraphs 135.12 (3) “d” and “e” as follows:

*d.* A corrective action design report (CADR) must be submitted by a certified groundwater professional for all high risk sites unless the terms of a corrective action plan are formalized in a memorandum of agreement within a reasonable time frame specified by the department. The CADR must be submitted on a form provided by the department and in accordance with department CADR guidance within 60 days of site classification approval as provided in 135.10(11). The CADR must identify at least two principally applicable corrective action options designed to meet the objectives in 135.12(3), an outline of the projected timetable and critical performance benchmarks, a specific monitoring proposal designed to verify its effectiveness and provide sufficient supporting documentation consistent with industry standards that the technology is effective to accomplish site-specific objectives. The CADR must contain an analysis of its cost effectiveness in relation to other options. The department will review the CADR in accordance with 135.12(9).

*e.* Interim monitoring. From the time a Tier 2 site cleanup report is submitted and until the department determines a site is classified as no action required, interim monitoring is required at least annually for all sites classified as high risk. Groundwater samples must be taken: (1) from a monitoring well at the maximum source concentration; (2) a transition well meaning a monitoring well with detected levels of contamination closest to the leading edge of the groundwater plume as defined to the pathway-specific target level, and between the source(s) and the point(s) of exposure; and (3) a guard well

meaning a monitoring well between the source(s) and the point(s) of exposure with concentrations below the SSTL line. If concentrations at the point of exposure already exceed the SSTL, the point of exposure must be monitored. Monitoring conducted as part of remediation or as a condition of establishing a no action required classification may be used to the extent it meets this criteria. Soil monitoring is required at least annually for all applicable pathways in accordance with 135.12(5)“d.”. All existing plastic water lines, drinking water wells and non-drinking water wells within 100 feet of the largest actual plume (defined to the appropriate target level for the receptor type) must be tested annually for chemicals of concern. Actual plumes refer to groundwater plumes for all chemicals of concern.

ITEM 6 Amend paragraphs 135.12 (9) “a” and “d” as follows:

*a.* Owners and operators must submit a corrective action design report (CADR) within 60 days of the date the department approves or is deemed to approve a Tier 2 assessment report under 135.10(11) or a Tier 3 assessment is to be conducted. The department may establish an alternative schedule for submittal. In the alternative to submitting a CADR, owners or operators may participate in a corrective action meeting process to develop a corrective action plan which would be incorporated into a memorandum of agreement or other written agreement approved by the department. Owners or operators shall implement the terms of an approved CADR, memorandum of agreement or other corrective action plan agreement.

*d.* Review. Unless the report proposes to classify the site as no action required, the department must approve the report within 60 days for purposes of completeness or disapprove the report upon a finding of incompleteness, inaccuracy or noncompliance with these rules. If no decision is made within this 60-day period, the report is deemed to be approved for purposes of completeness. The department retains the authority to review the report at any time a no action required site classification is proposed. Owners or operators who fail to implement actions or meet the activity schedule in a memorandum of agreement resulting from a corrective action meeting or other written corrective action plan agreement or who fail to implement the actions or schedule outlined in an approved CADR are subject to legal action.

ITEM 7 Amend 135.18 by adding paragraphs (5), (6), and (7):

135.18(5) Risk based corrective action assessment reports, corrective action plans, and corrective action design reports accepted before **(effective date of revised rule)**. Any owner or operator who had a Tier 2 site cleanup report, Tier 3 report, or corrective action design report approved by the department before **(effective date of revised rule)**, may elect to submit a Tier 2 site cleanup report using the *Tier 2 Version 3.1* software to the department. The owner or operator shall notify the department that they wish to evaluate the leaking underground storage tank site with the *Tier 2 Version 3.1* software. If the owner or operator so elects, the site shall be assessed, classified, and, if necessary, remediated, in accordance with the rules of the department as of **(effective date of revised rule)**. If the leaking underground storage tank site is undergoing active remediation, the remediation system shall remain operating until the re-evaluation is completed and accepted or as otherwise approved by the department. Once a site has been evaluated using the *Tier 2 Version 3.1* software, it can no longer be evaluated with the previous *Tier 2 Version 2.51* software except for the Groundwater Ingestion to Drinking Water Well Pathway where applicable per 135.10(4)(b).

135.18(6) Risk based corrective action assessment reports, corrective action plans, and corrective action design reports in the process of preparation with a submittal schedule established prior to **(effective date of revised rule)**. The owner or operator must notify the department they wish to use the *Tier 2 Version 3.1* software to evaluate the leaking underground storage tank site before submitting the next report, and prior to expiration of the previously established submittal schedule. The department will determine if a sensitive area is present and establish a new activity schedule. Once a site has been evaluated using the *Tier 2 Version 3.1* software, it can no longer be evaluated with the previous *Tier 2 Version 2.51* software except for the Groundwater Ingestion to Drinking Water Well Pathway where applicable per 135.10(4)(b).

135.18(7) Risk based corrective action assessment reports, corrective action plans, and corrective action design reports received by the department but not yet reviewed. The certified groundwater professional will notify the department within 60 days of **(effective date of revised rule)** whether they are electing to complete a risk based corrective action

assessment using Tier 2 Version 3.1 or proceeding with the risk based corrective action assessment using Tier 2 Version 2.51. Once a site has been evaluated using the Tier 2 Version 3.1 software, it can no longer be evaluated with the previous software except for the Groundwater Ingestion to Drinking Water Well Pathway where applicable per 135.10(4)(b).

ITEM 8 Amend Appendix B as follows:

**Appendix B - Tier 2 Equations and Parameter Values**

All Tier 1 equations and parameters apply at Tier 2 except as specified below.

$$C(x) = C_s \exp\left(\frac{x}{2\alpha_x} \left[1 - \sqrt{1 + \frac{4\lambda\alpha_x}{u}}\right]\right) \operatorname{erf}\left(\frac{S_w}{4\sqrt{\alpha_y x}}\right) \operatorname{erf}\left(\frac{S_d}{4\sqrt{\alpha_z x}}\right) \quad (1)$$

$$C(x) = C_s \exp\left(\frac{x_m}{2\alpha_x} \left[1 - \sqrt{1 + \frac{4\lambda\alpha_x}{u}}\right]\right) \operatorname{erf}\left(\frac{S_w}{4\sqrt{\alpha_y x_m}}\right) \operatorname{erf}\left(\frac{S_d}{4\sqrt{\alpha_z x_m}}\right) \quad (1)$$

Where  $x_m = ax + bx^c$  (2)

The value of  $x_m$  is computed from equation (2), where the values for a, b and c in equation (2) are given in Table 1.

Table 1. Parameter values for equation (2)

<u>Chemical</u>	<u>a</u>	<u>b</u>	<u>C</u>
<u>Benzene</u>	<u>1</u>	<u>0.000000227987</u>	<u>3.929438689</u>
<u>Toluene</u>	<u>1</u>	<u>0.000030701</u>	<u>3.133842393</u>
<u>Ethylbenzene</u>	<u>1</u>	<u>0.0001</u>	<u>2.8</u>
<u>Xylenes</u>	<u>1</u>	<u>0.0</u>	<u>0.0</u>
<u>TEH-Diesel</u>	<u>1</u>	<u>0.000000565</u>	<u>3.625804634</u>
<u>TEH-Waste Oil</u>	<u>1</u>	<u>0.000000565</u>	<u>3.625804634</u>
<u>Naphthalene</u>	<u>1</u>	<u>0</u>	<u>0</u>

Variable definitions

x: distance in the x direction downgradient from the source

erf( ): the error function

C(x): chemical concentration in groundwater at x

Cs: Source concentration in groundwater (groundwater concentration at x=0)

Sw: width of the source (perpendicular to x)

$S_d$ : vertical thickness of the source  
 $u$ : groundwater velocity (pore water velocity);  $u=Ki/\theta_e$   
 $K$ : hydraulic conductivity  
 $i$ : groundwater head gradient  
 $\theta_e$ : effective porosity  
 $\lambda$ : first order decay coefficient, chemical specific  
 $\alpha_x, \alpha_y, \alpha_z$ : dispersivities in the x, y and z directions, respectively

For the following lists of parameters, one of three is required: site-specific measurements, defaults or the option of either (which means the default may be used or replaced with a site-specific measurement).

#### Soil parameters

Parameter		Default Value	Required
$\rho_s$	soil bulk density	1.86 g/cm <sup>3</sup>	option
$f_{oc}$	fraction organic carbon in the soil	0.01 kg-C/kg-soil	option
$\theta_T$	total soil porosity	0.3 cm <sup>3</sup> -voids/cm <sup>3</sup> -soil	option
$\theta_{as}$	volumetric air content in vadose zone	0.2 cm <sup>3</sup> -air/cm <sup>3</sup> -soil	default
$\theta_{ws}$	volumetric water content in vadose zone	0.1 cm <sup>3</sup> -H <sub>2</sub> O/cm <sup>3</sup> -soil	default
$\theta_{acrack}$	volumetric air content in foundation/wall cracks	0.2 cm <sup>3</sup> -air/cm <sup>3</sup> -soil	default
$\theta_{wcrack}$	volumetric water content in foundation/wall cracks	0.1 cm <sup>3</sup> -H <sub>2</sub> O/cm <sup>3</sup> -soil	default
$I$	infiltration rate of water through soil	7 cm/year	default

If the total porosity is measured, assume 1/3 is air filled and 2/3 is water filled for determining the water and air fraction in the vadose zone soil and floor cracks.

#### Groundwater Transport Modeling Parameters

Parameter		Default Value	Required
$K$	hydraulic conductivity	16060 cm/year	site-specific
$i$	groundwater head gradient	0.01 cm/cm	site-specific
$S_w$	width of the source	use procedure specified in 135.10(2)	site-specific
$S_d$	vertical thickness of the source	3 m	default
$\alpha_x$	dispersivity in the x direction	0.1x	default
$\alpha_y$	dispersivity in the y direction	0.33 $\alpha_x$	default
$\alpha_z$	dispersivity in the z direction	0.05 $\alpha_x$	default

$\theta_e$	effective porosity	0.1	default
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where  $u=K_i/\theta_e$

### Groundwater Transport Modeling Parameters (continued)

#### First-order Decay Coefficients

Chemical	Default Value $\lambda$ (d <sup>-1</sup> )	Required
Benzene	<del>0.0005</del> 0.000127441	default
Toluene	<del>0.0007</del> 0.0000208066	default
Ethylbenzene	<del>0.00013</del> 0.0	default
Xylenes	0.0005	default
Naphthalene	0.00013	default
<del>Benzo(a)pyrene</del> TEH-Diesel	0.0000554955	default
<del>Benz(a)anthracene</del> TEH-Waste Oil	0.0000554955	default
Chrysene	$\theta$	default

#### Other Parameters for Groundwater Vapor to Enclosed Space

Parameter	Default Value	Required	
L <sub>gw</sub>	depth to groundwater from the enclosed space foundation	1 cm	option
LB	enclosed space volume/infiltration area ratio	200 cm	option
ER (s <sup>-1</sup> )	enclosed space air exchange rate	0.00014	default
L <sub>crack</sub>	enclosed space foundation or wall thickness	15 cm	default
$\alpha$	areal fraction of cracks in foundation/wall	0.01	default

#### Other Parameters for Soil Vapor to Enclosed Space

Parameter	Default Value	Required	
L <sub>s</sub>	depth to subsurface soil sources from the enclosed space foundation	1 cm	option
LB	enclosed space volume/infiltration area ratio	250 cm *	option
ER (s <sup>-1</sup> )	enclosed space air exchange rate	0.000185 *	default
L <sub>crack</sub>	enclosed space foundation or wall thickness	15 cm	default
$\alpha$	areal fraction of cracks in foundation/wall	0.01	default

\*These values are an average of residential and nonresidential factors.

#### Soil Leaching to Groundwater

Parameter	Default Value	Required
<input type="checkbox"/> groundwater mixing zone	2 m	default

#### Building Parameters for Iowa Tier 2

Parameter	Residential	Nonresidential
ER (s-1) enclosed space air exchange rate	0.00014	0.00023
LB enclosed space volume/infiltration area ratio	200 cm	300 cm

#### Other Parameters

For Tier 2, the following are the same as Tier 1 values (refer to Appendix A): chemical-specific parameters, slope factors and reference doses, and exposure factors (except for those listed below).

Exposure Factors for Tier 2 Groundwater Vapor to Enclosed Space Modeling:

Potential Residential: use residential exposure and residential building parameters.

Potential Nonresidential: use nonresidential exposure and nonresidential building parameters.