

NEBRASKA ADMINISTRATIVE CODE

NEBRASKA DEPARTMENT OF ENVIRONMENT AND ENERGY

TITLE 118

GROUND WATER QUALITY STANDARDS AND USE CLASSIFICATION

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GOVERNOR

NEBRASKA DEPARTMENT OF ENVIRONMENT AND ENERGY

TITLE 118 - GROUND WATER QUALITY STANDARDS AND USE CLASSIFICATION

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Chapter 1 – DEFINITIONS

In addition to the definitions in Neb. Rev. Stat. § 81-1502, the following definitions apply:

001 "Aquifer" means a geologic formation, group of formations, or part of a formation that is capable of yielding usable amounts of water to a well, spring, or other point of discharge.

002 "Background" means the levels of chemical, physical, biological, and radiological constituents or parameters prior to an activity or pollution event, as determined by methods acceptable to the Department.

003 "Beneficial use" means any existing or potential ground water quality dependent use as identified in this title.

004 "Cleanup" means the removal or attenuation of pollutants from the environment through physical, chemical, or biological processes.

005 "Degradation" means a worsening (i.e., of ground water quality) caused directly or indirectly by man.

006 "Department" means the Department of Environment and Energy.

007 "Gross beta particle activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

008 "Ground water" is defined in Neb. Rev. Stat. § 46-706.

009 "Impairment of Use" means an adverse impact on a beneficial use of ground water due to water quality degradation (as indicated by the narrative and numerical standards of Chapter 3) such that any previously existing beneficial use cannot be fully attained.

010 "Maximum contaminant level" means the maximum permissible level of a substance or matter in ground water.

011 "Milligrams per liter (mg/l)" means the concentration of a substance expressed as the weight in milligrams contained in one liter of solution. For most practical purposes, this term is equivalent to parts per million (ppm).

012 "Petroleum" is defined in Neb. Rev. Stat. § 66-1510.

013 "pH" means the negative logarithm of the hydrogen ion concentration ($\text{pH} = -\log [\text{H}^+]$). pH is a measure of the acidity and alkalinity of a solution on a scale from 0 to 14, with 7 representing neutrality. Numbers from 7 up to 14 denote increasing alkalinity, and numbers from 7 down to 0 denote increasing acidity.

014 "Picocurie (pCi)" means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

015 "Pollutant" means any gas, liquid, or solid introduced into ground water that causes pollution.

016 "Private drinking water supply" means that ground water used as drinking water which is not included under public drinking water supply.

017 "Public drinking water supply" means that ground water used in a public water supply system.

018 "Public water supply system" is defined in Neb. Rev. Stat. § 71-5301(10).

019 "Rem" means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem" (mrem) is 1/1000 of a rem.

020 "Remedial action" means any immediate or long term response to a pollution event including cleanup, restoration, mitigative actions, and any other action approved or required by the Department.

021 "Responsible party" means any person causing pollution or creating a condition from which pollution is likely to occur, any owner or operator of a source where pollution has occurred or where a condition has been created from which pollution is likely to occur, or any responsible person as defined by Title 126 - Rules and Regulations Pertaining to the Management of Wastes.

022 "Restoration" means the cleanup of polluted ground water to background quality.

023 "Toxic substances" means those pollutants or combinations of pollutants, or disease causing agents which, after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Department, cause either death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), inhibition of growth or physical deformation on any organism or its offspring.

024 "Water supply system" is defined in Neb. Rev. Stat. § 71-5301(9). 025 "Water well" means any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed for the purpose of exploring for ground water, monitoring ground water, utilizing the geothermal properties of the ground, obtaining hydrogeologic information, or extracting water from or injecting water into the underground water reservoir. Water well will not include any excavation made for obtaining or prospecting for oil or natural gas or for inserting media to repressure oil or natural gas bearing formations regulated by the Nebraska Oil and Gas Conservation Commission.

026 "Wellfield" means a group of two or more public drinking water supply wells in close proximity to each other.

027 "Wellhead area" means the water-saturated subterranean strata from which ground water is withdrawn for a public water supply system, along with the overlying unsaturated subterranean strata, land surface, surface waters, and air space providing ground water recharge to such strata.

028 "Wellhead protection area" is defined in Neb. Rev. Stat. § 46-1502(4).

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1), (2)

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Chapter 2 – INTENT, REGULATION, AND APPLICABILITY OF STANDARDS AND CLASSIFICATION

001 The Ground Water Quality Standards and Use Classification are the foundation for other ground water regulatory programs. These standards will be implemented in conjunction with other regulatory programs. If other regulatory programs do not exist, these standards alone may constitute the basis for remedial action of ground water contamination.

002 In determining regulatory requirements which may be placed on potential point sources, the Department will consider the ground water classification, vulnerability of the ground water to pollution, beneficial uses of ground water, characteristics of the potential point source, technical and socioeconomic factors, and other site-specific factors, as necessary. This determination will apply to all potential point sources for which the Department has regulatory authority. These regulatory requirements will not preempt more stringent restrictions required of sources and facilities covered by state or federal statutes and regulations.

003 The ground water standards and ground water classifications apply to all ground waters of the State with the following exceptions:

003.01 Within an aquifer or a part of an aquifer that has been exempted through the Rules and Regulations of the Nebraska Oil and Gas Conservation Commission or through NAC Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells. This exception will apply only for ground water contaminants directly related to aquifer exemption. If the exemption designation is removed, this exception will no longer apply.

004 The numerical standards of Chapter 3 are intended to be applied in regulatory programs administered by the Department. This does not imply that all ground waters in the State will be expected to meet these levels. When point source ground water pollution has occurred, the numerical standards are to be applied according to Chapter 6.

005 The numerical standards of Chapter 3 apply to all ground water classes except as provided below:

005.01 The numerical standards of Chapter 3 will not apply to ground waters classified as GC unless any of the following situations occur:

005.01A If a condition exists which has impaired or will impair, in the Department's judgment, beneficial uses other than drinking water.

005.01B If public health or welfare are threatened.

005.01C If considered necessary by the Department to protect hydrologically connected ground waters, surface water beneficial uses (as assigned in Title 117 - Nebraska Surface Water Quality Standards), or surface waters defined by the Department through the Nebraska Wellhead Protection Program as contiguous with a wellhead protection area.

005.02 The numerical standards of Chapter 3 will not apply within a discrete boundary for the pollutants under consideration, as may be determined under the remedial action provisions of Chapter 6 in the event of pollution.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2)

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Chapter 3 - ANTIDEGREDATION; BENEFICIAL USES; NARRATIVE AND NUMERICAL STANDARDS; SAMPLE COLLECTION

001 The existing and potential beneficial uses of ground water in the State will be protected from impairment. The highest and most sensitive beneficial use of ground water is drinking water. The Department will protect the existing and potential beneficial uses of ground water regardless of its quality.

002 In determining whether the standards found in this chapter are attainable for any specific aquifer, the Department will take into consideration environmental, technological, social and economic factors.

003 The existing high quality ground water will be maintained and protected when the existing quality is better than the maximum contaminant levels set out in this chapter.

004 The Department may choose, after notice and hearing, to allow degradation of such high quality ground water where justified as a result of necessary and widespread economic or social development; provided however, that degradation of ground water quality will not interfere with or become injurious to existing water uses.

005 The following narrative standards apply to ground waters in the State:

005.01 Wastes, toxic substances, or any other pollutant (alone or in combination with other pollutants) introduced directly or indirectly by human activity will not be allowed to enter ground water:

005.01A If beneficial uses of ground water would be impaired or public health and welfare would be threatened; or

005.01B If beneficial uses of hydrologically connected ground waters or assigned uses of surface waters would be impaired.

005.02 Any pollutant introduced directly or indirectly by human activity that would impair beneficial uses of ground water due to unacceptable color, corrosivity, odor, or any other aesthetic characteristic will not be allowed.

006 Numerical standards (maximum contaminant levels) for the parameters listed below apply to ground waters in the State. Any substance introduced directly or indirectly by human activity will not be allowed to enter ground water if one or more of the following numerical standards would be exceeded:

<u>Public Health Parameters</u>	<u>Maximum Contaminant Levels</u>
1,1,1-Trichloroethane	0.2 mg/l
1,1,2-Trichloroethane	0.005 mg/l
1,1-Dichloroethylene	0.007 mg/l
1,2,4-Trichlorobenzene (1,2,4-TCB)	0.07 mg/l

1,2-Dibromo-3-chloropropane (DBCP)	0.0002 mg/l
1,2-Dichloroethane	0.005 mg/l
1,2-Dichloropropane	0.005 mg/l
2,4,5-TP Silvex	0.05 mg/l
2,4-D	0.07 mg/l
Acrylamide	(Reserved)
Alachlor	0.002 mg/l
Aldicarb	(Reserved)
Antimony	0.006 mg/l
Arsenic	0.010 mg/l
Asbestos	7.00E+06 fibers/liter with fiber length > 10 microns
Atrazine	0.003 mg/l
Barium	2 mg/l
Benzene	0.005 mg/l
Benzo(a)pyrene (PAHs)	0.0002 mg/l
Beryllium	0.004 mg/l
Cadmium	0.005 mg/l
Carbofuran	0.04 mg/l
Carbon Tetrachloride	0.005 mg/l
Chlordane	0.002 mg/l
Chlorobenzene	0.1 mg/l
Chromium (total)	0.1 mg/l
cis-1,2-Dichloroethylene	0.07 mg/l
Copper	1.3 mg/l
Cyanide (as free cyanide)	0.2 mg/l
Dalapon	0.2 mg/l
Di(2-ethylhexyl)adipate (Adipates)	0.4 mg/l
Di(2-ethylhexyl)phthalate (Phthalates)	0.006 mg/l
Dibromomethane	(Reserved)
Dichloromethane (Methylene Chloride)	0.005 mg/l
Dinoseb	0.007 mg/l
Dioxin (2,3,7,8-TCDD)	3.00E-08 mg/l
Diquat	0.02 mg/l
Endothall	0.1 mg/l
Endrin	0.002 mg/l
Epichlorohydrin	(Reserved)
Ethylbenzene	0.7 mg/l
Ethylene Dibromide	0.00005 mg/l
Fluoride	4.0 mg/l
Glyphosate	0.7 mg/l
Heptachlor	0.0004 mg/l
Heptachlor Epoxide	0.0002 mg/l
Hexachlorobenzene	0.001 mg/l
Hexachlorocyclopentadiene	0.05 mg/l
Lead	0.015 mg/l

Lindane	0.0002 mg/l
Mercury	0.002 mg/l
Methoxychlor	0.04 mg/l
Molybdenum	(Reserved)
Nickel	(Reserved)
Nitrate (as N)	10 mg/l
Nitrite (as N)	1 mg/l
o-Dichlorobenzene	0.6 mg/l
Oxamyl (Vydate)	0.2 mg/l
p-Dichlorobenzene	0.075 mg/l
Pentachlorophenol	0.001 mg/l
Perchlorate	(Reserved)
Picloram	0.5 mg/l
Polychlorinated biphenyls (PCBs)	0.0005 mg/l
Selenium	0.05 mg/l
Simazine	0.004 mg/l
Sodium	(Reserved)
Styrene	0.1 mg/l
Tetrachloroethylene	0.005 mg/l
Thallium	0.002 mg/l
Toluene	1 mg/l
Total Trihalomethanes (TTHMs)	0.10 mg/l
Toxaphene	0.003 mg/l
trans-1,2-Dichloroethylene	0.1 mg/l
Trichloroethylene	0.005 mg/l
Vanadium	(Reserved)
Vinyl Chloride	0.002 mg/l
Xylenes (total)	10 mg/l

Microbiology:	
Total coliform	(Reserved)

Other Parameters Affecting Use	
Aluminum	0.05 mg/l
Chloride	250 mg/l
Foaming agents	0.5 mg/l
Iron	0.3 mg/l
Manganese	0.05 mg/l
pH	6.5 - 8.5 standard pH units
Silver	0.10 mg/l
Sulfate	250 mg/l
Total Dissolved Solids (TDS)	500 mg/l
Zinc	5 mg/l

007 The numerical standards listed above are intended to protect beneficial uses of ground water. If the background level of a parameter is greater than the numerical standard, this will not

in and of itself prohibit the use of the ground water.

008 If the background level of a parameter is greater than the numerical standard listed above, the background level will be used as the numerical standard.

009 Sample collection and analysis methods.

009.01 Sample collection will be performed according to methods approved by the Department to ensure the collection of a representative sample.

009.02 Any sample analysis method used has to be approved by the Department and provide protection to public health, safety, and the environment.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2)

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Chapter 4 - GROUND WATER CLASSIFICATION

001 All ground waters of the State will be classified based on existing and potential drinking water use.

002 Class assignment, where possible, will be based on the background condition or beneficial use of the ground water prior to a pollution event.

003 All ground waters of the State are classified into one of the following classes:

003.01 Class GA. Ground water currently being used as a public drinking water supply or is proposed to be used as a public drinking water supply is assigned to Class GA. This includes:

003.01A Ground water withdrawn by a public water supply system that is used or is intended to be used as drinking water. This includes wells used incidentally or intermittently for drinking water and wells that are temporarily not being used (but have been used in the past) for drinking water. Class GA is determined by delineating a boundary around:

003.01A1. An area, based on local hydrogeologic conditions around a well or wellfield, defined by the Department, or the local water system involved (as approved by the Department), including wellhead protection areas, as defined by the Department through the Nebraska Wellhead Protection Program.

003.01A2. An area at least as large as and encompassing the entirety of that described by 003.01A3. below designated through local ordinances, if 003.01A1. above has not been determined; or

003.01A3. The area within a 1,000-foot radius of a single well or the area within a 1,000-foot distance of the perimeter of a wellfield, if neither 003.01A1. nor 003.01A2. above has been determined.

003.01B Ground water represented by an area of overlying land which has been zoned or purchased by a local government for the purpose of developing a public drinking water supply well or wellfield, including ground water in provisional wellhead protection areas as defined by the Department through the Nebraska Wellhead Protection Program.

003.02 Class GB. Ground water currently being used as a private drinking water supply or has the potential for being used as a public or private drinking water supply but currently not classified as GA is assigned to Class GB. Class GB is assigned to all ground waters in the State except those assigned to Classes GA and GC.

003.03 Class GC. As of the effective date of these regulations, Class GC has not been assigned to any ground waters in the State. Ground water assigned to this class is not being used, and has little or no potential for use, as a public or private drinking water supply. Class

GC is assigned on a case-by-case basis when information becomes available and will include, but not be limited to:

003.03A Ground water with poor natural or background quality compared to the numerical standards of Chapter 3. Class GC(R), a subset of Class GC, will be assigned to certain portions of this ground water if the Department determines that restoration or cleanup may be appropriate, pursuant to the provisions of Chapter 6, to allow for attainment of future beneficial uses.

003.03B Ground water in which hydrogeologic conditions make development of a public or private drinking water supply unlikely. Such information as depth to ground water and the transmissivity and areal extent of the aquifer may be considered.

004 All public drinking water supply wells as identified by the Department will be used in Class GA determination.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2)

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Chapter 5 - PROCEDURES FOR CHANGING A GROUND WATER CLASSIFICATION

001 Ground waters classified by these regulations may be reclassified by the Council, pursuant to NAC Title 115, if a just cause exists. Requesting a classification change to avoid cleanup in the event of ground water pollution or in anticipation of ground water pollution will not be considered a just cause except that reclassification may be justified if a lower classification is appropriate based on the criteria of 003 below.

002 The reclassification process may be initiated by the Department or by petition to the Council. A petition for reclassification will contain or reference sufficient information for the Council to make a decision on the petition. All information will be thoroughly examined to determine the need for reclassification.

003 Criteria which may be used to evaluate the need for reclassification is to include but not be limited to:

003.01 Information documenting a use of the ground water that either was previously unknown or has changed since a former classification;

003.02 Information concerning the natural or background quality of the ground water; and

003.03 Hydrogeologic conditions including depth to ground water and transmissivity and areal extent of the aquifer.

004 A ground water reclassification to Class GC is not required for an aquifer exemption petition to be considered or granted by the Department pursuant to Title 122.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2)

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Chapter 6 - REMEDIAL ACTION PROVISIONS FOR POINT SOURCE GROUND WATER POLLUTION EVENTS

001 When a point source pollution event (except for petroleum releases which are covered under 002 below) has caused or will cause, in the Department's judgment, ground water pollution, the Ground Water Remedial Action Protocol found in Appendix A will apply to the responsible party. Such events which result from activities subject to the ground water standards and classifications of this title, and which are regulated by a permit issued under Title 122, may be governed by the remedial action plan approved in the Title 122 permit instead of Appendix A, but only if the Title 122 permit contains such an approved plan.

002 When a point source pollution event has been caused by a release of petroleum, the procedures of Appendix B will apply to the responsible party.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2); 81-15, 124.01

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Chapter 7 - PUBLIC NOTICE AND COMMENT PERIOD

001 The Department will give public notice of the following:

001.01 A proposed final remedial action or during implementation, a proposed modification to a final remedial action, in accordance with Appendix A or Appendix B.

001.02 A scheduled hearing.

001.03 A Department decision to allow degradation of ground water quality.

002 No public notice is required when a request or petition for an action or a hearing is denied by the Department. Written notice of the denial will be given to the person who submitted the request or petition. Such denial will be considered a final order by the Director and subject to appeal pursuant to Neb. Rev. Stat. § 81-1509.

003 The requirements for public notices include:

003.01 Notices may describe more than one proposed action or event.

003.02 Notices will give the public a comment period of at least 30 days.

003.03 Notices will be provided to the following persons:

003.03A Person requesting action by the Department or the responsible party in a remedial action situation.

003.03B Person in charge of the public water supply system.

003.03C Overlying and adjacent ground water users and land owners which would be affected if Class GB or GC areas are involved. A notice published pursuant to 003.04 below may be substituted for individual mailings if the affected area is a densely populated, municipal area.

003.03D Any other person either upon request or on a Department list to receive notices for a particular geographic area or on a specific subject.

003.04 Public notice will be issued by publication on the Department's website or circulating the notice in the geographical area of the affected ground water through publication in a daily or weekly newspaper with general circulation.

003.05 Notices may be announced in press releases or by other methods designed to give actual notice to persons potentially affected by the proposed action or event.

003.06 Notices will contain the following information:

003.06A A summary of the proposed action or event including location and description of

the ground water involved.

003.06B An address to which all comments should be sent.

003.06C The name, address, and telephone number of a person from whom additional information may be obtained.

003.06D A brief description of the comment procedures and the procedures by which a public hearing may be requested.

003.06E Any additional information considered necessary or proper by the Department.

003.07 If the notice is for a hearing, the notice will also include the following:

003.07A A reference to the date of any previous public notices relating to the proposed action or event.

003.07B The date, time, and location of the hearing.

003.07C A brief description of the nature and purpose of the hearing, including the applicable rules and procedures and a concise statement of the issues.

004 During the public comment period, any interested person may submit to the Director written comments on the proposed action or event and may request or petition for a hearing, in writing, stating the nature of the issues to be raised in the hearing.

005 Public hearings are governed by Title 115 – Rules of Practice and Procedure for permits and licenses.

Enabling Legislation: Neb. Rev. Stat. § 81-1505(1)(2)

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY CONTROL

Appendix A - GROUND WATER REMEDIAL ACTION PROTOCOL

Procedures for Determining Needed Action for Point Source
Ground Water Pollution Events

If not already known, the Department will identify, if possible, the source(s) of contamination and the responsible party (or parties). The Department will notify the responsible party after the determination has been made. A responsible party is to complete the following protocol in accordance with Chapter 6, 001.

Part I. IMMEDIATE ACTION

Step 1. Initial Review

1) Perform an initial review to determine whether immediate action is needed to eliminate the existence or likelihood of an imminent and substantial threat to the public health and welfare or the environment or to mitigate the significantly increasing difficulty of cleanup if action is delayed, and if so, what actions are required. Base the review on as many of the items addressed in Steps 6 and 7 as possible.

- a) imminent - a short time span (i.e., less than 90 days)
- b) substantial - a significant impact on the public or environment (e.g., human illness or death, serious financial loss, severe ecological damage)
- c) significant - if action is delayed, cleanup costs increase by one or two orders of magnitude
- d) immediate actions - may include cleanup to at least an initial level, stabilization or containment, monitoring, shutdown/ termination of facility/activity, or any combination of measures. These actions are carried out by the responsible party.

2) If the need for immediate action is apparent or if the need cannot be readily determined, proceed to Step 2 and work in conjunction with Department.

3) If no immediate action is necessary (e.g., due to the nature of the pollution event developing over many years or moving slowly), proceed to Step 4.

Step 2. Implementation of Immediate Actions

1) Implement the immediate actions identified as required by Step 1 or as determined necessary in consultation with the Department.

2) Proceed to Step 3 when the immediate actions have been completed.

Step 3. Evaluation of Immediate Actions

1) Determine if immediate action has successfully eliminated the imminent and substantial threat to the public health and welfare and the environment or successfully mitigated any significant increase in difficulty of cleanup associated with delayed action.

2) If the immediate action was unsuccessful, return to Steps 1 and 2.

3) If requirements were met, proceed to Step 4.

Step 4. No Immediate Threat Present

Immediate action is not now needed, but additional measures for complete and permanent resolution of the problem may be required. Further assessment is necessary to determine the need for any final remedial action..

Part II. FINAL REMEDIAL ACTION

If at any time during the Part II assessment an immediate threat is identified, return to Step 1 (Part I).

Step 5. Preliminary Assessment

1) Complete a preliminary assessment to evaluate the possible threat of contamination to ground water. This assessment involves a review of existing information and require the collection of minimal or no field data. If it can be determined from this preliminary assessment that there is no threat of ground water contamination, proceed to Step 11. If ground water contamination is possible or likely, proceed to Step 6.

Step 6. Initial Site Assessment

1) Before this or any subsequent assessments are started, contact the Department to establish what information must be collected. In some cases where ground water contamination is immediately evident, or where ground water could not be used as drinking water, it may acceptable to combine Steps 6 and 7.

2) Complete an initial site assessment to determine if ground water has been or is likely to be impacted by the point source. Work will be approved by the Department prior to beginning the assessment. This assessment may involve test holes to determine the proximity of contaminants to ground water. If this initial assessment reveals that there is no threat of ground water contamination, proceed to Step 11; otherwise proceed to Step 7 under the direction of the Department.

Step 7. Detailed Site Assessment

1) Perform a detailed site assessment to determine the vertical and horizontal extent of the ground water contamination and its impact or potential impact to human health and/or the environment through examination of all pertinent factors. Work will be approved by the Department prior to beginning the investigation.

2) Provide the detailed site assessment to the Department. The Department may, at any time, request additional information.

Step 8. Define Preliminary Cleanup Levels

A remedial action class (RAC) is defined for pollution events in three types of ground water (or overlying soils) depending on the degree (or potential) of use of the ground water as drinking water. The extent of remedial action recommended will differ depending on the RAC of the contaminated (or likely to be contaminated) ground water. The RAC assigned will be determined

from the condition of the ground water prior to the pollution event. The Department will assign the RAC based on information submitted by the responsible party in the detailed site assessment and other available information.

RAC-1. This category includes ground waters of Class GA and the portion of Class GB in a 500-foot radius (or greater, if determined necessary by the Department) around all private drinking water supply wells. RAC-1 is automatically assigned anytime a public or private drinking water supply well has been polluted.

RAC-2. This category includes ground waters of Class GB (except for the portion of Class GB placed in RAC-1) and Class GC(R).

RAC-3. This category includes, but is not limited to, ground waters of Class GC (except for Class GC(R) which was placed in RAC-2).

The RAC categories are not intended to represent a ground water classification system but rather a pollution event ranking scheme. It gives the Department a method to determine the importance of remedial action based on the use of the ground water. For instance RAC-1 is the category of highest rank; it represents that ground water actually being used for drinking water and that ground water intended to be used in a public drinking water supply. Therefore, RAC-1 events will normally receive the most extensive remedial action measures.

RAC-2 events involve ground water not now directly used as drinking water but having a reasonable potential to be used in the future. The potential for use exists if the ground water is located in a highly populated area or is part of a regional, high-yielding aquifer or if otherwise justified. The RAC-2 category also includes ground water with prior contamination that may be easily or cost-effectively treated to drinking water quality.

Pollution events will be of lowest importance, RAC-3, if the ground water involved is not used, or likely to be used, as drinking water. Generally remedial action measures will be least extensive for this category since the future use of ground water for drinking is improbable. Justification for assigning events to RAC-3 will be based on a combination of several different reasons. One reason for unusability is poor natural quality which makes the ground water unfit for human consumption. Insufficient yield is another reason the ground water may not be used for drinking. A third reason is historical contamination that occurred prior to the pollution event currently being investigated (see NRS § 81-1505(2)(d)). This past contamination may have rendered ground water unsuitable for drinking and uneconomical to treat. Past and present intensive land use is also a reason why ground water could be unusable as drinking water. This includes areas of concentrated industrial development or densely populated areas where ground water is likely to be contaminated or will not be used as drinking water.

The ranking of some events as RAC-3 does not mean there will be places in the State where wholesale contamination of ground water will be allowed. Departmental authority through its various programs to control practices or discharges that may contaminate ground water will still be in effect. RAC-3 events will be given a lower priority and less staff effort by the Department than RAC-1 or RAC-2 events.

RACs were developed primarily for use with the principal aquifer--the ground water commonly used for drinking. They will also be adapted for use with both deeper and perched ground water. When doing so, interconnections with overlying or underlying ground water of different quality will be considered.

Some contamination threats may occur in which the use potential of the ground water would be RAC-1 or RAC-2, but the soil, geology, and other site-specific characteristics are such that ground water contamination is virtually impossible. After an appropriate assessment, the event may be downgraded to RAC-3.

In every ground water contamination occurrence, certain minimum requirements will be imposed upon the responsible party, depending on the RAC. Cleanup of readily removable contaminants (e.g., free product) will be required. Additional cleanup and/or mitigation may also be required. If additional cleanup is not required, the remaining contaminated ground water will be managed and monitored to prevent any further damage.

In RAC-2, cleanup of readily removable contaminants (e.g., free product) will be required. If additional cleanup is not required, the remaining contaminated ground water will be managed and monitored to prevent any further damage.

In RAC-3, cleanup of readily removable contaminants (e.g., free product) will be required. Monitoring may also be necessary.

In addition to the minimum requirements listed above, RAC-1 and RAC-2 events are potentially subject to additional cleanup requirements. No further cleanup will be required for RAC-3 events based on drinking water usage. In certain cases,

1) The Department will set a preliminary cleanup level for additional cleanup required. in RAC-1 and RAC-2 events. The idealistic goal of the Department for any ground water cleanup is restoration - returning the ground water to its quality before contamination (background levels). Most (if not all) of the time these levels are impractical, unattainable, and (in some cases) unmeasurable. Therefore, the preliminary cleanup level will be based on the level necessary to maintain a drinking water use, although a preliminary cleanup level set at the background level may be considered in some cases. If a Department or EPA ground water/drinking water standard exists for the contaminant, it will be the level used. If there is no established standard, EPA's Ambient Water Quality Criteria, Health Advisories, and other documents will be used to set the preliminary cleanup level. The level will be set at the concentration which is estimated to result in a 1 in a 1,000,000 (10⁻⁶) excess cancer risk over a lifetime, at the concentration which is expected to result in no adverse health effect for longer-term or lifetime exposure, or the laboratory detection limit (if higher and within an acceptable range). If appropriate EPA data is nonexistent, data found in the literature will be used to determine the preliminary cleanup level. If sufficient information regarding acceptable levels is not found, the preliminary cleanup level will be set at background or the acceptable laboratory detection limit.

Sometimes the background level of a contaminant (as reported by the responsible party and approved by the Department) may be higher than what would be proposed as the preliminary cleanup level in the preceding paragraph. In these situations the background level will be used as the preliminary cleanup level.

In a few cases ground water cleanup based on drinking water use may not be sufficient to maintain other beneficial uses. For these unusual instances, preliminary cleanup levels will be based on the level needed to maintain the uses other than drinking water. This may necessitate cleanup even in RAC-3 events. Although the ground water in RAC-3 areas is not used as drinking water, it may serve other important uses (e.g., irrigation, industrial). It may also be necessary to set cleanup levels which protect streams and lakes from a contaminated ground

water discharge that would violate surface water standards. Finally, the proximity to RAC-1 or RAC-2 areas, the likelihood of slow but eventual migration to these areas, and the cumulative effects of a series of contamination events must be considered when setting the preliminary cleanup level for RAC-3.

After receiving notification, either agree to the preliminary cleanup level or propose an alternate level. If a different cleanup level is proposed, it must be based on technological, economic, and/or risk analyses completed by the responsible party.

a) The technological analysis will determine if technologies exist to clean up the ground water to the preliminary cleanup level. If technologies do exist, report the various methods, including the contribution of cleanup processes which occur naturally. If cleanup to the preliminary level is not technologically possible, report what level of cleanup is attainable. As part of this analysis, the technological feasibility of various mitigative actions (e.g., supplying new sources of water and point-of-use treatment) should be investigated.

b) For an economic analysis, examine the economics of cleaning up to the preliminary level. If it is impossible to reach the preliminary cleanup level, report what level of cleanup is economically possible. Analyze the economic feasibility of mitigation instead of cleanup as well.

c) A risk analysis may include other factors, information, or evaluations not previously considered, to be based on the risk of the contamination harming human health and/or the environment.

If cleanup to the preliminary level is not attainable based on the foregoing analyses, report what portion of the ground water will remain contaminated following a lesser degree of cleanup. Given the technological considerations of cleanup, the appropriate calculations should be used in an attempt to define the three-dimensional boundary of the contamination plume under different remedial action scenarios (including no cleanup). The contamination plume, in this case, is defined as ground water where the concentrations of identified contaminants exceed their preliminary cleanup levels. For every cleanup scenario assessed, the economic impacts are to be defined. The relationship of the contaminated ground water boundary to existing users and discharge points of ground water are to be described.

If submitting an alternative cleanup level, include any supporting justification for an alternate cleanup level, a contamination maintenance program, a mitigation plan, or combination. The Department will consider the information contained in the justification on a case-by-case basis and establish a proposed final cleanup level or action. The level may be the same as the Department's preliminary cleanup level, the same as the proposed alternate cleanup level, or some other level.

The Department's decision on the remedial action necessary, including the proposed final cleanup level, will be placed on public notice. Any person may submit written comments on the proposed action or may request a hearing. Following the comment period and any hearing, the Department will notify the responsible party of the Department's final decision (including changes made as a result of a hearing).

2) Develop a workplan for performance of the final remedial action. The time frame for required action (including cleanup) will be the period of potential exposure to the contamination in the absence of any remedial action or 20 years, whichever is less. On a case-by-case basis, a

longer period of time may be allowed if adequately justified by the responsible party. The workplan is subject to the Department's approval.

Step 9. Implementation and Review of Remedial Actions

- 1) Obtain any other permits from the Department that may be required to implement the workplan (e.g., UIC, NPDES).
- 2) Implement the remedial actions specified in the workplan.
- 3) Keep the Department apprised of cleanup efforts, and the Department will periodically review the effectiveness of the remedial actions. If the Department determines the long-term needs of protecting the public health and welfare and the environment have not been, or are not being, satisfied or if additional remedial action is necessary, the Department may require a return to Steps 7 and 8.
- 4) A request may be made to modify the required final remedial action during the implementation process. Any request must be accompanied by additional justification as described in Step 8. The Department will review the information, and if a change is appropriate, a public notice will be issued.

Step 10. Final Review

A final review will be performed by the Department to determine the need for any ongoing actions. These may include long-term monitoring to ensure cleanup levels are stabilized and maintained, periodic sampling of nearby supply wells, maintenance of installed structures, and annual case review. If acceptable cleanup levels were never reached, ongoing monitoring or maintenance may be necessary to ensure other ground water does not become contaminated.

- 1) Continue any ongoing actions determined to be necessary by the Department until ground water contamination is no longer a concern.

Step 11. Situation of No Threat to Ground Water Quality

The situation does not pose a threat to ground water quality. However, if other health, safety, or environmental concerns exist, they should be addressed by the appropriate Departmental procedures.

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Appendix B - REMEDIAL ACTION PROTOCOL FOR PETROLEUM RELEASES

Procedures for Determining Needed Action for Point Source Pollution Events from Petroleum Releases Using Risk-Based Corrective Action (RBCA).

If not already known, the Department will identify, if possible, the source(s) of contamination and the responsible party (or parties). The Department will notify the responsible party after the determination has been made. A responsible party is to complete the following protocol in accordance with Chapter 6, 002.

Part I. IMMEDIATE ACTION

Step 1. Initial Review

1) Perform an initial review to determine whether immediate action is needed to eliminate the existence or likelihood of an imminent and substantial threat to the public health and welfare or the environment or to mitigate the significantly increasing difficulty of cleanup if action is delayed, and if so, what actions are required. Base the review on as many of the items addressed in Step 6 as possible.

- a) imminent - a short time span (i.e., less than 90 days)
- b) substantial - a significant impact on the public or environment (e.g., human illness or death, serious financial loss, severe ecological damage)
- c) significant - if action delayed, cleanup costs increase by one or two orders of magnitude
- d) Immediate actions - may include cleanup to at least an initial level, stabilization or containment, monitoring, shutdown/termination of facility/activity, or any combination of measures. These actions are carried out by the responsible party.

2) If the need for immediate action is apparent or if the need cannot be readily determined, proceed to Step 2 and work in conjunction with Department.

3) If no immediate action is necessary (e.g., due to the nature of the pollution event developing over many years or moving slowly), proceed to Step 4.

Step 2. Implementation of Immediate Actions

1) Implement the immediate actions identified as required by Step 1 or as determined necessary in consultation with the Department.

Proceed to Step 3 when the immediate actions have been completed.

Step 3. Evaluation of Immediate Actions

1) Determine if immediate action has been successfully eliminated the imminent and substantial threat to the public health and welfare and the environment or successfully mitigated any significant increase in difficulty of cleanup associated with delayed action.

2) If the immediate action was unsuccessful, return to Steps 1 and 2.

3) If requirements were met, proceed to Step 4.

Step 4. No Immediate Threat Present

Immediate action is not now needed, but additional measures for complete and permanent resolution of the problem may be required. Further assessment is necessary to determine the need for any final remedial action.

Proceed to Part II, Step 5.

Part II. FINAL REMEDIAL ACTION

If at any time during the Part II assessment an immediate threat is identified, return to Step 1 (Part I).

Step 5. Preliminary Assessment

1) Complete a preliminary assessment to evaluate the possible threat of contamination to soils and ground water and threat to public health and welfare. This assessment involves a review of existing information and require the collection of minimal or no field data. If it can be determined by the Department from this preliminary assessment that there is limited soil contamination and no threat of ground water contamination or threat to human health and welfare, proceed to Step 12. If soil contamination is extensive or its extent is unknown or ground water contamination is possible or likely, proceed to Step 6.

Step 6. RBCA Tier 1 Site Assessment

1) Before this or any subsequent assessments are started, contact the Department to establish what information must be collected. The Department will specify sampling and analysis requirements.

2) Collect all information, including any site assessment data, as directed by the Department. The required site assessment data will include, but not be limited to, the following types of information:

1. historical information;
2. site information;
3. contamination characteristics;
4. aquifer characteristics.

3) Investigate the following potential exposure pathways for chemicals of concern designated by the Department:

1. Dermal contact with and ingestion of chemicals of concern from contaminated surface soils;
2. Enclosed space inhalation of chemicals of concern from contaminated subsurface soils;
3. Leaching of chemicals of concern from contaminated surface and subsurface soils to ground water;
4. Enclosed space inhalation of chemicals of concern from contaminated, shallow ground water; and,
5. Ingestion of chemicals of concern from contaminated ground water.

Individual chemicals of concern are designated based on the petroleum product(s) released at the site and include, but are not limited to, the following:

Light Distillates (e.g., gasoline, JP-4)	
Benzene	Total Xylenes
Toluene	n-Hexane
Ethylbenzene	Methyl tertiary-Butyl Ether (MTBE)

Middle Distillates (e.g., diesel fuel, kerosene)	
Benzene	Naphthalene
Toluene	Pyrene
Ethylbenzene	Benzo(a)pyrene (BaP)
Total Xylenes	

Waste Oil		
Benzene	Naphthalene	Chlorinated solvents*
Toluene	Pyrene	Metals*
Ethylbenzene	BaP	Ethylene glycol*
Total Xylenes		

*To be determined on a case-by-case basis as directed by the Department. The Department will provide investigative and sampling requirements for these chemicals as needed.

4) Report the required information to the Department in the format specified by the Department.

Step 7. Evaluation of RBCA Tier 1 Investigation Results

In evaluating the RBCA Tier 1 investigation results, the contamination levels found during the site investigation will be compared to risk-based screening levels (RBSLs) which will be established by the Department using the following criteria:

1. Remedial Action Classifications.

A remedial action class (RAC) is defined for pollution events in three types of ground water (or overlying soils) depending on the degree (or potential) of use of the ground water as drinking water. The extent of remedial action recommended will differ depending on the RAC of the contaminated (or likely to be contaminated) ground water. The RAC assigned will be determined from the condition of the ground water prior to the pollution event. The Department will assign the RAC based on information submitted by the responsible party in the RBCA Tier 1 site assessment and other available information.

RAC-1. This category includes ground waters of Class GA and the portion of Class GB in a 500-foot radius (or greater, if determined necessary by the Department) around all private drinking water supply wells. RAC-1 is automatically assigned anytime a public or private drinking water supply well has been polluted.

RAC-2. This category includes ground waters of Class GB (except for the portion of Class GB placed in RAC-1) and Class GC(R).

RAC-3. This category includes, but is not limited to, ground waters of Class GC (except for Class GC(R) which was placed in RAC-2).

The RAC categories are not intended to represent a ground water classification system but rather a pollution event ranking scheme. It gives the Department a method to determine the importance of remedial action based on the use of the ground water. For instance RAC-1 is the category of highest rank; it represents that ground water actually being used for drinking water and that ground water intended to be used in a public drinking water supply. Therefore, RAC-1 events will normally receive the most extensive remedial action measures.

RAC-2 events involve ground water not now directly used as drinking water but having a reasonable potential to be used in the future. The potential for use exists if the ground water is located in a highly populated area or is part of a regional, high-yielding aquifer or if otherwise justified. The RAC-2 category also includes ground water with prior contamination that may be easily or cost-effectively treated to drinking water quality.

Pollution events will be of lowest importance, RAC-3, if the ground water involved is not used, or likely to be used, as drinking water. Generally remedial action measures will be least extensive for this category since the future use of ground water for drinking is improbable. Justification for assigning events to RAC-3 will be based on a combination of several different reasons. One reason for unusability is poor natural quality which makes the ground water unfit for human consumption. Insufficient yield is another reason the ground water may not be used for drinking. A third reason is historical contamination that occurred prior to the pollution event currently being investigated (see NRS § 81-1505(2)(d)). This past contamination may have rendered ground water unsuitable for drinking and uneconomical to treat. Past and present intensive land use is also a reason why ground water could be unusable as drinking water. This includes areas of concentrated industrial development or densely populated areas where ground water is likely to be contaminated or will not be used as drinking water.

The ranking of some events as RAC-3 does not mean there will be places in the State where wholesale contamination of ground water will be allowed. Departmental authority through its various programs to control practices or discharges that may contaminate ground water will still be in effect. RAC-3 occurrences, in general, will be given a lower priority and less staff effort by the Department than RAC-1 or RAC-2 occurrences; however, cleanup of a RAC-3 event may be required due to concerns about enclosed space inhalation exposure pathways and vapors threatening public health and welfare.

RACs were developed primarily for use with the principal aquifer--the ground water commonly used for drinking. They will also be adapted for use with both deeper and perched ground water. When doing so, interconnections with overlying or underlying ground water of different quality will be considered.

Some contamination threats may occur in which the use potential of the ground water would be RAC-1 or RAC-2, but the soil, geology, and other site-specific characteristics are such that ground water contamination is virtually impossible. After an appropriate assessment, the event may be downgraded to RAC-3.

In every ground water contamination occurrence, certain minimum requirements will be imposed upon the responsible party, depending on the RAC. Cleanup of readily removable contaminants (e.g., free product) will be required. Additional cleanup and/or mitigation may also be required. If additional cleanup is not required, the remaining contaminated ground water will be managed and monitored to prevent any further damage.

In RAC-3, cleanup of readily removable contaminants (e.g., free product) will be required. Additional cleanup of a RAC-3 event may be required due to concerns about enclosed space inhalation exposure pathways and public health and welfare. Monitoring may also be necessary. Because RAC-3 ground water is generally not used for drinking water, the ground water ingestion and soil leaching to ground water pathways are considered to be incomplete in RAC-3 and not subject to this RBCA assessment.

2. Carcinogenic and non-carcinogenic health effects.

A. Carcinogenic effects

Chemical-specific Maximum Contaminant Levels (MCLs) (see Chapter 3) will be used to calculate the appropriate RBSL for a carcinogen for the groundwater ingestion and soil-leaching to groundwater exposure pathways of concern for a RAC-1 release.

An Excess Lifetime Cancer Risk (ELCR) of 1×10^{-6} will be used in the calculation of the RBSLs for a carcinogen for the dermal contact/soil ingestion exposure pathway and for inhalation pathways in the presence of subsurface structures for all releases.

An ELCR of 1×10^{-5} will be used in the calculation of the RBSLs for a carcinogen for the groundwater ingestion and soil-leaching to groundwater exposure pathways of concern for a RAC-2 release and for the inhalation exposure pathways when no subsurface structures are present for all releases.

B. Non-carcinogenic effects

Chemical-specific MCLs (or a health-based standard where an MCL has not been promulgated for a particular chemical) will be used to calculate the RBSL for a non-carcinogen for the groundwater ingestion and soil-leaching to groundwater exposure pathways of concern for a RAC-1 release.

RBSLs for non-carcinogens for the groundwater ingestion and soil-leaching to groundwater exposure pathways of concern for a RAC-2 release, for the dermal contact/soil ingestion exposure pathway for all releases, and for the enclosed space inhalation pathways for all releases will be established by the Department using the following criteria:

1. exposure pathway;
2. RAC designation;
3. level of exposure based on the ratio of the observed concentration of a chemical of concern to a chemical-specific reference concentration.

For purposes of the RBCA Tier 1 assessment, toluene, ethylbenzene and total xylenes are considered to have additive health effects.

3. Fate and transport models. The Department will select various models and model default values to calculate RBSLs for use in evaluating the RBCA Tier 1 data.

4. Land use.

5. Location of water supply wells.

6. Other criteria as determined by the Department.

Upon comparing the RBSLs to the actual contamination levels found during the site investigation and consideration of other pertinent factors, the Department will determine if additional remedial actions will be required. If additional remedial actions are not required, proceed to Step 11. Otherwise, proceed to Step 8.

Step 8. RBCA Tier 2 Site Assessment

1) Perform a RBCA Tier 2 site assessment for those exposure pathways where actual site contamination levels were greater than the Tier 1 RBSLs under Step 7. This investigation will define the extent of contamination from the release and collect site-specific parameters to use in the Tier 2 evaluation performed under Step 9. The Department will specify what data needs to be collected for the Tier 2 site assessment. Work will be approved by the Department prior to beginning the investigation.

2) Report the results of the Tier 2 site assessment in the format specified by the Department. The Department may, at any time, request additional information.

Step 9. Evaluation of RBCA Tier 2 Investigation Results, Determination of Site-Specific Target Limits, and Review of Proposed Remedial Actions

The site-specific physical and chemical assessment found during the Tier 2 site assessment will be used to establish site-specific target limits (SSTLs) using the same fate and transport models previously used to establish the RBCA Tier 1 RBSLs. The contamination levels found during the investigation will be compared to the SSTLs in a manner similar to that performed for the RBCA Tier 1 evaluation.

1) The Department will determine if additional remedial actions will be required. If additional remedial actions are not required, proceed to Step 11.

2) The Department will set a preliminary cleanup level for any additional cleanup required. The level will normally be set at the appropriate SSTL(s). After receiving notification of the preliminary cleanup level, either agree or propose an alternate level. If a different cleanup level is proposed, it must be based on a technological, risk, or economic analysis. The Department may also propose an alternate level.

a) A technological analysis will determine if technologies exist to clean up the soil and/or ground water to the preliminary cleanup level. If cleanup to the preliminary level is not technologically possible, report what level of cleanup is attainable. As part of this analysis, the technological feasibility of various mitigative actions (e.g., supplying new sources of water and point-of-use treatment) should be investigated.

b) A risk analysis may include other factors, information, or evaluations not previously considered. Other ELCR target levels may be considered if appropriate.

c) For an economic analysis, examine the economics of cleaning up to the preliminary level. If it is impossible to reach the preliminary cleanup level, report what level of cleanup is economically possible. The economic feasibility of mitigation instead of cleanup should also be analyzed.

If cleanup to the preliminary level is not attainable based on one or more of the foregoing

analyses, report what portion of the soil and/or ground water will remain contaminated following a lesser degree of cleanup. Given the technological considerations of cleanup, the appropriate calculations should be used in an attempt to define the three-dimensional boundary of the contamination plume under different remedial action scenarios (including no cleanup). The contamination plume, in this case, is defined as soil and/or ground water where the concentrations of identified contaminants exceed their preliminary cleanup levels. For every cleanup scenario assessed, the economic impacts are to be defined. The relationship of the contaminated media (i.e., ground water, soils, soil gas) boundaries to existing users and potential points of exposure must be described.

If submitting an alternative cleanup level, include any supporting justification for an alternate cleanup level, a contamination maintenance program, a mitigation plan, or combination. The Department will consider the information contained in the justification on a case-by-case basis and establish a proposed final cleanup level or action. The level may be the same as the Department's preliminary cleanup level, the same as the proposed alternate cleanup level, or some other level.

The Department's decision on the remedial action necessary, including the proposed final cleanup level, will be placed on public notice. Any person may submit written comments on the proposed action or may request a hearing.

Following the comment period and any hearing the Department will notify the responsible party of Department's final decision (including changes made as a result of a hearing).

3) Develop a workplan and schedule for performance of the final remedial action. The time frame for required action (including cleanup) will be the period of potential exposure to the contamination in the absence of any remedial action or 20 years, whichever is less. On a case-by-case basis, a longer period of time may be allowed if adequately justified by the responsible party. The workplan is subject to the Department's approval.

Step 10. Implementation and Review of Remedial Actions

1) Obtain any other permits from the Department that may be required to implement the workplan (e.g., UIC, NPDES).

2) Implement the remedial actions approved in the workplan.

3) Keep the Department apprised of cleanup efforts, and the Department will periodically review the effectiveness of the remedial actions. If the Department determines the long-term needs of protecting the public health and welfare and the environment have not been, or are not being, satisfied or if additional remedial action is necessary, the Department may require a return to Steps 8 and 9.

4) A request may be made to modify the required final remedial action during the implementation process. Any request must be accompanied by additional justification as described in Step 9. The Department may propose modifications to the required final remedial action. If a change is appropriate, a public notice will be issued.

Step 11. Final Review

A final review will be performed by the Department to determine the need for any ongoing

actions. These may include long-term monitoring to ensure cleanup levels are stabilized and maintained, periodic sampling of nearby supply wells, maintenance of installed structures, and annual case review. If established cleanup levels were never reached, ongoing monitoring or maintenance may be necessary to ensure other soil and/or ground water does not become contaminated and/or public health and welfare threats do not exist.

1) Continue any ongoing actions determined to be necessary by the Department until ground water and soil contamination is no longer a concern.

Step 12. Closure

The situation does not pose a threat to ground water quality or public health and welfare.