


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of: CROW BUTTE RESOURCES, INC. (License Renewal for the In Situ Leach Facility, Crawford, Nebraska)	
	ASLBP #: 08-867-02-OLA-BD01
	Docket #: 04008943
	Exhibit #: NRC-063-00-BD01
	Admitted: 8/18/2015
	Rejected:
	Identified: 8/18/2015
	Withdrawn:
	Stricken:
	Other:

NRC-063
Submitted: 5/8/2015

NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

**TITLE 118 – GROUND WATER QUALITY STANDARDS
AND USE CLASSIFICATION**

REVISED EFFECTIVE DATE: March 27, 2006

DAVE HEINEMAN

GOVERNOR



**Nebraska Department
of Environmental Quality**

NEBRASKA ADMINISTRATIVE CODE

TITLE 118
GROUND WATER QUALITY STANDARDS AND USE CLASSIFICATION

TABLE OF CONTENTS BY CHAPTER

<u>Chapter</u>	<u>Subject</u>	<u>Enabling Legislation</u> <u>Neb. Rev. Stat.</u>
1	Definitions	
2	Intent and Applicability of Standards and Classification	81-1505(1)(2)
3	Antidegradation Clause	81-1505(1)(2)
4	Narrative and Numerical Standards	81-1505(1)(2)
5	Sample Collection and Analysis Methods	81-1505(1)(2)
6	Ground Water Beneficial Uses	81-1505(1)(2)
7	Ground Water Classification	81-1505(1)(2)
8	Procedures for Changing a Ground Water Classification	81-1505(1)(2)
9	Regulation of Potential Point Sources	81-1505(1)(2)
10	Remedial Action Provisions for Point Source Ground Water Pollution Occurrences	81-1505(1)(2); 81-15,124.01
11	Public Notice and Comment Period	81-1505(1)(2)
12	General Provisions	81-1505(1)(2)(11)(16)(17); 81-1509; 84-906 et seq.; 84-914; 84-915
App. A	Ground Water Remedial Action Protocol	
App. B	Remedial Action Protocol for Petroleum Releases	

NEBRASKA ADMINISTRATIVE CODE

TITLE 118
GROUND WATER QUALITY STANDARDS AND USE CLASSIFICATION

ALPHABETICAL TABLE OF CONTENTS BY SUBJECT

<u>Subject</u>	<u>Enabling Legislation</u> <u>Neb. Rev. Stat.</u>	<u>Chapter</u>
Antidegradation Clause	81-1505(1)(2)	3
Definitions		1
General Provisions	81-1505(1)(2)(11)(16)(17); 81-1509; 84-906 et seq.; 84-914;84-915	12
Ground Water Beneficial Uses	81-1505(1)(2)	6
Ground Water Classification	81-1505(1)(2)	7
Intent and Applicability of Standards and Classification	81-1505(1)(2)	2
Narrative and Numerical Standards	81-1505(1)(2)	4
Procedures for Changing a Ground Water Classification	81-1505(1)(2)	8
Public Notice and Comment Period	81-1505(1)(2)	11
Regulation of Potential Point Sources	81-1505(1)(2)	9
Remedial Action Provisions for Point Source Ground Water Pollution Occurrences	81-1505(1)(2); 81- 15,124.01	10
Sample Collection and Analysis Methods	81-1505(1)(2)	5

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 1 - DEFINITIONS

001 "Aquifer" shall mean 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" shall mean 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" shall mean any existing or potential ground water quality dependent use as identified in Chapter 6, 001.

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

005 "Council" shall mean the Environmental Quality Council.

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

007 "Department" shall mean the Department of Environmental Quality.

008 "Director" shall mean the Director of the Department of Environmental Quality.

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

010 "Ground water" shall mean water occurring beneath the surface of the ground that fills available openings in rock or soil materials such that they may be considered saturated.

011 "Impairment of Use" shall mean 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 4) such that any previously existing beneficial use cannot be fully attained.

012 "Maximum contaminant level" shall mean the maximum permissible level of a substance or matter in ground water.

013 "Milligrams per liter (mg/l)" shall mean 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).

014 "Nonpoint source" shall mean any source of pollutants other than those defined as point sources.

015 "Person" shall mean any individual, partnership, association; public or private corporation; trustee, receiver, assignee, agent, municipality, or other governmental subdivision, public agency, officer or governing or managing body of any municipality, governmental subdivision or public agency, or any other legal entity except the Department.

016 "Petroleum" shall mean:

- a) motor vehicle fuels as defined in §66-482, except denatured agricultural ethyl alcohol that is not blended with motor vehicle fuels;
- b) diesel fuel as defined in §66-654, including kerosene; and
- c) c) a fraction of crude oil that is liquid at a temperature of sixty degrees Fahrenheit and a pressure of fourteen and seven-tenths pounds per square inch absolute, except any such fraction which is regulated as a hazardous substance under §101(14) of the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

017 "pH" shall mean 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.

018 "Picocurie (pCi)" shall mean that quantity of radioactive material producing 2.22 nuclear transformations per minute.

019 "Point source" shall mean any discernible confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or vessel or other floating craft from which pollutants are or may be discharged.

020 "Pollution" shall mean the man-made or man-induced alteration of the chemical, physical, biological, or radiological integrity of water.

021 "Pollutant" shall mean any gas, liquid, or solid introduced into ground water that causes pollution.

022 "Private drinking water supply" shall mean that ground water used as drinking water which is not included under public drinking water supply.

023 "Public drinking water supply" shall mean that ground water used in a public water supply system.

024 "Public water supply system" shall mean a water supply system designed to provide the public water for human consumption if such system has at least fifteen service connections or regularly serves at least twenty-five individuals. Public water supply system includes, but is not limited to,

- a) any collection, treatment, storage, or distribution facilities under control of the operator of such system and used primarily in connection with such system; and
- b) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. For purposes of this subdivision, a connection to a system that delivers water by a constructed conveyance other than a pipe shall not be considered a connection if
 - i) the water is used exclusively for purposes other than residential uses, such as drinking, bathing, cooking, and other similar uses,
 - ii) the Department of Health and Human Services Regulation and Licensure determines that alternative water to achieve the equivalent level of public health protection provided

by the Nebraska Safe Drinking Water Act and rules and regulations under the act is provided for residential or similar uses for drinking and cooking, or

iii) the Department of Health and Human Services Regulation and Licensure determines that the water provided for residential or similar uses for drinking, cooking, and bathing is centrally treated or treated at the point of protection provided by the Nebraska Safe Drinking Water Act and the rules and regulations.

An irrigation district in existence prior to May 18, 1994, that provides primarily agricultural service through a piped water system with only incidental residential or similar use shall not be considered to be a public water system if the system or the residential or similar users of the system comply with subdivision (ii) or (iii) of this subdivision. A water supplier that would be a public water system only as a result of the amendments made by the 1996 amendments to the federal Safe Drinking Water Act shall not be considered a public water system until August 7, 1998.

025 "Rem" shall mean 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.

026 "Remedial action" shall mean any immediate or long term response to a pollution occurrence including cleanup, restoration, mitigative actions, and any other action approved or required by the Department.

027 "Responsible party" shall mean 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.

028 "Restoration" shall mean the cleanup of polluted ground water to background quality.

029 "Toxic substances" shall mean 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.

030 "Wastes" shall mean all liquid, gaseous, solid, radioactive, or other substances introduced directly or indirectly by man which may pollute or tend to pollute any air, land, or waters of the State.

031 "Water supply system" shall mean all sources of water and their surroundings under the control of one owner, and shall include all structures, conduits, and appurtenances by means of which such water is collected, treated, stored, or delivered, except service pipes between street mains and buildings and the plumbing within or in connection with the buildings served.

032 "Water well" shall mean 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 shall 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.

033 "Waters of the State" shall mean all waters within the jurisdiction of this State including all streams, lakes, ponds, impounding reservoirs, marshes, wetlands, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the State.

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

035 "Wellhead area" shall mean 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.

036 "Wellhead protection area" shall mean that part of a wellhead area from which ground water contaminants could be expected to reach a public water supply well within the useful lifetime of that well.

Legal Citation: Title 118, Ch. 1, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 2 - INTENT AND APPLICABILITY OF STANDARDS AND CLASSIFICATION

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

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

002.01 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 the Nebraska Department of Environmental Quality's Title 122 - Rules and Regulations for Underground Injection and Mineral Production Wells. This exception will apply only for ground water contaminants directly related to the activity requiring exemption. If the exemption designation is removed, this exception will no longer apply.

002.02 As explained in 003 and 004 below.

003 The numerical standards of Chapter 4 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 shall be applied according to Chapter 10.

004 The numerical standards of Chapter 4 shall apply to all ground water classes of Chapter 7 except as provided below:

004.01 The numerical standards of Chapter 4 shall not apply to ground waters classified as GC unless any of the following situations occur:

004.01A If a condition exists which has impaired or will impair, in the Department's judgment, beneficial uses other than drinking water.

004.01B If public health or welfare are threatened.

004.01C 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.

004.02 The numerical standards of Chapter 4 shall not apply within a discrete boundary for the pollutants under consideration, as may be determined under the remedial action provisions of Chapter 10 in the event of pollution.

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

Legal Citation: Title 118, Ch. 2, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY
Chapter 3 - ANTIDegradation Clause

001 It is the public policy of the State of Nebraska to protect and improve the quality of ground water for human consumption; agriculture, industry and other productive, beneficial uses; and to achieve the standards set out in Chapter 4 herein, wherever attainable. In determining whether such standards are attainable for any specific aquifer, the State should take into consideration environmental, technological, social and economic factors.

002 It is recognized that the existing quality of some ground water in Nebraska is better than the maximum contaminant levels set out in Chapter 4 herein as of the date on which these standards become effective. This existing high quality ground water will be maintained and protected.

003 In select cases the State 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 in no event may degradation of ground water quality interfere with or become injurious to existing water uses.

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

Legal Citation: Title 118, Ch. 3, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 4 - NARRATIVE AND NUMERICAL STANDARDS

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

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

001.01A If beneficial uses of ground water would be impaired or public health and welfare would be threatened; or

001.01B If beneficial uses of hydrologically connected ground waters or assigned uses of surface waters would be impaired.

001.02 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 shall not be allowed.

002 Numerical standards (maximum contaminant levels) for the parameters listed below shall apply to ground waters in the State in accordance with Chapters 2 and 3. Any substance introduced directly or indirectly by human activity shall not be allowed to enter ground water if one or more of the following numerical standards would be exceeded ("reserved" indicates that a standard will be promulgated for this parameter):

<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

<u>Public Health Parameters</u>	<u>Maximum Contaminant Levels</u>
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	0.1 mg/l
cis-1,2-Dichloroethylene	0.07 mg/l
Copper	1.3 mg/l
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
Picloram	0.5 mg/l
Polychlorinated biphenyls (PCBs)	0.0005 mg/l
Selenium	0.05 mg/l
Simazine	0.004 mg/l
Sodium	(Reserved)

<u>Public Health Parameters</u>	<u>Maximum Contaminant Levels</u>
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	10 mg/l

<u>Radionuclides:</u>	
Gross alpha particle activity (including radium-226 but excluding radon and uranium)	15 pCi/l
Gross beta particle activity	4 mrem/yr
Combined radium-226 and radium-228	5 pCi/l
Radon	(Reserved)
Uranium	0.030 mg/l

<u>Microbiology:</u>	
Total coliform	(Reserved)

<u>Other Parameters Affecting Use</u>	
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

003 The numerical standards listed in 002 above are intended to protect beneficial uses of ground water. If the background level of a parameter is greater than the numerical standard, this shall not in and of itself prohibit the use of the ground water.

004 If the background level of a parameter is greater than the numerical standard listed in 002 above, the background level shall be used as the numerical standard.

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

Legal Citation: Title 118, Ch. 4, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 5 - SAMPLE COLLECTION AND ANALYSIS METHODS

001 Sample collection shall be performed according to methods approved by the Department to insure the collection of a representative sample.

002 Any sample analysis method used must be approved by the U.S. Environmental Protection Agency and/or approved by the Department and provide protection to public health, safety, and the environment.

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

Legal Citation: Title 118, Ch. 5, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 6 - GROUND WATER BENEFICIAL USES

001 The beneficial uses of ground water in the State shall be protected from impairment. These include existing or potential use for drinking water, irrigation, livestock watering, industrial and commercial purposes, maintaining assigned surface water uses, and other beneficial uses.

002 Although all beneficial uses included in 001 above shall be protected, the highest and most sensitive beneficial use of ground water is drinking water. Ground water that is suitable for drinking water is usually suitable for other beneficial uses. Therefore, protecting ground water for drinking water use normally protects it for all beneficial uses.

003 The Department will protect the beneficial uses of ground water regardless of its quality.

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

Legal Citation: Title 118, Ch. 6, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 7 - GROUND WATER CLASSIFICATION

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

002 Class assignment, where possible, shall 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 shall be classified by the Department into one of the following classes:

003.01 Class GA. Ground water assigned to this class is currently being used as a public drinking water supply or is proposed to be used as a public drinking water supply. 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 will be determined by delineating a boundary around:

003.01A1. An area, based on local hydrogeologic conditions around a well or wellfield, defined by the Nebraska Department of Health and Human Services Regulation and Licensure, the Department, or the local water system involved (as approved by the Nebraska Department of Health and Human Services Regulation and Licensure), 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 assigned to this class is 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 cannot be classified as GA. Class GB shall be assigned to all ground waters in the State except those assigned to Classes GA and GC.

003.03 Class GC. Ground water assigned to this class is not being used, and has little or no potential for being used, as a public or private drinking water supply. Class GC shall be assigned on a case-by-case basis as the necessary information becomes available and shall include, but not be limited to:

003.03A Ground water with poor natural or background quality compared to the numerical standards of Chapter 4. Class GC(R), a subset of Class GC, shall 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 10, 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 Nebraska Department of Health and Human Services Regulation and Licensure shall be used in Class GA determination. As of the effective date of these regulations, Class GC has not been assigned to any ground waters in the State.

005 Ground water may be reclassified according to the procedures set forth in Chapter 8.

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

Legal Citation: Title 118, Ch. 7, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 8 - PROCEDURES FOR CHANGING A GROUND WATER CLASSIFICATION

001 Ground waters classified by these regulations may be reclassified by the Council, pursuant to the Department's Title 115 - Rules of Practice and Procedure, 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 shall 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 Department may initiate the reclassification process, or any other person may petition the Council to reclassify a portion of ground water. If a petition for reclassification comes from outside the Department, it shall 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 shall 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 shall not be 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)

Legal Citation: Title 118, Ch. 8, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 9 - REGULATION OF POTENTIAL POINT SOURCES

001 In determining regulatory requirements which may be placed on potential point sources, the Department shall 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 shall apply to all potential point sources for which the Department has regulatory authority, including but not limited to:

<u>Point Source</u>	<u>Regulated By</u>
National Pollutant Discharge Elimination Systems	Title 119
Injection Wells	Title 122
Wastewater Treatment Plants	Title 123
Septic Tanks	Title 124
Individual Waste Treatment Lagoons	Title 125
Pretreatment Facilities	Title 127
Hazardous Waste Treatment, Storage, or Disposal Facilities	Title 128
Livestock Waste Control Facilities	Title 130
Licensed Landfills	Title 132
Mineral Exploration Holes	Title 135

002 The regulatory requirements of this chapter shall not preempt more stringent restrictions required of sources and facilities covered by federal regulations within the Clean Water Act (CWA); Safe Drinking Water Act (SDWA); Resource Conservation and Recovery Act (RCRA); or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and other applicable federal statutes.

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

Legal Citation: Title 118, Ch. 9, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 10 - REMEDIAL ACTION PROVISIONS FOR POINT SOURCE GROUND WATER
POLLUTION OCCURRENCES

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 shall apply. Such events which result from activities subject to the ground water standards and classifications of Title 118, 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 shall apply.

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

Legal Citation: Title 118, Ch. 10, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 11 - PUBLIC NOTICE AND COMMENT PERIOD

001 The Department shall give public notice of the following:

001.01 A final remedial action has been proposed, in accordance with Appendix A, Step 8, or Appendix B, Step 9.

001.02 During implementation, a modification to a final remedial action has been proposed, in accordance with Appendix A, Step 9, or Appendix B, Step 10.

001.03 A hearing has been scheduled.

001.04 The Department will allow degradation of ground water quality, according to Chapter 3.

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 shall be given to the person who submitted the request or petition. Such denial shall be considered a final order by the Director and subject to appeal pursuant to Chapter 12.

003 The conditions or requirements for public notices include:

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

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

003.03 Notices shall be mailed 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 and the Nebraska Department of Health and Human Services Regulation and Licensure if a Class GA area is involved.

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 mailing list to receive notices for a particular geographic area or on a specific subject.

003.04 Public notice shall be issued by 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 shall 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 interested persons may obtain further information.

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, it shall also contain 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.

003.07D The name and address of the person requesting or petitioning for a hearing.

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.

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

Legal Citation: Title 118, Ch. 11, Nebraska Department of Environmental Quality

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Chapter 12 - GENERAL PROVISIONS

001 Public hearings are governed by the Department's Title 115 - Rules of Practice and Procedure, for permits and licenses.

002 If any clause, paragraph, subsection, or section of these regulations shall be held invalid, it shall conclusively be presumed that the Environmental Quality Council would have enacted the remainder of these regulations not directly related to such clause, paragraph, subsection, or section.

003 Any appeal from any final order or final determination of the Director shall be pursuant to Neb. Rev. Stat. § 81-1509.

004 These rules and regulations shall become effective five days after filing with the Secretary of State.

Enabling Legislation: Neb. Rev. Stat. §§ 81-1505(1)(2)(11)(16)(17); 81-1509; 84-906 et seq.; 84-914; 84-915

Legal Citation: Title 118, Ch. 12, Nebraska Department of Environmental Quality

Appendix A - GROUND WATER REMEDIAL ACTION PROTOCOL

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

Part I. IMMEDIATE ACTION

Step 1. Initial Review

An initial review will be performed to determine whether immediate action is needed, and if so, what actions are required. The amount of time spent for this review may range from a field decision requiring only minutes to a more involved office decision taking a few days. The review will be based on as many of the items addressed in Steps 6 and 7 as possible.

The determination as to whether immediate action is needed will be based upon the following two factors:

1) Existence or likelihood of an imminent and substantial threat to the public health and welfare or the environment

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)

2) Significantly increasing difficulty of cleanup if action is delayed (e.g., if action delayed, cleanup costs increase by one or two orders of magnitude).

The type and extent of immediate action to be taken will, at a minimum, satisfy the following:

1) eliminate imminence or substantiality of threat

2) result in significantly less cleanup difficulty than if action delayed.

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's Emergency Response Plan. If at a later time it becomes apparent that immediate action is not needed, proceed to Step 4.

In some cases, it may be obvious that immediate action will not be necessary due to the nature of the pollution occurrence (e.g., developed over many years, moving slowly). If no immediate action is necessary, proceed to Step 4.

Step 2. Implementation of Immediate Actions

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 will be carried out by the responsible party.

Proceed to Step 3.

Step 3. Evaluation of Immediate Actions

After immediate action has been taken, a determination will be made as to whether or not it successfully met the requirements of Steps 1 and 2.

If requirements were not met, return to Steps 1 and 2 for reassessment.

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

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

Step 5. Preliminary Assessment

A preliminary assessment will be undertaken to evaluate the possible threat of contamination to ground water. This assessment is to involve 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.

Note: In certain pollution occurrences where the ground water is not or could not be used as drinking water (RAC-3, as described in Step 8), an abbreviated site assessment (Steps 6 and 7) may be appropriate.

Enough information must be collected for the Department to determine if the occurrence fits into the RAC-3 category.

Step 6. Initial Site Assessment

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.

If ground water contamination is possible or likely, an initial site assessment will be made by the responsible party to define the extent of contamination. This may involve test holes to determine if contaminants have reached ground water or, if not, how close they are (see Attachment A). If this initial assessment reveals that there is no threat of ground water contamination, proceed to Step 11; otherwise proceed to Step 7.

Before this or any subsequent assessments are started, the responsible party should discuss their plans with the Department to make sure they understand what information must be collected. In some cases where ground water contamination is immediately evident, it is acceptable to combine Steps 6 and 7.

Note: Initial and Detailed Site Assessments will be performed by the Department in the case of chemigation accidents in accordance with Neb. Rev. Stat. § 46-1101 et seq.

Step 7. Detailed Site Assessment

A detailed site assessment will now be performed through examination of all pertinent factors (see Attachment B). For ground water or soil (potential ground water) contamination occurrences, various items considered may include:

soil characteristics - texture, permeability, thickness, chemical/physical properties of materials from the land surface to the water table

hydrogeologic characteristics - depth to ground water, direction and rate of ground water flow, permeability, transmissivity, aquifer interconnections, perched ground water, recharge area and rate

contaminant characteristics - toxicity, health risks, concentration, amount, mobility, areal extent, source characterization

site characteristics - climate information, topography, accessibility proximity to supply well and its recharge area or cone of influence, land use

background water quality and use - background levels of conventional parameters and additional contaminants of concern, existing or potential use

background soil quality or use - background levels of conventional parameters and additional contaminants of concern, existing or potential use of soil

The detailed site assessment will be presented to the Department by the responsible party. The Department may, at any time, request additional information.

Step 8. Define Preliminary Cleanup Levels and Review Proposed Remedial Actions

Most ground water in the principal aquifer (closest underlying major aquifer) is of drinkable quality and is used by nearly all Nebraskans as drinking water. Water of drinking water quality is usually suitable for all other beneficial uses. For these reasons, protecting ground water for drinking water use is most important and normally protects it for all uses. A remedial action class (RAC) is defined for pollution occurrences 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. (Note that the RAC assigned will be determined from the condition of the ground water prior to the pollution occurrence. The Department will do this based on information submitted by the responsible party in the detailed site assessment and other available information.) Below are definitions of the three RAC categories followed by some further explanation.

RAC-1. This category includes ground waters of Class GA and a portion of Class GB, a 500-foot radius (or greater, if determined necessary by the Department) around all private drinking water supply wells. In addition, RAC-1 shall be automatically assigned anytime a public or private drinking water supply well has been polluted. RAC-1 shall receive the most extensive remedial action measures.

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). RAC-3 shall receive the least extensive remedial action measures.

The RAC categories are not intended to represent a ground water classification system but rather a pollution occurrence 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 occurrences will normally receive the most extensive remedial action measures.

RAC-2 occurrences 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 occurrences 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 occurrences 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 occurrences 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 will be given a lower priority and less staff effort by the Department than RAC-1 or RAC-2 occurrences.

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 occurrence 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. In RAC-1, cleanup of readily removable contaminants (e.g., free product) will be required. Additional cleanup and/or mitigation will 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 occurrences are potentially subject to additional cleanup requirements. No further cleanup will be required for RAC-3 occurrences based on drinking water usage. In certain cases, other permits from the Department may be required (e.g., UIC, NPDES).

The Department will set a preliminary cleanup level for additional cleanup required in RAC-1 and RAC-2 occurrences. 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 occurrences. 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 the responsible party is notified of the preliminary cleanup level, they have the right to agree or propose an alternate level. If a different cleanup level is proposed, it must be based on technological and economic analyses completed by the responsible party.

The technological analysis will determine if technologies exist to clean up the ground water to the preliminary cleanup level. If technologies do exist, the various methods will be reported, including the contribution of cleanup processes which occur naturally. If cleanup to the preliminary level is not technologically possible, the responsible party should 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.

In their economic analysis, the responsible party must examine the economics of cleaning up to the preliminary level. If it is impossible to reach the preliminary cleanup level, the responsible party will 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 the foregoing analyses, the responsible party will 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 should be described.

Justification for an alternate cleanup level, a contamination maintenance program, a mitigation plan, or a combination of these will be submitted to the Department. 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 responsible party's alternate cleanup level, or some other level.

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 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 Department's final decision (including changes made as a result of a hearing), a workplan for performance of the final remedial action will be prepared by the responsible party except in chemigation accidents in accordance with Neb. Rev. Stat. § 46-1101 et seq. The workplan is subject to the Department's approval.

Proceed to Step 9.

Step 9. Implementation and Review of Remedial Actions

The remedial actions specified in the workplan are to be implemented by the responsible party. The responsible party will keep the Department apprised of their cleanup efforts, and the Department will

periodically review the effectiveness of the remedial actions. If 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, reassess the situation in Steps 7 and 8.

Any request by the responsible party to modify the required final remedial action during the implementation process 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.

If the remedial action needs have been satisfied, proceed to Step 10.

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 insure 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 insure other ground water does not become contaminated. Such ongoing actions should be continued until ground water contamination is no longer a concern.

If ground water is no longer threatened by contamination, proceed to Step 11.

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.

Note: A flow diagram depicting the steps of the protocol and major decision points is given in Figure 1.

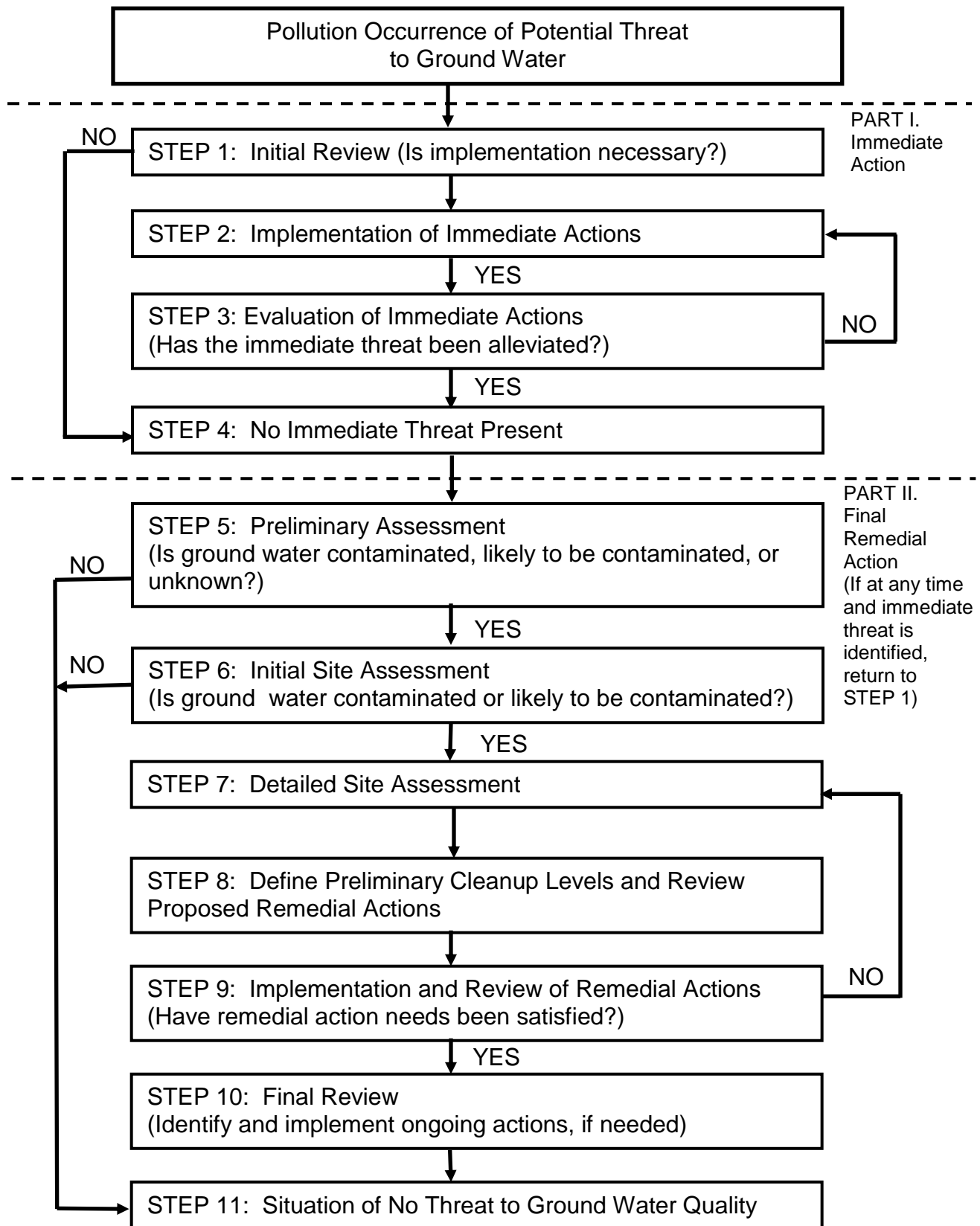


Figure 1. Flow diagram depicting protocol steps.

ATTACHMENT A

RECOMMENDED INFORMATION REQUIREMENTS FOR STEP 6 ASSESSMENT

I. Unsaturated Zone

- A. Soils (0-5 feet) (if applicable)
 - 1. Association name
 - 2. Texture of each horizon
 - 3. Permeability of each horizon
 - 4. Depth (thickness) of each horizon
 - 5. Chemical composition and characteristics
- B. Underlying sediments
 - 1. Thickness of each stratum
 - 2. Lithology of each stratum
 - 3. Permeability of each stratum
- C. Total thickness of unsaturated zone

II. Zone of Contamination in Unsaturated Zone

- A. Lateral and vertical delineation
- B. Quantity and/or concentration of contaminant(s)

III. Physical/Chemical Properties of Material Discharged

- A. Density
- B. Other pertinent physical properties
- C. Chemical composition
- D. Solubility
- E. Volatility
- F. Persistence
- G. Toxicity
- H. Degradation products (if applicable)

IV. Reporting Requirements

(Note: A report is to be prepared if it is found that no threat of groundwater contamination exists or if requested by the Department).

- A. Detailed test-hole logs
Use of Unified Soil Classification is recommended
- B. Map(s)/Cross Section(s)/Table(s)
 - 1. Large-scale site map showing pertinent features and location of test holes
 - 2. Map and cross section(s) depicting zone of contamination
 - 3. Results of field/laboratory analyses
- C. Text describing and analyzing information

ATTACHMENT B

RECOMMENDED INFORMATION REQUIREMENTS FOR STEP 7 ASSESSMENT

Note: A Detailed Site Assessment (Step 7) is performed in addition to, and possibly in conjunction with, the Initial Site Assessment (Step 6) if ground water contamination is identified, suspected, or imminent).

I. Aquifer(s)

- A. Hydrogeologic framework of principal (regional) aquifer
 - 1. Thickness
 - 2. Transmissivity
 - 3. Lithology
 - 4. Faults, fractures and other secondary permeability characteristics (if present)
 - 5. Approximate water-level elevation or depth to water
 - 6. Overlying (perched) aquifer and underlying confined aquifer (if present)
 - 7. Geologic formation name(s)
 - 8. Regional flow direction(s)
 - 9. Flow velocity
- B. Uppermost aquifer
 - 1. Configuration of the water table
 - 2. Thickness of each stratum
 - 3. Lithology of each stratum
 - 4. Permeability or transmissivity
 - 5. Flow velocity
 - 6. Local sources of recharge and/or discharge (e.g., losing and gaining streams)

II. Ground Water Contaminant Plume

- A. Lateral and vertical configuration
- B. Quantity and/or concentration of contaminant(s)
- C. Velocity of movement

III. Ground Water Use

- A. Identify all water supply wells within 2,000 feet of the contaminant plume
- B. Well inventory data
 - 1. Location (legal description)
 - 2. Use(s)
 - 3. Depth
 - 4. Owner
 - 5. Construction specifications

IV. Background Quality of Ground Water

- A. Uppermost aquifer
- B. Principal aquifer (if distinct from uppermost aquifer)
- C. Water-quality parameters

1. Dissolved solids content (or specific conductance measurement)
2. Nitrate-nitrogen
3. Primary chemical constituents of material discharged

V. Site Characteristics

- A. Climatic information
- B. Topography
- C. Accessibility
- D. Land Use
- E. Existing or abandoned wells or test holes not identified in III above within 2,000 feet of the contaminant plume

VI. Reporting Requirements

- A. Detailed test hole logs
 1. Thickness and lithology of all strata
 2. Measured water levels
 3. Land surface elevations
 4. Other pertinent information
- B. Map(s)/Cross Section(s)/Table(s)
 1. Large-scale site map showing pertinent features and location of test borings and inventoried wells and/or test holes.
 2. Map and cross section(s) depicting contaminant plume
 3. Water-table-configuration map
 4. Results of field/laboratory analyses
- C. Text describing and analyzing information

Title 118 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY

Appendix B - REMEDIAL ACTION PROTOCOL FOR PETROLEUM RELEASES

Procedures for Determining Needed Action for Point Source Pollution Occurrences From Petroleum Releases Using Risk-Based Corrective Action (RBCA)

Part I. IMMEDIATE ACTION

Step 1. Initial Review

An initial review will be performed to determine whether immediate action is needed, and if so, what actions are required. The amount of time spent for this review may range from a field decision requiring only minutes to a more involved office decision taking a few days. The review will be based on as many of the items addressed in Step 6 as possible.

The determination as to whether immediate action is needed may include consideration of at least the following two factors:

1) Existence or likelihood of an imminent and substantial threat to the public health and welfare or the environment

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)

2) Significantly increasing difficulty of cleanup if action is delayed (e.g., if action delayed, cleanup costs increase by one or two orders of magnitude).

The type and extent of immediate action to be taken will, at a minimum, satisfy the following:

1) eliminate imminence or substantiality of threat

2) result in significantly less cleanup difficulty than if action delayed.

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's Emergency Response Plan. If at a later time it becomes apparent that immediate action is not needed, proceed to Step 4.

In some cases, it may be obvious that immediate action will not be necessary due to the nature of the pollution occurrence (e.g., developed over many years, moving slowly). If no immediate action is necessary, proceed to Step 4.

Step 2. Implementation of Immediate Actions

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 will be carried out by the responsible party.

Proceed to Step 3.

Step 3. Evaluation of Immediate Actions

After immediate action has been taken, a determination will be made as to whether or not it successfully met the requirements of Steps 1 and 2.

If requirements were not met, return to Steps 1 and 2 for reassessment.

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

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

Step 5. Preliminary Assessment

A preliminary assessment will be undertaken to evaluate the possible threat of contamination to soils and ground water and threat to public health and welfare. This assessment is to involve 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

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. The responsible party will be required to perform the risk-based corrective action (RBCA) Tier 1 site assessment as described in this Step.

The purpose of the site assessment will be to gather information in order to incorporate principles of RBCA into the Department's petroleum release corrective action process. Site assessment data collected will be reported in a format specified by the Department. Site assessment data reported to the Department will include, but not be limited to, the following types of information, as specified by the Department:

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

The following potential exposure pathways are to be investigated:

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.

The Department will specify sampling and analysis requirements. 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.

The responsible party will identify land use within 500 feet and all water supply wells within 2000 feet of a source area of contamination.

Before this or any subsequent assessments are started, the responsible party should discuss their plans with the Department to make sure they understand what information must be collected.

Proceed to Step 7.

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.

Most ground water in the principal aquifer (closest underlying major aquifer) is of drinkable quality and is used by nearly all Nebraskans as drinking water. Water of drinking water quality is usually suitable for all other beneficial uses. For these reasons, protecting ground water for drinking water use is most important and normally protects it for all uses. A remedial action class (RAC) is defined for pollution occurrences 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. (Note that the RAC assigned will be determined from the condition of the ground water prior to the pollution occurrence. The Department will do this based on information submitted by the responsible party in the RBCA Tier 1 site assessment and other available information.) Below are definitions of the three RAC categories followed by some further explanation.

RAC-1. This category includes ground waters of Class GA and a portion of Class GB, a 500-foot radius (or greater, if determined necessary by the Department) around all private drinking water supply wells. In addition, RAC-1 shall be automatically assigned anytime a public or private drinking water supply well has been polluted. RAC-1 will usually receive the most extensive remedial action measures.

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). RAC-3 will usually receive the least extensive remedial action measures.

The RAC categories are not intended to represent a ground water classification system but rather a pollution occurrence 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 occurrences will normally receive the most extensive remedial action measures.

RAC-2 occurrences 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 occurrences 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 occurrences 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 occurrences 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 occurrence 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 occurrence 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. In RAC-1 and RAC-2, 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 occurrence 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 4) 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 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 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. Residential land use refers to the presence of dwellings (e.g., houses, apartments) and sensitive population centers (e.g., schools, daycare centers, hospitals, nursing homes) within 500 feet of a source area. Commercial land use will be any land use not meeting the criteria of residential 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

A RBCA Tier 2 site assessment will be performed by the responsible party for those exposure pathways where actual site contamination levels were greater than the Tier 1 RBSLs under Step 7. This investigation will be geared towards defining the extent of contamination from the release and collecting site-specific parameters to use in the Tier 2 evaluation performed under Step 9. Site assessment data collected will be reported in a format specified by the Department. For ground water or soil

contamination occurrences, site assessment data reported to the Department may include, but not be limited to, the following types of information, as specified by the Department:

- soil characteristics - texture, permeability, porosity, thickness, chemical/physical properties of materials (e.g., soil bulk density, fractional organic carbon) from the land surface to the water table
- hydrogeologic characteristics - depth to ground water, direction and rate of ground water flow, permeability, transmissivity, aquifer interconnections, perched ground water, recharge area and rate
- contaminant characteristics - toxicity, health risks, concentration, amount, mobility, areal extent, source characterization
- site characteristics - climate information, topography, accessibility, proximity to water supply well and its recharge area or cone of influence, land use
- background water quality and use - background levels of conventional parameters and additional contaminants of concern, existing or potential use
- background soil quality or use - background levels of conventional parameters and additional contaminants of concern, existing or potential use of soil

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

In evaluating the RBCA Tier 2 investigation report, the results of the site-specific physical and chemical assessment found during the investigation 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.

Upon comparing the SSTLs 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.

The Department will set a preliminary cleanup level for any additional cleanup required. The level will normally be set at the appropriate SSTL(s).

In some cases soil and/or ground water cleanup based on drinking water use may not be sufficient to maintain other beneficial uses or protect human health and welfare. For these 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 occurrences. Cleanup of a RAC-3 occurrence may be required due to concerns about enclosed space inhalation exposure pathways and/or fire and explosion. 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 the responsible party is notified of the preliminary cleanup level, they have the right to agree or propose an alternate level. If a different cleanup level is proposed, it must be based on a technological, risk, or economic analysis completed by the responsible party. The Department may also propose an alternate level.

The 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, the responsible party should 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.

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

In their economic analysis, the responsible party must examine the economics of cleaning up to the preliminary level. If it is impossible to reach the preliminary cleanup level, the responsible party will 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, the responsible party will 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.

Justification for an alternate cleanup level, a contamination maintenance program, a mitigation plan, or a combination of these will be submitted to the Department. 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 responsible party's alternate cleanup level, or some other level.

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 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 Department's final decision (including changes made as a result of a hearing), a workplan and schedule for performance of the final remedial action will be prepared by the responsible party. The workplan is subject to the Department's approval.

Proceed to Step 10.

Step 10. Implementation and Review of Remedial Actions

The remedial actions approved in the workplan are to be implemented by the responsible party. The responsible party will keep the Department apprised of their cleanup efforts, and the Department will periodically review the effectiveness of the remedial actions. If 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, reassess the situation in Steps 8 and 9.

Any request by the responsible party to modify the required final remedial action during the implementation process 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.

If the remedial action needs have been satisfied, proceed to Step 11.

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 insure 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 insure other soil and/or ground water does not become contaminated and/or public health and welfare threats do not exist. Such ongoing actions should be continued until ground water and soil contamination is no longer a concern.

If ground water is no longer threatened by contamination and a threat to public health and welfare does not exist, as determined by the Department, proceed to Step 12.

Step 12. Closure

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